590+ Series DC Digital Drive

Frame 6

Addendum

HA466833U001 Issue 2

Compatible with Version 7.x Software

WARRANTY

Parker SSD Drives warrants the goods against defects in design, materials and workmanship for the period of 12 months from the date of delivery on the terms detailed in Parker SSD Drives Standard Conditions of Sale IA500504.

Parker SSD Drives reserves the right to change the content and product specification without notice.

Safety Information

Requirements

IMPORTANT: Please read this information BEFORE installing the equipment.

Intended Users

This manual is to be made available to all persons who are required to install, configure or service equipment described herein, or any other associated operation.

The information given is intended to highlight safety issues, EMC considerations, and to enable the user to obtain maximum benefit from the equipment.

Complete the following table for future reference detailing how the unit is to be installed and used.

INSTALLATION DETAILS		
Serial Number *(see product label)*		
Where installed *(for your own information)*		
Unit used as a: *(refer to Certification for the Inverter)*	❑ Component	❑ Relevant Apparatus
Unit fitted:	❑ Wall-mounted	❑ Enclosure

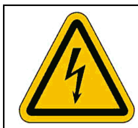
Application Area

The equipment described is intended for industrial motor speed control utilising AC induction or AC synchronous machines.

Personnel

Installation, operation and maintenance of the equipment should be carried out by qualified personnel. A qualified person is someone who is technically competent and familiar with all safety information and established safety practices; with the installation process, operation and maintenance of this equipment; and with all the hazards involved.

Product Warnings

	**Caution** Risk of electric shock		**Caution** Refer to documentation		**Earth/Ground** Protective Conductor Terminal

Safety Information

Hazards

DANGER! - Ignoring the following may result in injury

1. This equipment can endanger life by exposure to rotating machinery and high voltages.
2. The equipment must be permanently earthed due to the high earth leakage current, and the drive motor must be connected to an appropriate safety earth.
3. Ensure all incoming supplies are isolated before working on the equipment. Be aware that there may be more than one supply connection to the drive.
4. There may still be dangerous voltages present at power terminals (motor output, supply input phases, DC bus and the brake, where fitted) when the motor is at standstill or is stopped.
5. For measurements use only a meter to IEC 61010 (CAT III or higher). Always begin using the highest range. CAT I and CAT II meters must not be used on this product.
6. Allow at least 5 minutes for the drive's capacitors to discharge to safe voltage levels (<50V). Use the specified meter capable of measuring up to 1000V dc & ac rms to confirm that less than 50V is present between all power terminals and earth.
7. Unless otherwise stated, this product must NOT be dismantled. In the event of a fault the drive must be returned. Refer to "Routine Maintenance and Repair".

WARNING! - Ignoring the following may result in injury or damage to equipment

SAFETY

Where there is conflict between EMC and Safety requirements, personnel safety shall always take precedence.

- Never perform high voltage resistance checks on the wiring without first disconnecting the drive from the circuit being tested.
- Whilst ensuring ventilation is sufficient, provide guarding and /or additional safety systems to prevent injury or damage to equipment.
- When replacing a drive in an application and before returning to use, it is essential that all user defined parameters for the product's operation are correctly installed.
- All control and signal terminals are SELV, i.e. protected by double insulation. Ensure all external wiring is rated for the highest system voltage.
- Thermal sensors contained within the motor must have at least basic insulation.
- All exposed metalwork in the Inverter is protected by basic insulation and bonded to a safety earth.
- RCDs are not recommended for use with this product but, where their use is mandatory, only Type B RCDs should be used.

EMC

- In a domestic environment this product may cause radio interference in which case supplementary mitigation measures may be required.
- This equipment contains electrostatic discharge (ESD) sensitive parts. Observe static control precautions when handling, installing and servicing this product.
- This is a product of the restricted sales distribution class according to IEC 61800-3. It is designated as "professional equipment" as defined in EN61000-3-2. Permission of the supply authority shall be obtained before connection to the low voltage supply.

CAUTION!

APPLICATION RISK

- The specifications, processes and circuitry described herein are for guidance only and may need to be adapted to the user's specific application. We can not guarantee the suitability of the equipment described in this Manual for individual applications.

