INSTALLATION AND OPERATION MANUAL

DC DISTRIBUTION

Types:

DCM1000
DCM1010
DCM1600
DCM1610
DCM1800
DCM2400

IEE0201-1-007

DOCUMENT CONTROL SHEET

Further information about this instruction, or the equipment it describes, is available by contacting the Eaton Powerware National Service Hotline.

National Service Hotline

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WARNINGS AND CAUTIONS

Warning Hazardous Energy Levels

Hazardous energy levels from rectifier outputs or battery strings may be present in the equipment rack or housing where the DCM modules may be installed. These energy sources are generally capable of supplying very high short circuit currents. Take care that short circuits are not caused by accidentally dropping or touching metal objects to live terminals or surfaces.

Always terminate the DCM module end of the power feed cables before terminating the originating or power system end of the cables. This ensures that the cables are potential free during the installation activity at the DCM module.

Use insulated tools when terminating the power feed cables, the load cables and battery cables.

Warning Personal Clothing

Any persons (installation or maintenance staff) operating or working with/on the power equipment should ensure that they are not any wearing metal adornments, such as a watch or ring, that could cause short circuits and personal injury.

Updating Equipment & Service Manuals

In the interests of improving performance, reliability or servicing, **Eaton Power Quality** Pty Ltd reserves the right to update its equipment and/or service manuals without prior notice.

1. INTRODUCTION

This document covers general, technical and installation information on Eaton's range of DCM modules – D.C. distribution modules using Miniature Circuit Breakers (MCBs).

This document does not cover distribution products that are integrated into systems with rectifiers (eg the IMPS500) or special distribution modules such as high ohmic distribution modules (HODs).

2. GENERAL INFORMATION

2.1 Product Features

The main features of these units are:

- compact 4U, 19" rack mounting unit, front mount,
- hinged front cover,
- only front access is required,
- selection of MCB ratings,
- the MCBs can be replaced while the supply is connected,
- load cable entry is at the top,
- 24 way common bus,
- battery MCBs with auxiliary contacts (DCM1010, DCM1610, DCM1800 only),
- pole fillers for unused MCB positions.

Options:

- dual (A & B) feed,
- electronic MCB fail alarm, with potential free changeover-contact output,
- low voltage disconnect (LVD) module,
- 500A current shunts (for use with LVD module),
- rear cover (not suitable for units with LVD module).

2.2 Product Range

The range of distribution modules is displayed in the following table.
Variations on these for special needs are possible.

<table>
<tr><th rowspan="2"></th><th colspan="2">Load MCBs</th><th rowspan="2">A & B feed option</th><th rowspan="2">Maximum Current</th><th colspan="2">Battery MCBs</th><th rowspan="2">LVD</th><th rowspan="2">Shunt mtg</th></tr>
<tr><th>No.</th><th>Max. Size</th><th>No.</th><th>Max. Size</th></tr>
<tr><td>DCM1000</td><td>10</td><td rowspan="2">27mm (note 4)</td><td>Y</td><td rowspan="3">1200 A busbar (600 A + 600 A) (notes 1, 2 & 3)</td><td colspan="2" rowspan="3">0</td><td colspan="2" rowspan="3">(note 5 & 3)</td></tr>
<tr><td>DCM1600</td><td>16</td><td>Y</td></tr>
<tr><td>DCM2400</td><td>24</td><td>18mm</td><td>Y</td></tr>
<tr><td>DCM1010</td><td>10</td><td>27mm (note 4)</td><td>N</td><td rowspan="2">330 A (or 400A with LVD)</td><td>4</td><td rowspan="3">27mm, with aux contacts for alarms (note 4)</td><td rowspan="3">Y (note 3)</td><td rowspan="3">Y (note 3)</td></tr>
<tr><td>DCM1610
DCM1610-01</td><td>16</td><td rowspan="2">18mm</td><td>N</td><td>4</td></tr>
<tr><td>DCM1800</td><td>12</td><td>Y</td><td>As per DCM1000</td><td>6</td></tr>
</table>

Notes:

1. The design maximum current of the distribution is 1200 A (or 600 A + 600A when used with A & B feeds) because of the rating of the live and common busbars.
   The practical maximum current will be limited to this value or to the total of the MCB ratings, whichever is less.
2. For load currents greater than 600 A, the common bus must be fed from both ends, and the live feeds connected to both live bus flanges (evenly if possible).
3. The maximum load current for a d.c. distribution fitted with a LVD and/or current shunts (for current measurement purposes) may be limited to the rated value of the LVD or a current shunt.
   (ie 400 A for the LVD400, and up to 500 A for the current shunts.
4. The live-bus/battery-bus combs designed for 27mm MCBs may fit 18mm MCBs with the 'space' filled by a 9mm pole-filler.

5. An LVD contactor unit can be mounted on (the rear) of the DCM1000, DCM1600 & DCM2400. This may be restricted to a load – disconnect operation, because the MCBs in the modules do not have auxiliary contacts which are necessary for battery breaker operation.

