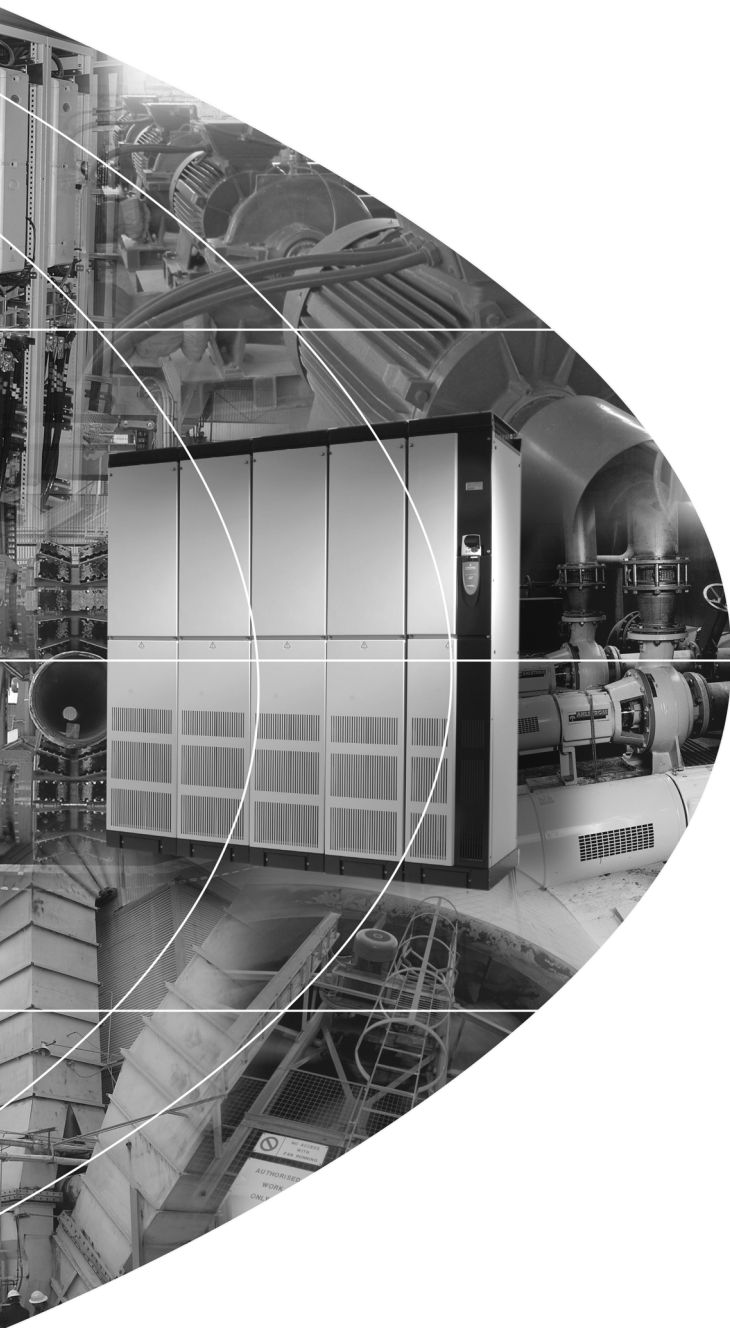




Installation Guide

Unidrive

Free Standing Extension

Part Number: 0471-0143-01
Issue: 1



www.controltechniques.com

General information

The manufacturer accepts no liability for any consequences resulting from inappropriate, negligent or incorrect installation or adjustment of the optional operating parameters of the equipment or from mismatching the variable speed drive with the motor.

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1	Introduction	2
2	Product information	2
3	Mechanical installation	3
3.1	Baying	3
3.1.1	Preparation for baying	3
3.1.2	Baying of enclosures	4
3.1.3	Other connections	5
4	Electrical installation	6
4.1	Power connections	6
4.1.1	Input	6
4.1.2	Output	6
4.2	Control connections	7
4.2.1	Rectifier status line connections	7
4.2.2	Parallel cable connections	8
4.3	Input current and fuse ratings	8
4.4	Input and output cable sizes	9
4.5	Maximum motor cable lengths	9
5	System rating label	9

1 Introduction

This document outlines how the current Unidrive SP size 9 Free Standing configuration can be extended to give higher output power by adding additional extension enclosures to the standard master and slave enclosures. Up to three extension enclosures can be added to a standard Unidrive size 9 Free Standing drive. Figure 3-1 shows a Unidrive SP size 9 Free Standing drive with one extension enclosure.