RISK ASSESSMENT

Under fault conditions, power loss or unintended operating conditions, the drive may not operate as intended.
In particular:

- Stored energy might not discharge to safe levels as quickly as suggested, and can still be present even though the drive appears to be switched off
- The motor's direction of rotation might not be controlled
- The motor speed might not be controlled
- The motor might be energised

A drive is a component within a drive system that may influence its operation or effects under a fault condition.
Consideration must be given to:

- Stored energy
- Supply disconnects
- Sequencing logic
- Unintended operation

Contents

590+ FRAME 6

IMPORTANT: Read Chapter 12: "Certification for the Converter" in the main Product Manual before installing this unit.

Read this Addendum in conjunction with the 590+ Product Manual HA466461U003, referring to instructions and examples supplied for the Frame H.

Below is a quick guide showing where information can be found:

Included in this Addendum:

- Assembly
- Mechanical Installation
- Electrical Installation *short explanation*
- Repair
- Trip LEDS
- Technical Specifications
- Standard Equipment
- Product Code
- Certificates

Refer to the Product Manual (Frame H) for:

- Electrical Installation *full explanation*
- Operation
- The Operator Station
- Programming
- Trips and Fault Finding
- Routine Maintenance
- Control Loops
- Parameter Specifications
- Optional Equipment
- Serial Communications
- The Default Application

2

Introduction

Output Currents (armature): Frame 6	
1250A 1600A 1950A	

All units are available as a:

590+ : 4Q 3-phase, fully controlled, anti-parallel thyristor bridge configuration
591+ : 2Q 3-phase, fully controlled thyristor bridge configuration

The 590+ Frame 6 is a high power DC drive and is supplied as a kit of parts ready for mounting onto the back panel of an enclosure. The drive can be arranged to have the AC input terminals either at the top or the bottom of the drive.

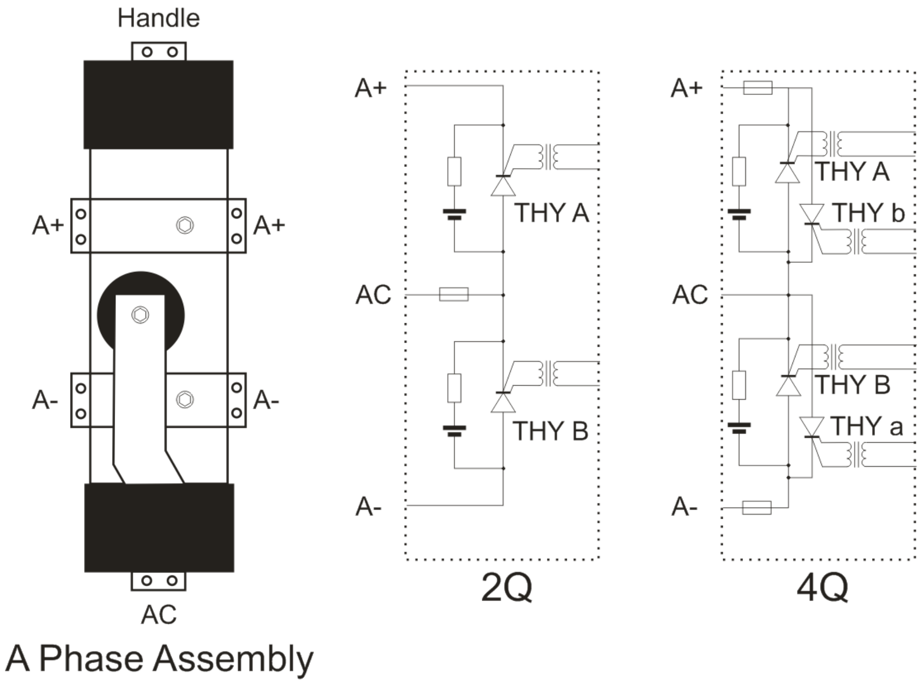
Note: *The phase assemblies must always be mounted with the fans at the bottom, however, the AC Supply Terminals can be moved to the top of the drive.* *Refer to page 5.*

A kit contains three phase assemblies (each having the same rating), a control panel assembly, and fishplates. Fishplates are used to inter-connect the DC outputs of the three phase assemblies to produce a 6-pulse stack.