3. GENERAL ARRANGEMENTS

3.1 DCM1000, DCM1600 & DCM2400

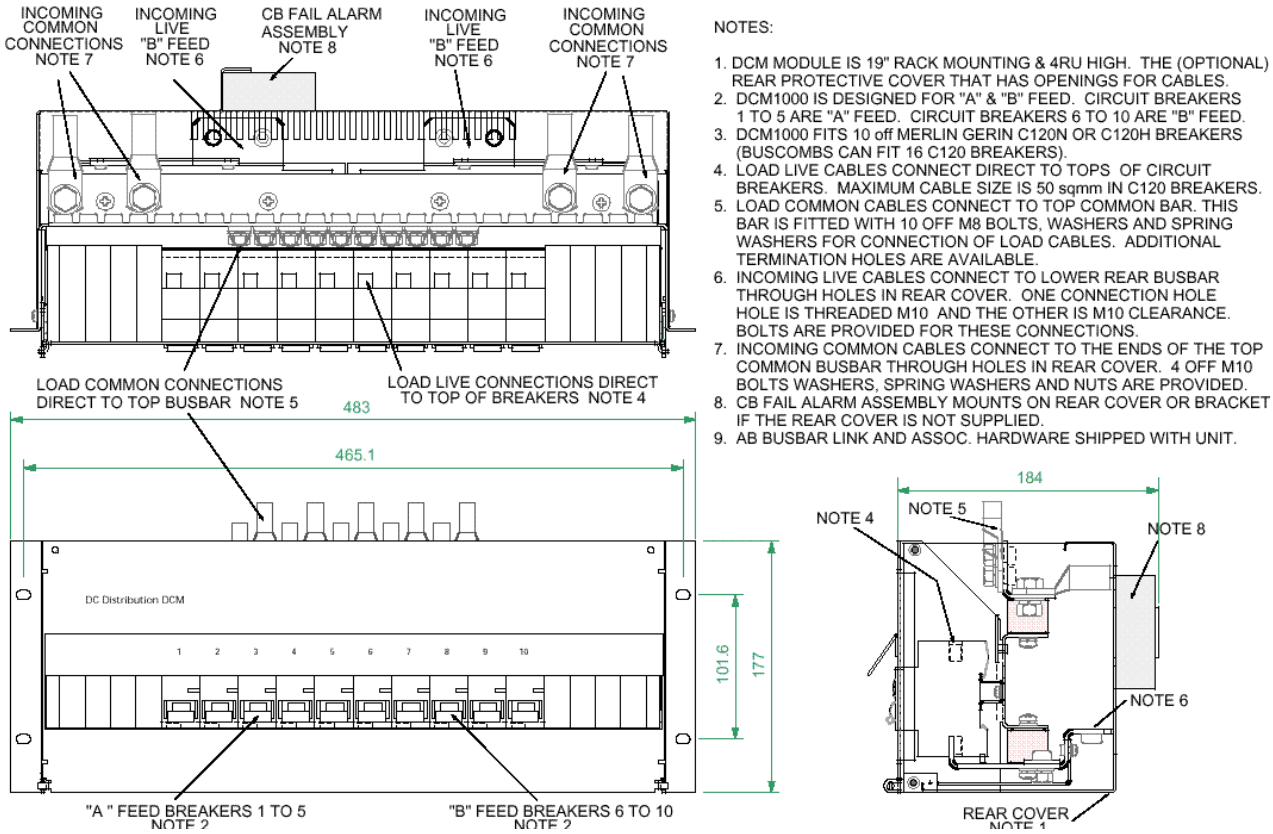

Figure 1. DCM1000, 10-way (with (optional) rear cover fitted)