Product ratings are given in section 2 together with the configuration required to achieve these values. This additional enclosure arrangement will require non-standard modifications and certain rules must be adhered to, these are outlined in section 3 and section 4.

NOTE

The resulting arrangement will require modifications to the standard Free Standing enclosures supplied from the factory, which:

1. Must be undertaken in accordance with the technical conditions outlined in this document.
2. Must be undertaken by a Control Techniques Drive Centre with in-house systems capability.
3. Must be discussed with the customer to ensure the solution is acceptable to their site.

The standard approach documented here is an ideal solution for creating higher power systems with Free Standing drives. Any solution not documented here is not supported and not permitted.

2 Product information

Table 2-1 and Table 2-2 below list the product ratings for IP21 drive configurations within a 40°C ambient.

The same ratings apply for SP9xx5 IP23 configured drives operating in a 30°C ambient. All values are based on 1000m altitude and 3kHz switching frequencies. Model configurations consist of existing SP9XX5 (master and slave enclosures) together with an additional size 9 extension enclosure or multiple size 9 extension enclosures (effectively multiples of the existing size 9 slave enclosures).

Table 2-1 400V Drive ratings (380V to 480V ±10%)

Model Configuration	Normal Duty		Heavy Duty			Max. continuous input current (A)	SPMD equivalent
	Maximum continuous current (A)	Peak current (A)	Maximum continuous current (A)	Peak current closed loop (A)	Peak current open loop (A)		
1 x SP94X5 + 1 x SP94X5 extension	1746	1920.6	1515	2272	1954	1575	6 x SPMD14X4
1 x SP94X5 + 2 x SP94X5 extension	2328	2560.8	2020	3030	2606	2100	8 x SPMD14X4
1 x SP94X5 + 3 x SP94X5 extension	2910	3201	2525	3787	3257	2625	10 x SPMD14X4

Table 2-2 690V Drive ratings (500V to 690V ±10%)

Model Configuration	Normal Duty		Heavy Duty			Max. Continuous input current (A)	SPMD equivalent
	Maximum continuous current (A)	Peak current (A)	Maximum continuous current	Peak current closed loop (A)	Peak current open loop (A)		
1 x SP96X5 + 1 x SP96X5 extension	1067	1173	933	1399	1203	962	6 x SPMD16X4
1 x SP96X5 + 2 x SP96X5 extension	1422	1564	1244	1866	1604	1282	8 x SPMD16X4
1 x SP96X5 + 3 x SP96X5 extension	1778	1955	1555	2332	2005	1603	10 x SPMD16X4

Table 2-3 Orders codes, model numbers available

Order Code	Part Number	Description
SP9415 Extension	16200006703006	Single extension enclosure for SP9415
SP9435 Extension	16200006773006	Single extension enclosure for SP9435
SP9615 Extension	16200006708006	Single extension enclosure for SP9615
SP9635 Extension	16200006778006	Single extension enclosure for SP9635