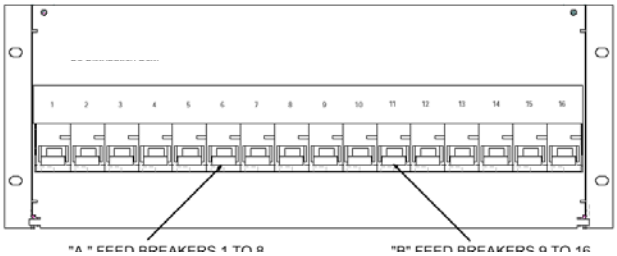

Figure 2. DCM1600, 16-way

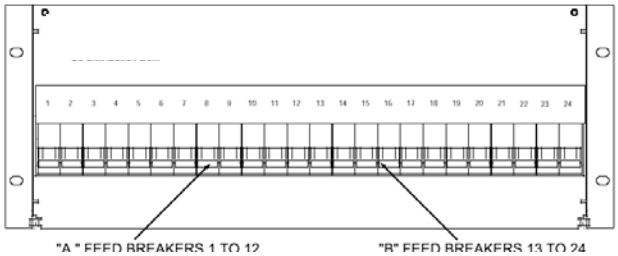

Figure 3. DCM2400, 24-way

3.2 DCM1010, DCM1610 & DCM1800 - DCMs with Battery MCBs

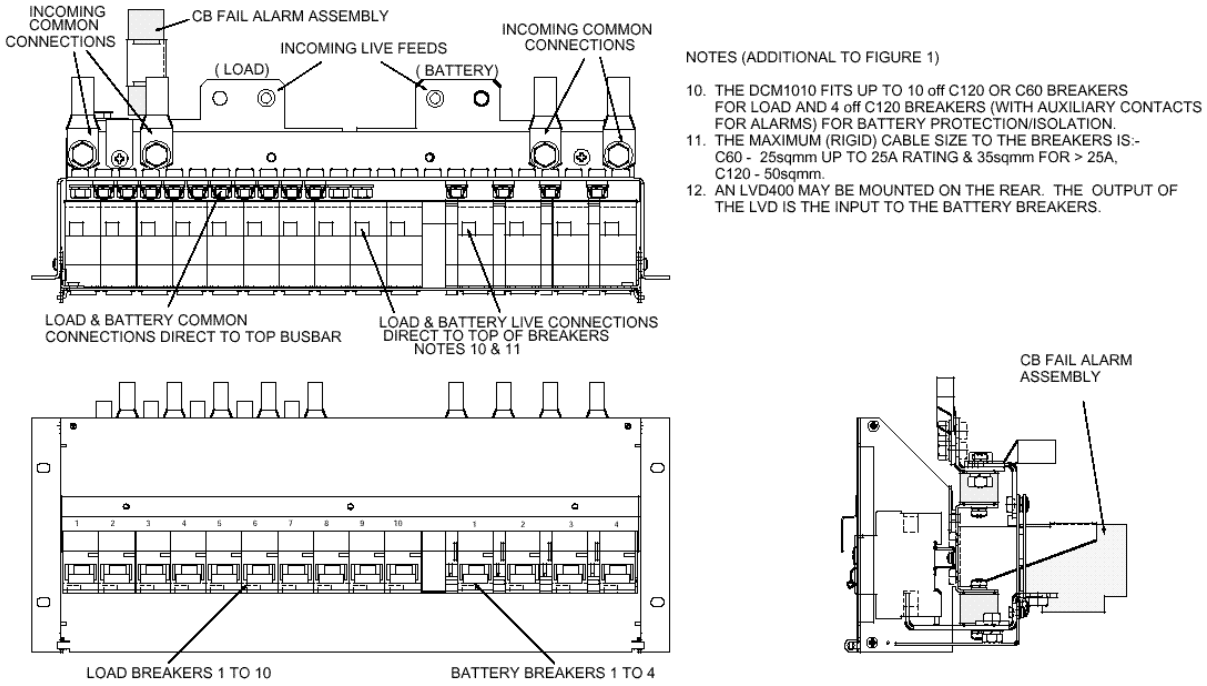

Figure 4. DCM1010, 10-way with 4 Battery MCBs

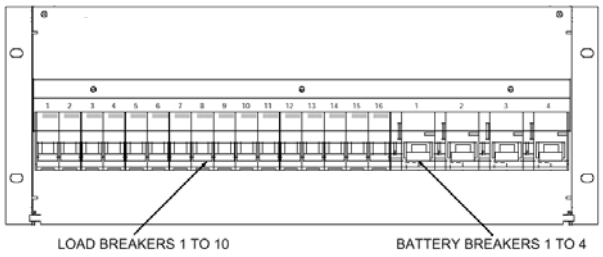

Figure 5. DCM1610, 16-way plus 4 Battery MCBs

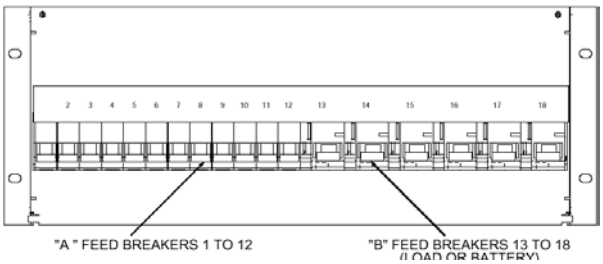

Figure 6. DCM1800, 12-way plus 6 Battery MCBs

3.3 Rear Mount LVD

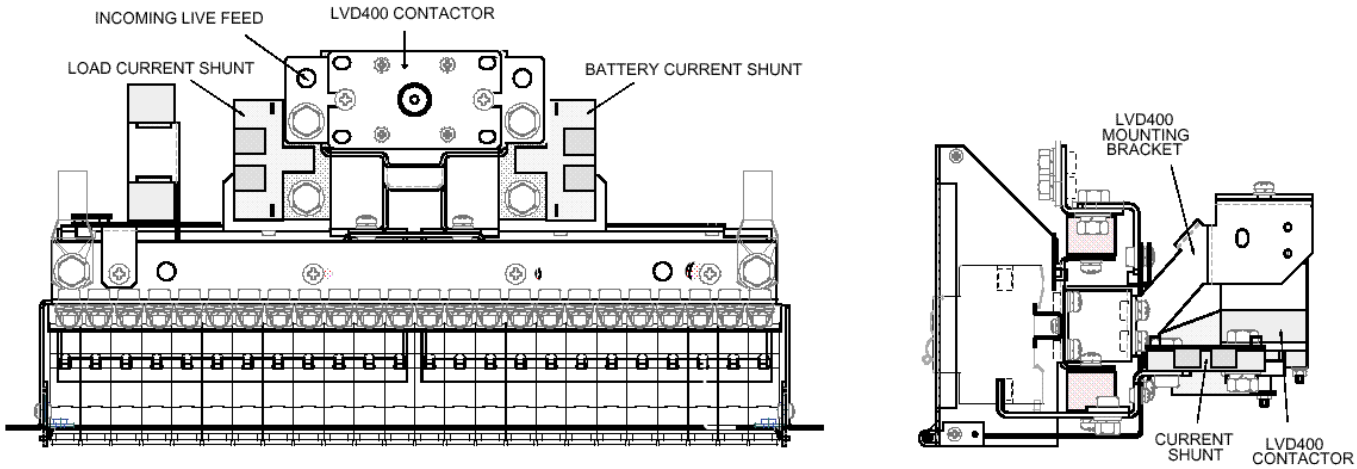

Figure 7. General Arrangement, Rear Mount LVD

4. INSTALLATION & COMMISSIONING PROCEDURES

4.1 DCM Module Installation Procedure

4.1.1 Preparation and fitting into the rack

The front cover may be removed during the installation and commissioning activities.

Setting for single or dual power feed (DCM1000, DCM1600, DCM2400, DCM1800).

(a) To configure the DCM module for dual (A&B) operation the busbar link (Live Busbar Link 19"/4U p/n 103922) that joins the left and right live busbar combs must be removed. The Fuse/CB Fail Alarm will operate from a single voltage source but, if required, the voltage feed PWA can be replaced by a dual feed PWA (p/n 106572 - PWA, AB Voltage Feed, DCM).

Setting Fuse/CB Alarm Assembly for SM30 or SM50 Operation

(b) Ensure that the four links in the Fuse/CB Fail Alarm Assembly are positioned correctly.