3 Mechanical installation

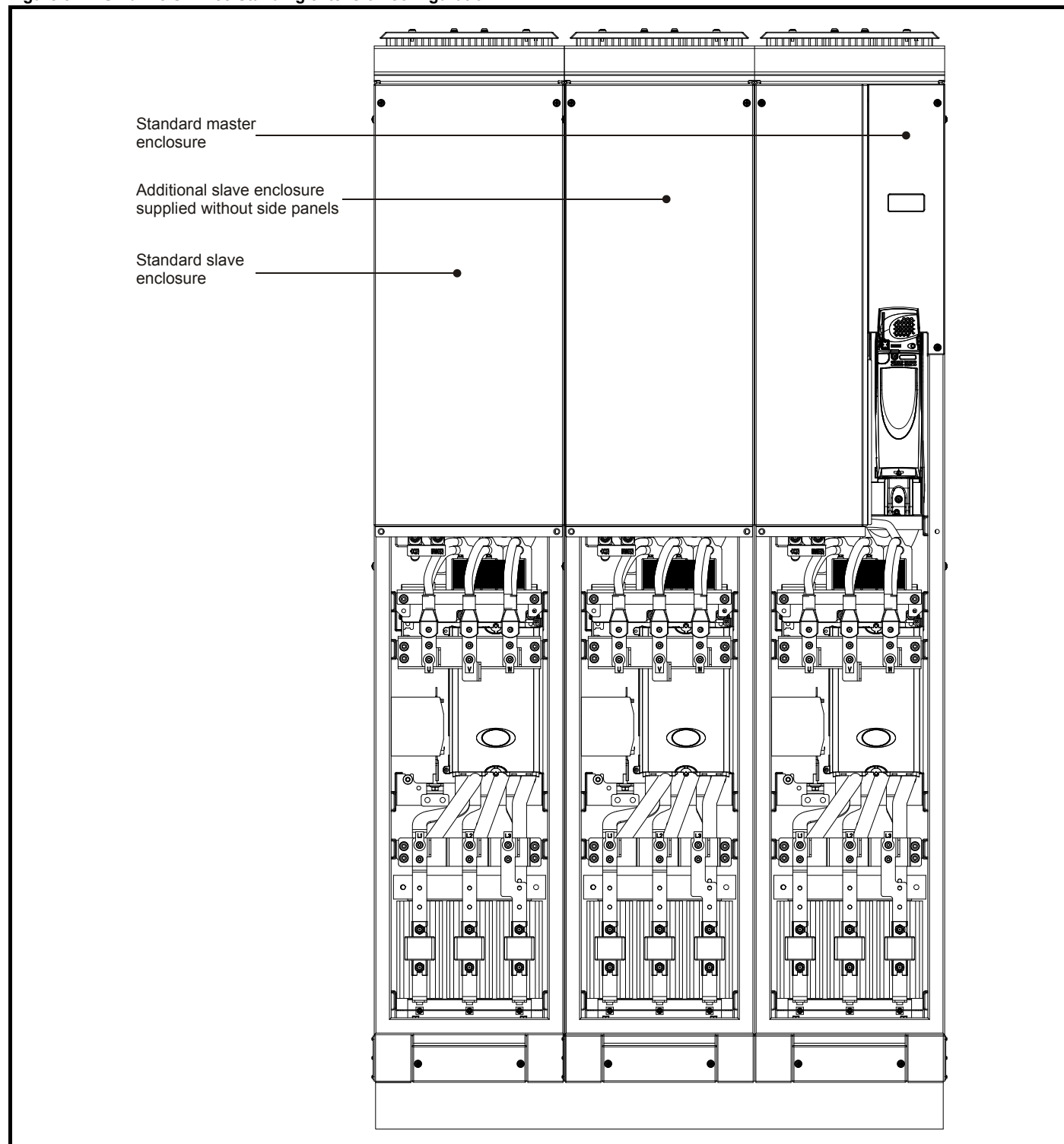
3.1 Baying

Prior to baying the enclosures, refer to the control connection procedure outlined in Figure 4.2 on page 7, as the rectifier status connections must be made prior to joining the enclosures.

3.1.1 Preparation for baying

Position the additional extension enclosure(s) (supplied with no side panels) between the master SP9 enclosure and the existing SP9 slave enclosure (supplied with one side panel), see Figure 3-1 below.