Unclip and open the assembly. Set the four links to the 'SM30' position if the DCM module is being used in a system with an SM20 or SM30 supervisor module, or to the 'SM50' position in any other case. Replace the assembly. (refer to section 7 below for details on the assembly).

Set-up for use with LVD

(c) Ensure that the busbar link that joins the left and right live busbar combs is removed.

Fitting into the rack

(d) Fit cage nuts into the rack at the desired location for the DCM module.

Design note: Load cable access is easier when a 1U or 2U space (covered by a blank panel) is left above the DCM module. Although this is not essential, it is advisable when it is intended to a install a large number of medium size (load) cables (ie 16mm^2 and greater).

(e) The DCM module may be mounted in the rack and secured in place with the M6 screws at this time, provided there is sufficient access to terminate the incoming live and common cables on the rear of the DCM.

Otherwise, these cables, and alarm cables/wires will need to be run and terminated first, and the DCM module manoeuvred into position to fix to the rack.

4.1.2 Terminating the incoming power feed cables

Low tensile bolts are used in the DCM module on the (copper) live and common busses.

The required torque is:	**M10**, hex head with spring & flat washers	**20 Nm** (16-22)
	M8, hex head with spring & flat washers	**12 Nm** (11-13)

The use of the common bus is optional as the rack may be fitted with its own common bus or terminal strip.

The DCM common bus has: (refer figure 1 & 4)	4 x Ø10.5mm (M10) threaded (inset nut) holes for incoming common feeds, and these are suitable for 150mm^2 cables 22 x M8 & 2 x M10 threaded (inset nut) holes for load common cables
The 2 x DCM live busses **each** have: (refer figure 1 & 4)	1 x Ø10.5mm (M10) clear hole and 1 x M10 threaded (inset nut) hole for incoming live feed, and these are suitable for 150mm^2 cables
When an LVD and shunts are fitted: (refer figure 7)	The live input is restricted to 1 only Ø10.5mm (M10) clear hole on the LVD bus.

Warning: Always terminate the DCM module end of the power feed cables before terminating the originating or power system end of the cables. This ensures that the cables are potential free during the installation activity.

Warning: Use insulated tools when terminating the power feed, load and battery cables.

(a) Terminate the common feed cables with M10 ring (crimp) lugs and bolt to the common bus using the bolts and washers supplied, **observing the torque requirements** as given above.

When more than 1 cable is used, terminate cables at both ends of the common bus.

Note: When used for greater than 600A load, the common bus **must** be fed from both ends.

(b) Terminate the live feed cables with M10 (crimp) lugs and bolt to the appropriate live bus, or to the LVD terminal, **observing the torque requirements** given above.

As with the common bus, if the DCM module is to be a single output (ie not dual fed), when more than 1 input feed cable is used, terminate cables on both of the live busses. The rating of the live busbar link in the DCM1000, DCM1600 and DCM2400 is 350 A.

Note: Each live bus has a clear hole and a threaded hole. Two cables can be mounted on the same clear hole position if required, by mounting one cable on each side of the bus. Thus 3 cables can be fitted to each live bus (when a LVD & shunt is not used).

When an LVD and current shunts are fitted, the DCM module is limited to a single clear hole on the LVD terminal bus. Two cables may be fitted to this hole. Normally, with an LVD fitted, the load will be restricted to either the LVD rating of 400 A or the shunt rating of 500 A and 2 x 150mm^2 cables will satisfy this requirement. (Additional termination points can be achieved by manufacturing a short length of bus, with sufficient holes, and bolting to the LVD terminal bus).

(c) Terminate the power system end of the common and live power feed cables, using ring (crimp) or bootlace style (crimp) lugs as is appropriate. **Observe the torque requirements** given above when using low tensile bolts.

4.1.3 Connecting the MCB Alarms

The Fuse/CB Fail Alarm Assembly is detailed in section 7 below.

To connect the DCM module alarms to the Eaton supervisory module or other monitoring device:-

(a) with an SM50 or SM60 supervisory module

Use an RJ45-RJ45 communications cable to connect an RJ45 socket (either socket) on the Fuse/CB Fail Alarm Assembly to the 'DCF/DCM' socket (XS2) on the rear of the SM50/SM60, *(refer Intergy Installation Guide, appendix B-12 & B-13 for typical wiring diagrams)*

(b) with an SM20 or SM30 supervisory module

Use an RJ45-RJ45 cable to connect an RJ45 socket (either socket) on the Fuse/CB Fail Alarm Assembly to the 'LVD & Fuse Fail' socket on the SM30/SM20 card.
(refer IMPS Guide page 4-2 for SM30 layout, & appendix A-2 for a typical wiring diagram).

(c) for other applications

The Fuse/CB Fail Alarm Assembly provides an isolated changeover contact for the 'Load MCB Fail' alarm. A make function (closed on alarm) or a break function can be selected.

To terminate the alarm wires, unclip and open the Fuse/CB Fail Alarm Assembly and terminate the wires on the 3 pin screw terminal strip, TB2.

If a 'Battery MCB Fail' alarm is also required, the alarm wires for this need to be terminated on the MCB auxiliary contacts. (see section 7).

Alternatively, the RJ45 output can be used with an RJ45 cable and an RJ45 break-out device at one end, the output can be used with a purpose built cable (with an RJ45 at one end and a screw or other terminals at the other end). In this case both of the load and battery MCB alarms can be presented together via the Fuse/CB Fail Assembly circuitry – see figure 10.

4.1.4 Connecting the LVD & Current Shunts

See Section 6.2 for further details of the LVD and current shunt connections.

4.2 DCM Module Commissioning Tests

4.2.1 Load MCB Alarm Test

The electronic MCB fail alarm circuitry will only generate an alarm when an MCB is tripped (or in the OFF position) **AND** a load is connected to the output.

(a) Connect power to the DCM. Ensure no MCB fail alarms are present. (All load MCBs connected to a load should be in the ON position, and all battery MCBs should be in the ON position).

(b) With an MCB in the OFF position, connect a load between it and the common bus. (Use a 2.7 kΩ resistor as a 'load', or an equipment load).

An alarm will be generated whilst the MCB is in the OFF position. Switch the MCB to the ON position to test that the alarm is released.

Note: The use of a 2.7kΩ resistor on a 'flying lead' will enable all load MCBs to be quickly tested, ie with all MCBS in the OFF position, touch each MCB's output briefly, in turn, and an alarm will be generated each time.

4.2.2 Battery MCB Alarm Test

The auxiliary contacts of the battery MCBs are wired in series. Each MCB should be tested individually to ensure that it is correctly wired into the alarm circuitry.

(a) Ensure no MCB fail alarms are present (all battery MCBs should be in the ON position). It is not necessary for input power to be connected to the DCM module if the system monitor is working.

(b) Turn each battery MCB OFF and ON in turn. If a test fails, check the wiring of the auxiliary contacts.

Note: Battery MCBs that will not be used to connect a battery can either be left in the ON position to prevent an alarm from being generated, or its auxiliary contact can be wired out of circuit. The first option is preferred as it means that the alarm will be not be overlooked at a future date if another battery string is added to the system.

4.2.3 Low Volt Disconnect Testing

See section 6.3 for alarm and function tests for the LVD

4.3 Connection of Battery Strings

(a) Switch the battery MCBs OFF and open the front cover to provide access for cable termination.

(b) Ensure the battery end of the battery live cables are **disconnected** from the battery terminals, and it is recommended that an **inter-cell link be removed** until all other connections are made.

(c) Terminate the battery return/common cables with M8 ring (crimp) lugs of a size appropriate for the cable size and bolt to the common bus using the M8 bolt and washers supplied, observing the torque requirements as given in 4.1.2 above.

(d) Terminate each multi-strand battery live cables with a boot-lace style (crimp) lug to ensure a better connection within the MCB tunnel terminals, fit into the tops of the MCBs and firmly tighten (screw) the tunnel terminal to secure the cable into position.

Note: Ensure that these normally large cables are bent to shape before fitting into the MCBs.

(e) Connect the battery end of the live and common/return cables to the battery terminals (and then replace the inter-cell link), **observing the correct torque requirements as recommended by the battery manufacturer**. For Eaton systems, refer to the system drawings.

(f) Close the front cover. Switch the battery MCBs ON unless additional procedures are required as part of the power system commissioning activities – like individual battery refreshing charge.

5. OPERATIONS

5.1 Connecting Load Cables

(a) Open the front cover to provide access for load cable terminations.

(b) Feed the load cables into the DCM. Ensure that the load end of the cables are correctly **terminated** (for safety purposes - eliminates potential problems with live unterminated cables).

(c) Terminate the load common cables with M8 or M10 ring (crimp) lugs of a size appropriate for the cable size and bolt to the common bus using the M8 or M10 bolts and washers supplied, **observing the torque requirements as given in 4.1.2 above**.

Note: For unused MCB positions, or MCBs that are not required to generate an alarm, the MCB Fail Detection wire (sense wire) can be completely removed, or disconnected and sleeved at the MCB end (an alarm will not be generated).

Note: Ensure that large load cables are bent to shape before fitting them into the MCBs.

(d) Terminate multi-strand live cables with bootlace style (crimp) lugs to ensure a better connection in the MCB tunnel terminal.

(e) Fit the load cable into the top of the MCBs. Slide the alarm wire (blade crimp end) behind the load cable as shown in figure 8 and firmly tighten (screw) the tunnel terminal to hold both securely.

(f) When installation is complete, close the front panel and tighten the securing screws.

(g) Turn the load MCBs ON as required.

(h) Update the DCM label strip with details of the load equipment.

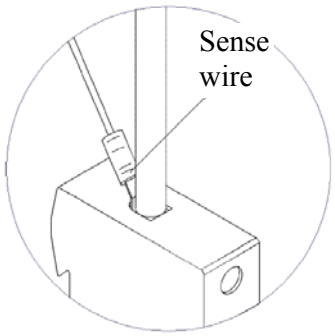

Figure 8. Load MCB

5.2 Installation and Replacement of MCBs

To remove an MCB,

- unscrew the top terminal and remove the load cable and alarm sense wire,
- unscrew the bottom terminal to completely clear the live comb. Push the MCB upwards to allow the top part to release from the DIN rail and lift the MCB outwards and upwards.

Note: the DCM modules use an ½ height DIN rail so it is **NOT** necessary to operate the MCB release mechanism on the bottom/rear of the MCB.

To install an MCB, fit the bottom terminal over the live comb, ensuring the top is sitting on the DIN rail, and tighten the terminal (a torque of between 1 & 2 Nm is sufficient).

Fit 9mm (p/n 105801) and/or 18mm (p/n 105975) pole fillers between MCBs to hold the MCBs in position (horizontally) and to provide protection (by filling the gap).

To remove a circuit breaker pole filler, push it upwards then rotate the front downwards.

6. LVD400 LOW VOLTAGE DISCONNECT UNIT

6.1 General

In some applications, the DCM module may be supplied fitted with a rear-mount Low Volts Disconnect (LVD) unit (refer figure 7). This comprises an LVD driver PCB and a 400A contactor (solenoid) which is energised to connect the battery.