Figure 3-1 Unidrive SP Free Standing extension configuration



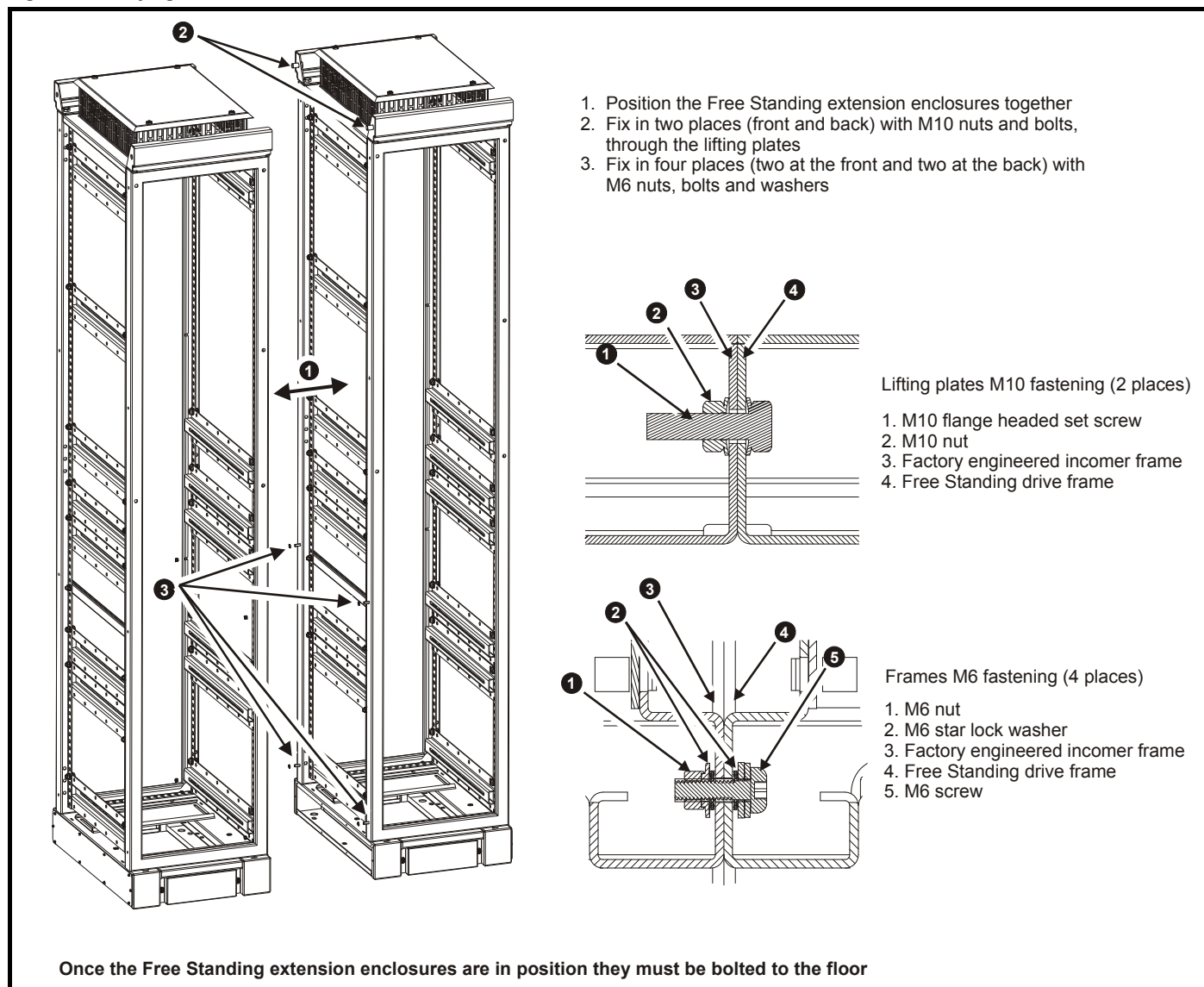
3.1.2 Baying of enclosures

1. Remove all front and side panels (where fitted). All panel screws are Pozi Pz4.
2. Panel ground cable connections will also need to be removed.

The Free Standing extension enclosures are bayed in the same way as the standard Free Standing drives. The following generic drawing demonstrates how to bay any type of Free Standing enclosure together.

On completion of the installation, ensure that all ground wires are re-connected to the outer panels with M6 nuts and star washers with a torque of 4Nm (35.4lb).