The LVD unit is controlled by the power system's supervisory module (SM30/SM50 etc.). When the bus voltage falls below a preset value (stored in the SM) the SM issues an LVD disconnect signal. The LVD driver PCB detects and filters the signal before de-energising the contactor.

The contactor is driven by a low frequency switch mode controller to reduce the holding current and therefore coil heating. (If required, the battery may be manually disconnected by moving the jumper

on HDR1 to the position next to the large dot on the PCB. The battery will remain disconnected until the jumper is returned to its original position).

Further details of the operating parameters and testing procedures are detailed in Eaton documents that are normally supplied with the power system, namely:-

- Intergy SM50 User's Guide,
- Intergy Installation Guide, and
- Intergy Mini Power System Installation Guide.

The LVD operating parameters, ie 'disconnect voltage', 'reconnect voltage', 'recognition time' and 'inhibit period', are contained in the supervisory modules Configuration File, and are displayed in the Configuration File printout, which is normally supplied with a power system.

6.2 Connecting the LVD & current shunts

The LVD400 is designed for use with Intergy supervisory modules. The LVD driver PCB requires a power supply (2 wire) and an RJ45 cable for signals and alarms from/to the SM. (The second RJ45 socket on the LVD driver is used to connect to another LVD driver PCB, or to a Fuse/CB Fail Alarm Assembly when an SM20 or SM30 is used).

Current shunts type CS02 are fitted with RJ45 sockets and are directly compatible with the SM50 and SM60 which also use RJ45 connectors for the 'Current' shunt input.

Current shunts with terminals (eg 150A, model 871) are required with the SM20 and SM30 as these are fitted with screw terminals for the 'external' current shunts. Alternatively a shunt with RJ45 connectors can be used, with an RJ45 break-out adaptor to support the final wire connection.

(a) with an SM50 or SM60 Supervisory Module

Connect an RJ45-RJ45 cable between the LVD (socket XL1) and the 'LVD' socket (XS5) on the rear of the SM50/SM60, *(refer Intergy Installation Guide, appendix B-12 & B-13 for typical wiring diagrams)*.

Connect a 2 wire power feed cable from the LVD (socket XL2) and a socket on the voltage feed PCB used to power the SM50/SM60.

Connect an RJ45-RJ45 cable between socket XU1 of one shunt to socket XU2 of the other shunt. Then connect an RJ45-RJ45 cable from XU1 of this latter shunt, to the 'Current' socket (XS6) on the rear of the SM50/SM60.

(b) with an SM20 or SM30

Connect an RJ45-RJ45 cable between the Fuse/CB Fail Alarm Assembly and LVD socket XL3, then also connect an RJ45-RJ45 cable from LVD socket XL1 to the 'LVD & Fuse Fail' socket on the SM20/SM30 board. *(refer IMPS Guide page 4-2 for SM30 layout, & appendix A-2 for a typical wiring diagram)*.

A power feed is required, between the 2 wire socket (XL2) on the LVD driver and the 2 wire screw terminal on the IMPS backplane (accessible from the front of the IMPS).

The shunts must be connected to the 'Ext Batt Shunt' and 'Ext Load Shunt' inputs on the IMPS backplane.

6.3 LVD Commissioning Tests

6.3.1 LVD Alarm Test

The LVD contactor is fitted with an auxiliary contact which indicates the status of the contactor. The LVD is normally in an energised state.

The Eaton supervisory modules use this contact to generate 2 alarms:-

- 'LVD Failed' occurs when the LVD releases outside of the control of the supervisory module, ie the coil becomes open circuit or it loses power.
- 'LVD Operated' occurs when the LVD operates (de-energised) as part of its normal function. When the LVD is used for battery disconnect (as opposed to load disconnect) operation, the

alarm will only be displayed for a short time because the supervisory module also loses power.

(a) To test the 'LVD Failed' alarm,

- disconnect the RJ45 cable between the LVD and the supervisory module.

This test proves the integrity of the LVD alarm wiring because the same input is used to generate both alarms. The supervisory module determines if the alarm is 'LVD Failed' or 'LVD Operated'.

However, if the 'LVD Operated' alarm needs to be tested individually then the following procedure is recommended, but it can only be conducted if the system is not commissioned.

(b) To test the 'LVD Operated' alarm,

- temporarily connect a battery (or other source at a low voltage say 48V) to the 'incoming' side of the LVD or DCM module (to maintain power to the supervisory module after the LVD has operated). eg connect the battery via a load MCB to allow switch ON/OFF,
- disconnect (turn off) all rectifiers, so the 'battery' is the only voltage source (reference),
- using DCTools in a PC connected to the supervisory module, temporarily set the system's float voltage and LVD disconnect voltage above the 'battery' voltage,
- when the test is complete, ensure the system parameters are restored to their original values (as given in the system's Configuration File printout) and disconnect the temporary battery.

6.3.2 LVD Function Test

The LVD operating parameters are stored within the systems supervisory module, and are contained in the power system's Configuration File printout.

(a) Check the power system's Configuration File printout or DCTools to ensure that the LVD parameters have been included and the function is enabled. If not, an updated configuration file will be necessary. Contact Eaton or use DCTools to update the Configuration File.

It will not normally be necessary to test that the LVD correctly operates at the test these parameters as the supervisory module will have been tested at the factory. Testing in the field is requires either a variable-voltage power source or a full battery discharge to a test/dummy load.

(b) To test the LVD function, using a separate variable-voltage power source:-

- turn off the system's a.c. power (disconnect the rectifiers),
- disconnect the batteries and connect a variable-voltage power source to the DCM module's input (ie via a load MCB),
- vary the voltage from 54 V to just below the LVD disconnect voltage and check that the LVD has released (and an alarm is displayed on the supervisory module),
- vary the voltage back up to just above the LVD reconnect voltage and check that the LVD has re-operated (and the alarm disappears from the supervisory module),
- disconnect the variable voltage power source and reconnect the batteries.

(c) To test the LVD function, using a test load to discharge the battery (refer to the 'Intergy Mini Power System Installation Guide' page 5-33 or the 'Intergy Installation Guide' page 3-33, for a more complete explanation and procedure description):-

- connect the test/dummy load, disconnect all but one battery string,
- turn off the system's a.c. power (disconnect the rectifiers), and allow the battery to discharge into the test/dummy load,
- check that LVD trips (de-energises) at the LVD disconnect voltage,
- reconnect the a.c. power (to power the supervisory module and recharge the battery),
- check that the LVD reoperates at just above the 'reconnect voltage' as the battery charges.

Note: the Intergy guides named above describe how to change the parameters to reduce the duration of the test.

7. FUSE/CB FAIL ALARM ASSEMBLY

The fuse/CB alarm circuitry comprises 3 component assemblies: (refer figures 9 & 10)

- a **voltage feed PWA or PCB**, provides the required interface including a current limiting resistance. This PCB may be single (power) fed (p/n 105625) or dual fed (p/n 106572).
- a **Fuse/CB Fail Alarm Sensor PCB**, contains logic circuitry to determine an alarm condition for up to 24 individual fuses or MCBs used for equipment load (not for batteries). Each fuse/CB is connected to the PCB using a 'sensor' wire with 'quick connect' terminals. **Note:** an alarm is only generated if the MCB is tripped/OFF **and** a load is connected. (If there is no load connected the MCB may be ON but an alarm will not be generated).
- **a Fuse/CB Fail Alarm Assembly PWA box**, which provides the output interfaces. It accepts the alarm signal and operates a relay. The relay contacts are used in the 'RJ45' output (SK2 and SK3) and as an isolated changeover contact via screw terminals (TB3). The Assembly must be set for SM30 or SM50 operation, by setting the position of 4 links.

The circuitry is suitable for both 24 V and 48 V, and either positive or negative earth systems.

The alarms from the battery MCB auxiliary contacts can be connected to the Assembly (screw terminals TB2), which internally connects them to the RJ45 connectors for extension (via an RJ45 cable) to the supervisory module. There is no internal connection of the battery MCB input (TB2) to the changeover contact output (TB3).

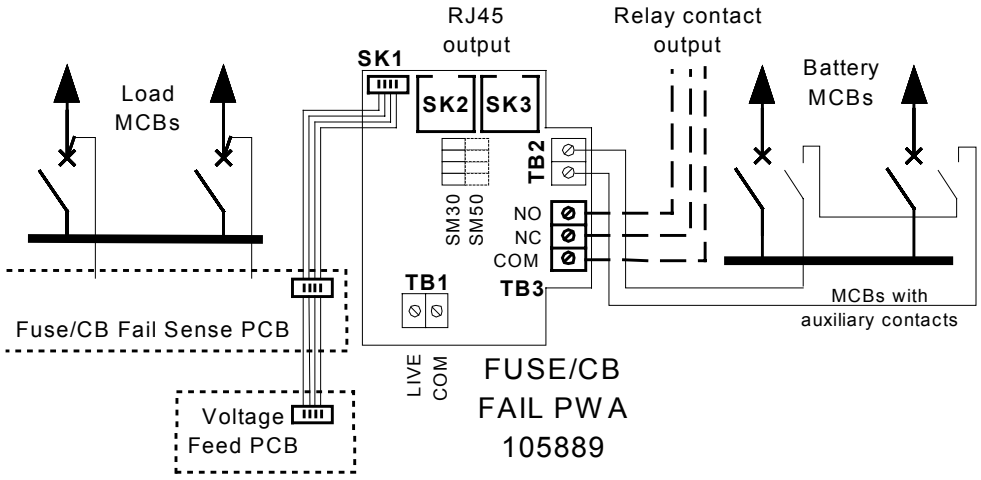

Figure 9. Fuse/CB Fail Alarm Assembly

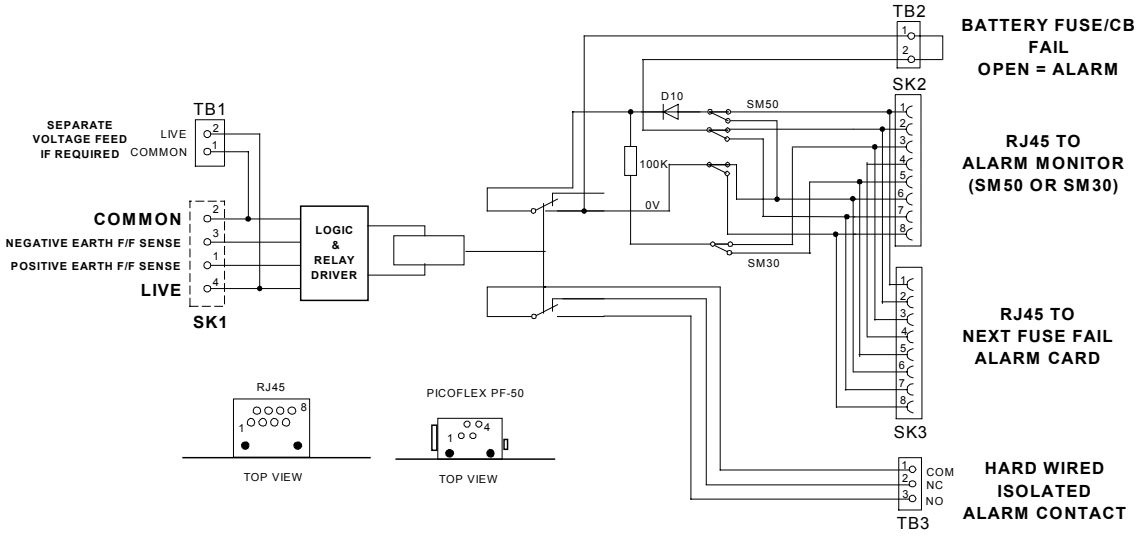

Figure 10. Fuse/CB Fail Alarm Assembly schematic – partial, for explanatory purposes