Figure 3-2 Baying of enclosures

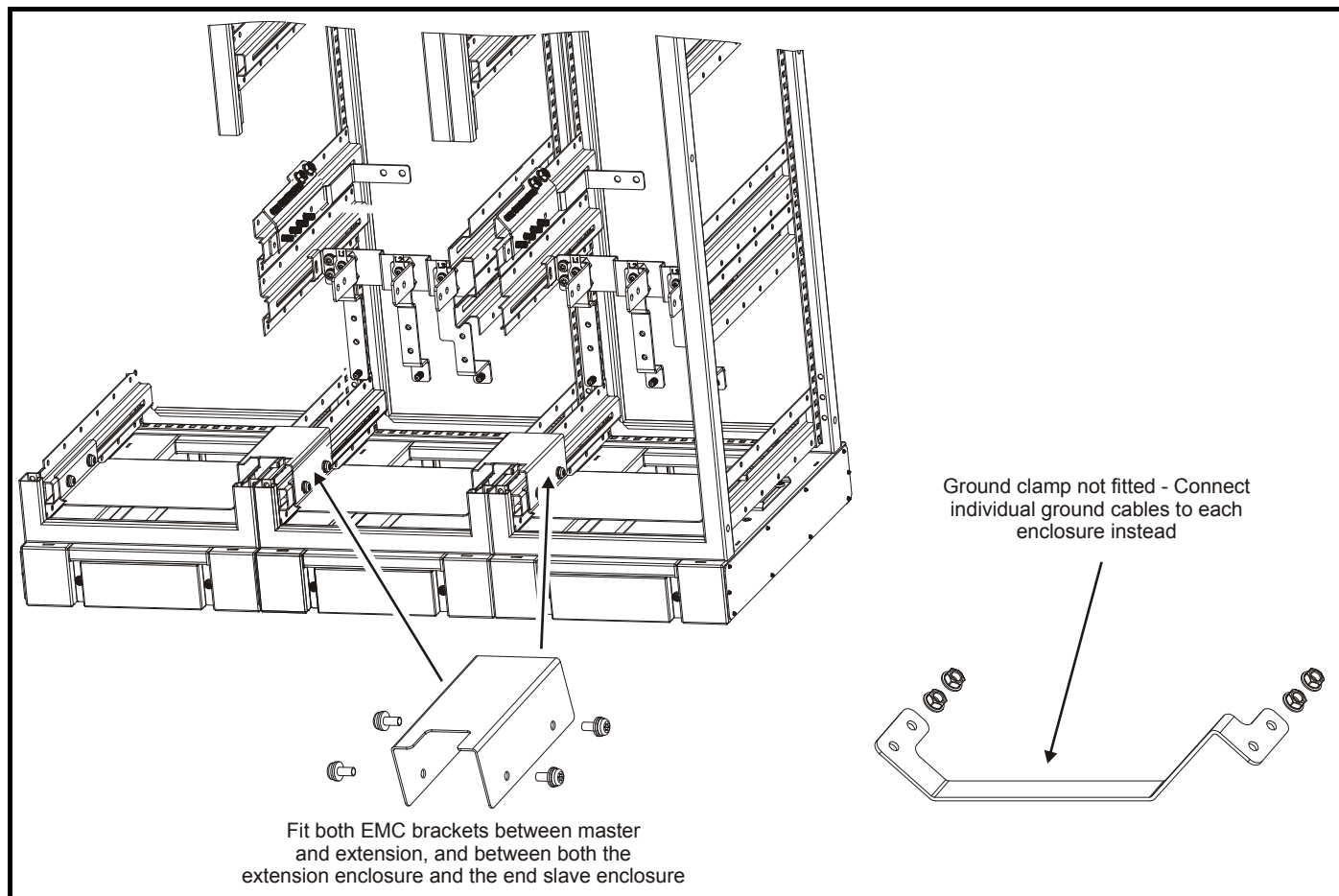


3.1.3 Other connections

The final size 9 extension system must be configured to permit mains and ground supply cables to enter each individual enclosure separately, for example mains feed for each rectifier and one ground per enclosure. Standard paralleling busbars (Control Techniques part number 6531-0222) or bespoke busbar connections internally between enclosures must not be used.

Connection of individual ground cables to each enclosure removes the requirement to fit the ground clamp/safety ground link but the EMC brackets between each enclosure must be fitted as outlined in Figure 3-3 below.