8. PRODUCT SPECIFICATIONS

	DCM 1000	DCM 1600	DCM 2400	DCM 1010	DCM 1610	DCM 1610-01	DCM 1800
Operating Voltage:	24 V or 48 V (maximum: 65 V)						
Maximum current (continuous DC)	**1200 A (600 + 600) (busbar link 350A see note)**			**330 A (busbar link), or 400 A if LVD used (& link removed)**			**As per DCM1000**
Current to Single Batt. String	(note: the 350A link rating will not be a limit in a 'single' system if the inputs are connected to both input bus flanges)			max MCB rating is 125 A @ 40°C			
Shunt current				500 A (with CS02 shunt)			
LVD400 current:				400 A			
Max. No. of Load MCBs & size	**10** 27mm or 18mm	**16** 27mm or 18mm	**24** 18mm wide	**10** 27mm or 18mm	**16** 18mm wide	**16** 18mm wide	**12** 18mm wide
Max. No. of Battery MCBs (with auxiliary contact)	**0**			**4** 27mm wide			**6** 27mm
MCB Types	27mm wide – Merlin Gerin C120 range (10A to 125A) (except for DCM1010, DCM1610 which may have NC100, 80-100A) 18mm wide – Merlin Gerin C60 range (2A to 63A) note: the MCB currents are referenced at 40°C						
Max. Operating Temp	50°C Ambient (note: MCBs are to be derated above 40°C)						
Load Cable Size (max)	**Live** – **C60** MCB, tunnel terminal, **25mm² ≤ 32A, 35mm² > 32A** (see note) – **C120** (& NC100) MCB, **50mm²** **note:** the MCB cable size is for 'rigid' cables, or the dimension of a multi-strand cable after it has been crimped using a boot-lace style crimp.						
	Common – **> 50mm²**, the bar has 22 x M8 & 2 x M10 threaded (inset nut) holes. **note**: the DCM1010 & DCM1610 have 4 x M8 threaded (inset nut) holes						
Power Feed Cable Termination	**Live Feed(s)** - There are 2 live busbars flanges to facilitate the LVD and A&B options. Each flange has 1 x ∅10.5mm clear hole, and 1 x M10 threaded (inset nut) hole. ie a total of 4 x M10 holes. The clear holes can accommodate 2 cables, mounted above and below the busbar, fixed with a single bolt. The M10 holes are suitable for 150mm². (M10 lugs can go up to 300mm²). **note:** when an LVD and shunts are used, the number of available holes for the live feed is reduced to 1 x ∅10.5mm clear hole on the LVD which can accommodate 2 cables up to 150mm² each (and input current rating > than the 500A shunt rating).						
	Common Feed - 4 x M10 threaded (inset nut) holes (suitable for 150mm²). **note**: the DCM1010 & DC1610 have 4 x ∅10.5mm clear holes						
MCB Fail Alarm Assembly (Optional):	Volt-free change-over contact rated at 1A/50V, 0.5A/100V (or opto isolated version) 'Normally Open' (NO) output ie closed on alarm via RJ45 connector, or Changeover contact via 3-way screw terminal connector. **Note:** The MCB fail alarm will only operate when a load is connected to the MCB. This means that unterminated load MCBs will not cause spurious alarms. The Fuse/CB Fail Alarm Assembly and associated Fuse Fail Sensor PCB will operate in 24V or 48V, positive or negative earth systems. **Connectors**:- SK1 is a 4-way male header Molex IDT 1.27mm pitch polarised Molex p/n 90325-0004. The required mating connector is a 4-way female, Molex p/n 90327-0304 SK2 & SK3 are FCC-68 8-way Molex. The required mating connector(s) is a standard RJ45 male plug (standard communications cable). TB1, TB2 and TB3 are 5mm pitch screw terminals.						
Dimensions	Height: 177mm (4U) Width: 480mm (to fit IEC 19" Standard racks) Depth : 146mm (total depth with no cables, or shunts fitted) 136mm (protrusion into rack) Weight: 4.7 kg (excluding MCBs)						
Packaged Dimensions	292mm x 610mm x 292mm, 5.7 kg (excluding MCBs)						
Telstra Serial/Item	274/595		274/484				

9. REFERENCES AND DEFINITIONS

References

Title	Number
DCTools	Eaton proprietary software
Intergy Mini Power System Installation Guide	Eaton, 99-00001-43D
Intergy Installation Guide	Eaton, 997-00012-06B
Intergy SM50 User's Guide	Eaton, 997-00012-09B

Definitions

C60, C120	MCBs with a 'C curve' operating characteristic.
CS02	Current Shunt model 02 – 500A with 2 x RJ45 connectors
DCM	d.c. distribution module fitted with MCBs
DCTools	Eaton proprietary software for use with Intergy supervisory modules
IMPS	Intergy Mini Power Systems
IMPS Guide	Intergy Mini Power Systems Installation Guide
MCB	Miniature Circuit Breaker
SM	Supervisory Module
SM20, SM30	Supervisory Module models SM20 and SM30, used in IMPS
SM50, SM60	Supervisory Module models SM50 and SM60 used in systems with the Intergy 2900 W and 5800 W rectifier range.
SM50 User Guide	Intergy SM50 User's Guide

END OF PAPER