Figure 3-3 Ground clamp removed and EMC bracket location



4 Electrical installation

4.1 Power connections

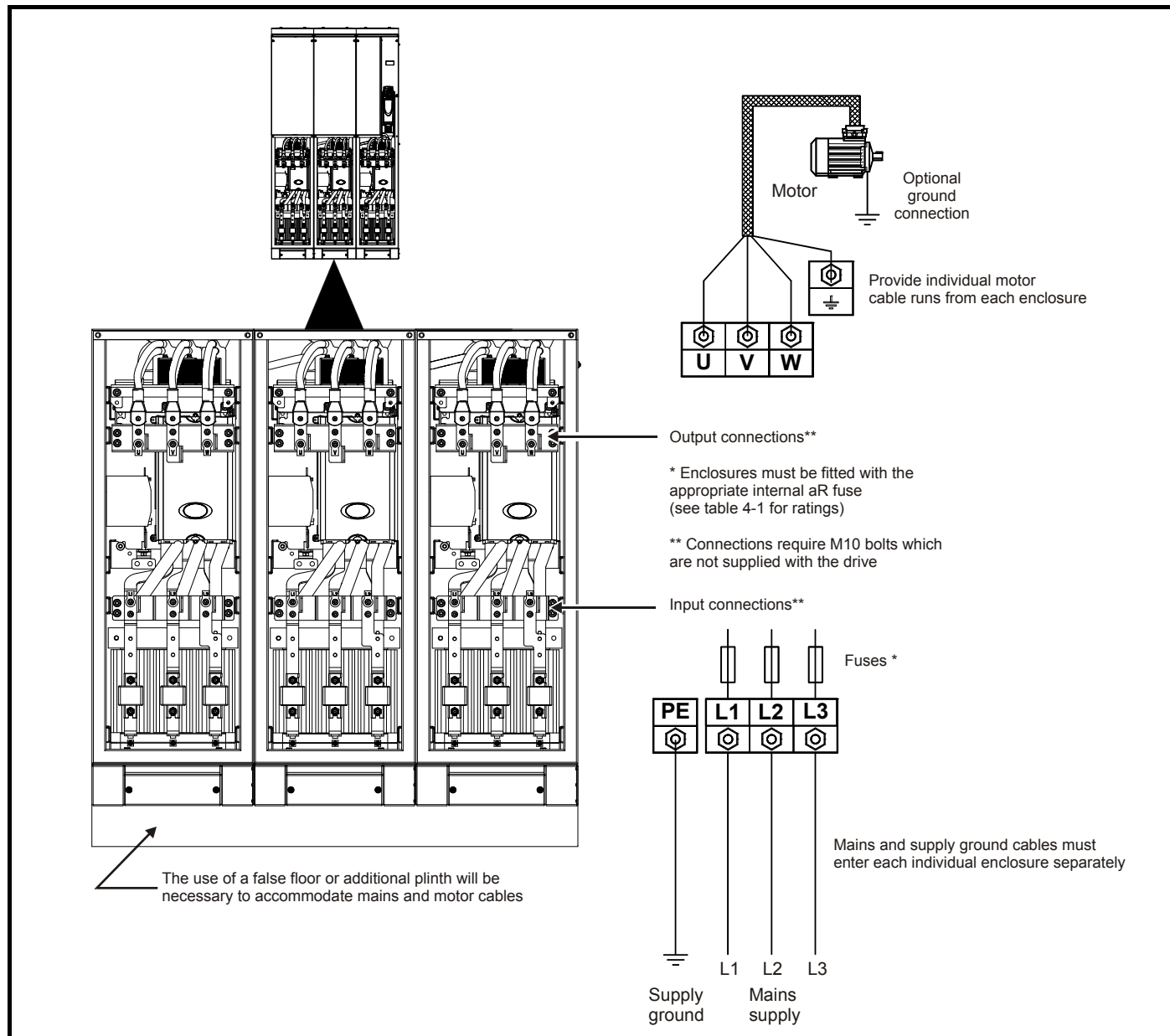
4.1.1 Input

As outlined in 3.1 above, the final size 9 extension system must be configured to permit mains and ground supply cables to enter each individual enclosure separately, individual cable feeds to each enclosure may be taken from an external mains busbar.

4.1.2 Output

Each size 9 extension enclosure must have individual motor cable runs in keeping with the existing size 9 extension output requirements, the minimum 15 metre motor cable length must also be maintained. All motor cables must be the same length.

Figure 4-1 Unidrive SP size 9 extension power connections



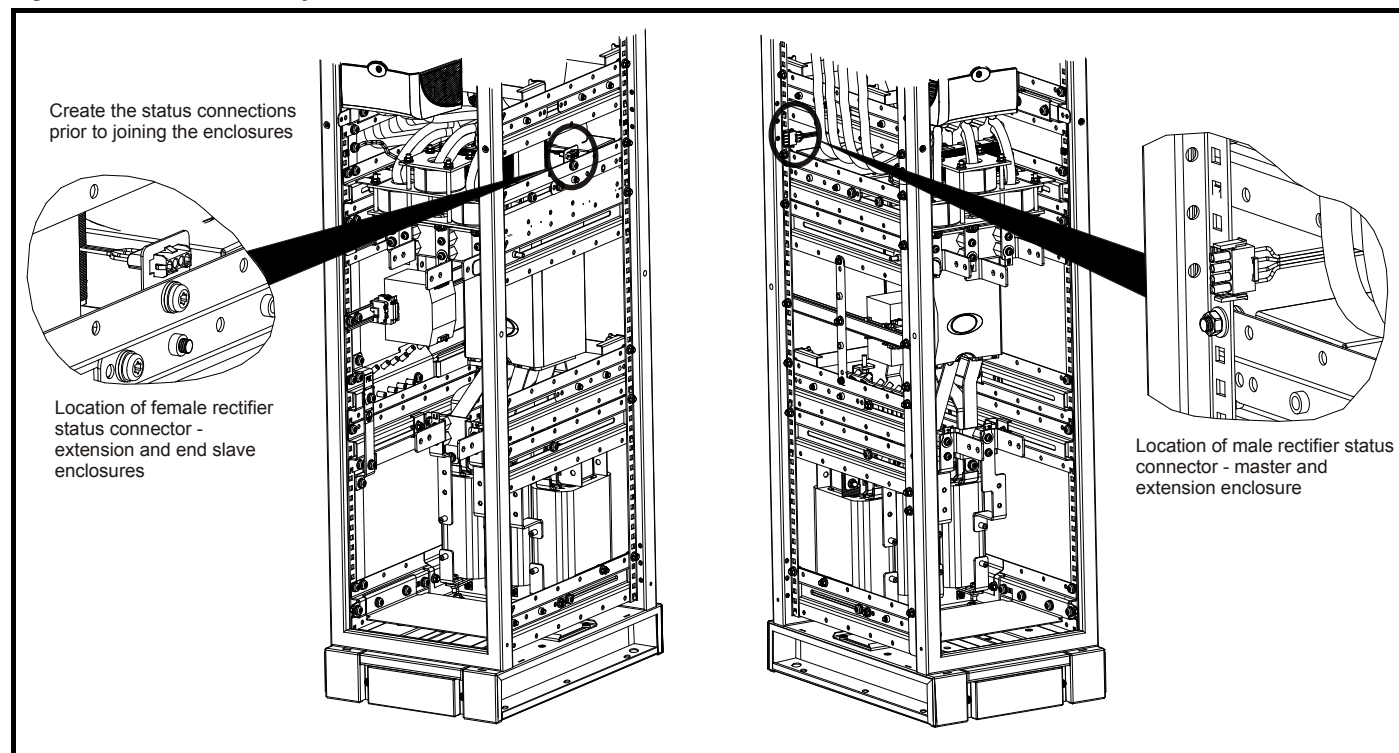
4.2 Control connections

4.2.1 Rectifier status line connections

Two status lines (status 1 and status 2 together with respective 0V connections) are fed between each of the SPMC rectifiers within each of the enclosures; the final SPMC in the chain is located within the master enclosure. The status output lines from this final SPMC are fed directly into the status inputs of the master SPMD. The master SPMD monitors the status lines and on detection of a trip disables the system.

Figure 4-2 outlines how the status lines should be connected between enclosures. Connect the male 4-way connector (master and extension enclosure) to the female connector (extension enclosure and end slave enclosure).

Figure 4-2 Location of 4 way rectifier status connectors

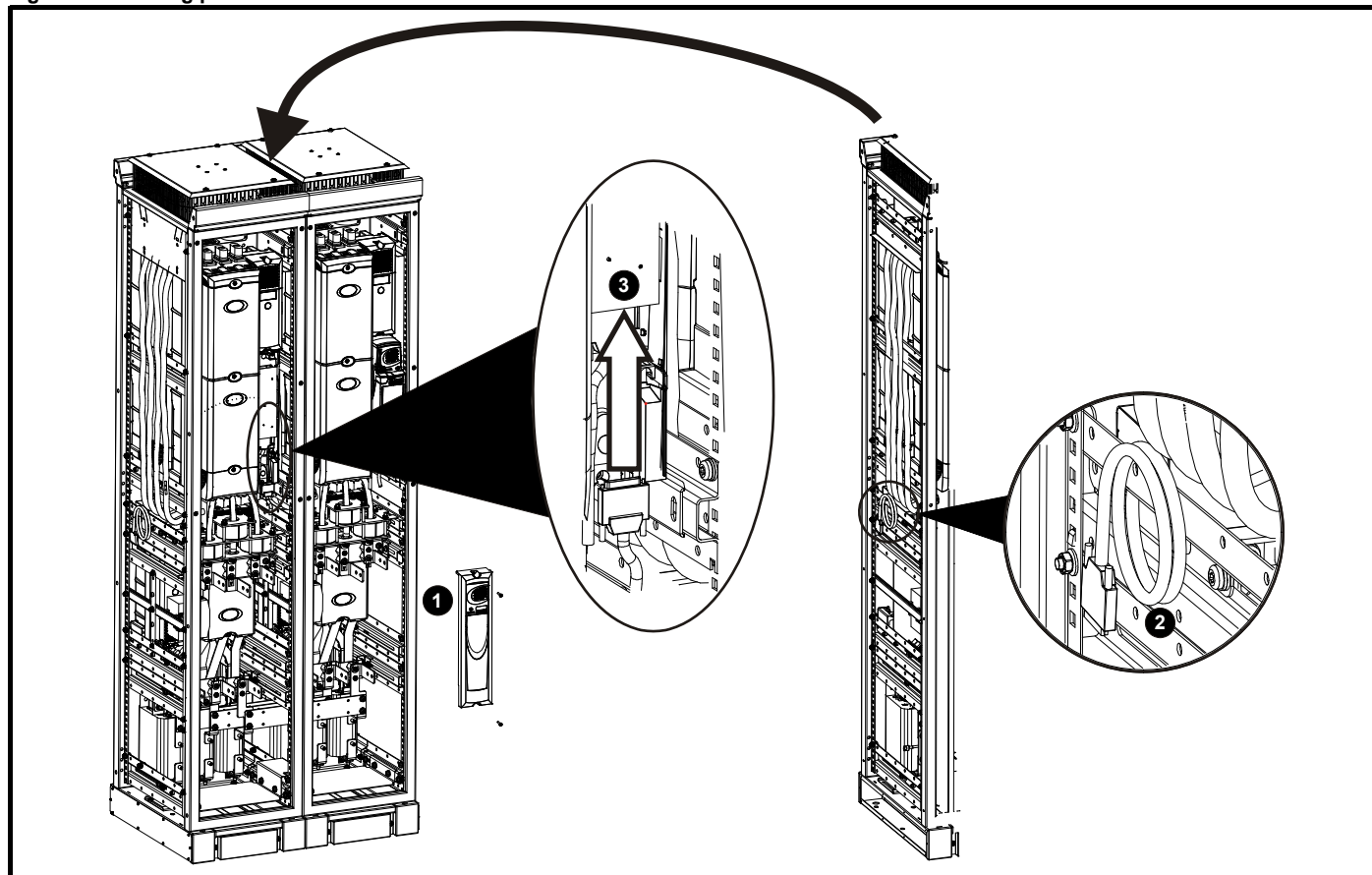


4.2.2 Parallel cable connections

With reference to Figure 4-3 below:-

1. Remove the SM-Control Slave interface cover from the extension and end slave enclosures.
2. Take the parallel cable from the left hand side of the master enclosure.
3. Attach it to the front SPMD module within the extension enclosure.
4. Repeat the process by connecting the parallel cables between any additional extension enclosures and the final end slave enclosure. (The end slave enclosure is not shown here).

Figure 4-3 Fitting parallel cable from master to extension enclosure and from extension to end slave enclosures



Refit front and side panels remembering to reconnect all panel ground cable connections first.

4.3 Input current and fuse ratings

Table 4-1 Input currents and primary/internal fuse ratings

Model	Typical input current	Maximum input current	Maximum overload input current	Semiconductor fuse in series with HRC fuse	
				HRC IEC class gG UL class J	Semiconductor IEC class aR
	A	A	A	A	A
SP94X5 Extension	525	531	684	800	800
SP96X5 Extension	321	324	421	600	800

Table 4-2 SP9 extension fuses

Fuse IC aR	Part number
800A	4300-0800

4.4 Input and output cable sizes

Table 4-3 Cable sizes per Unidrive SP extension enclosure

Model	Input Cables				Output Cables				UL i/p and o/p cables
	Biggest IEC		Smallest IEC		Biggest IEC		Smallest IEC		UL wire gauge (kcmil / AWG)
	Cable gauge (mm²)	Installation category	Cable gauge (mm²)	Installation category	Cable gauge (mm²)	Installation category	Cable gauge (mm²)	Installation category	
SP94X5 Extension	2 x 240	C	2 x 150	G	3 x 185	C	2 x 185	G	3 x 300 kcmil
SP96X5 Extension	1 x 240	C	1 x 150	G	2 x 120	C	1 x 150	G	2 x 4/0 AWG

Installation categories (IEC 60364-5-52:2001)

C = Multicore cable in free air

G = Separate cables separated vertically in free air

The recommended cable sizes above are only a guide. Refer to local wiring regulations for the correct size of cables.

4.5 Maximum motor cable lengths

Table 4-4 Maximum motor cable lengths (400V and 690V)

Model	400V and 690V nominal AC supply voltage		
	Maximum permissible motor cable length for the following frequencies		
	3kHz	4kHz	6kHz
SP94X5 Extension	500m	370m	250m
SP96X5 Extension	(1640ft)	(1214ft)	(820ft)

5 System rating label

A system rating label must be applied to the final size 9 extension system. The system label must contain the following information as an absolute minimum:

1. Electrical data - To include input supply voltage, phases, frequency and current.
2. A unique system serial number.
3. The name and address of the Drive Centre assembling the size 9 extension system.



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