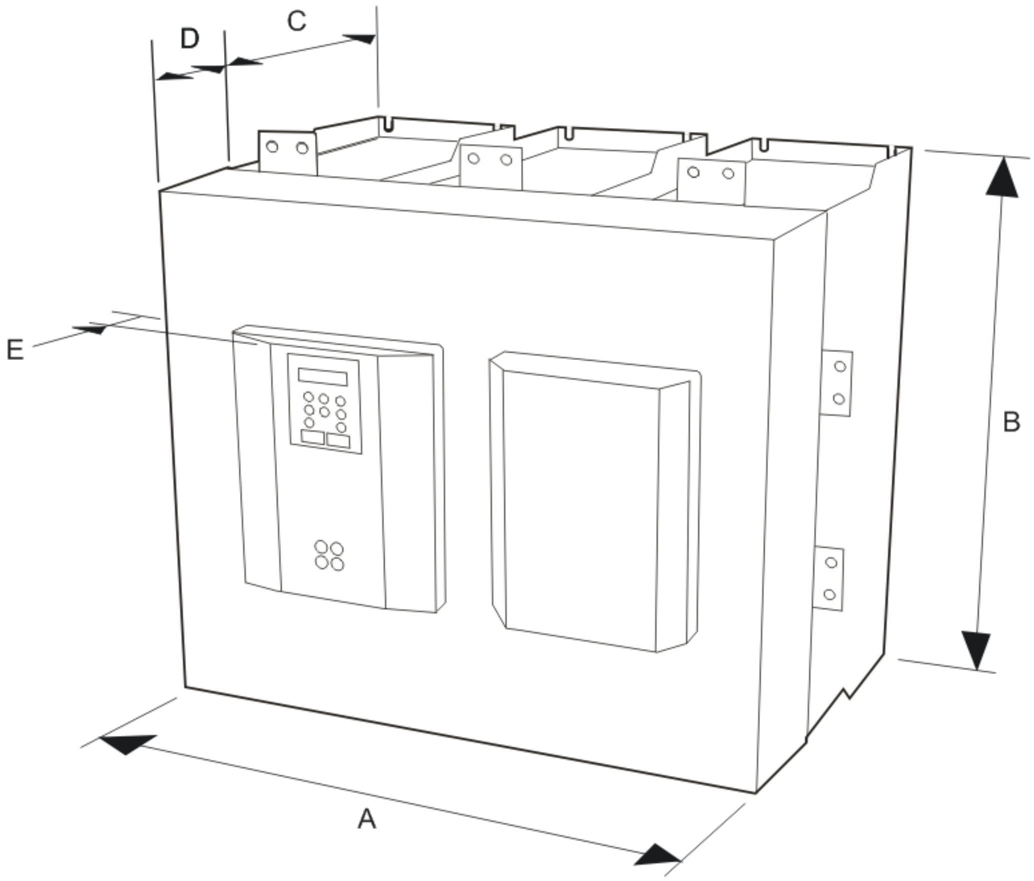
The control panel assembly mounts onto the front of the phase assemblies. The signals to-and-from the control panel assembly provide the operation of the drive.

Phase assemblies are available in three different ratings, at two different voltages, and in a two thyristor (2Q, non-regenerative) or four thyristor (4Q, regenerative) configuration.

When constructed, the drive is physically the same size for all ratings or configuration.



Dimensions



A	B	C	D	E
686 (27.00) *Refer to page 6 for terminal and fishplate sizes*	715 (28.15)	378 (14.88)	62 (2.44)	57 (2.24)
Dimensions are in millimetres (inches)				
Weights:				
Control Panel Assembly		11.25kg (25 lbs)		
Regen Phase Assembly (4Q)		33kg (73 lbs) each		
Non-Regen Phase Assembly (2Q)		28kg (62 lbs) each		

Cubicle Details

The drive must be mounted inside a cubicle that complies with the European safety standards VDE 0160 (1994)/EN50178 (1998) - it must require a tool for opening.

Cooling

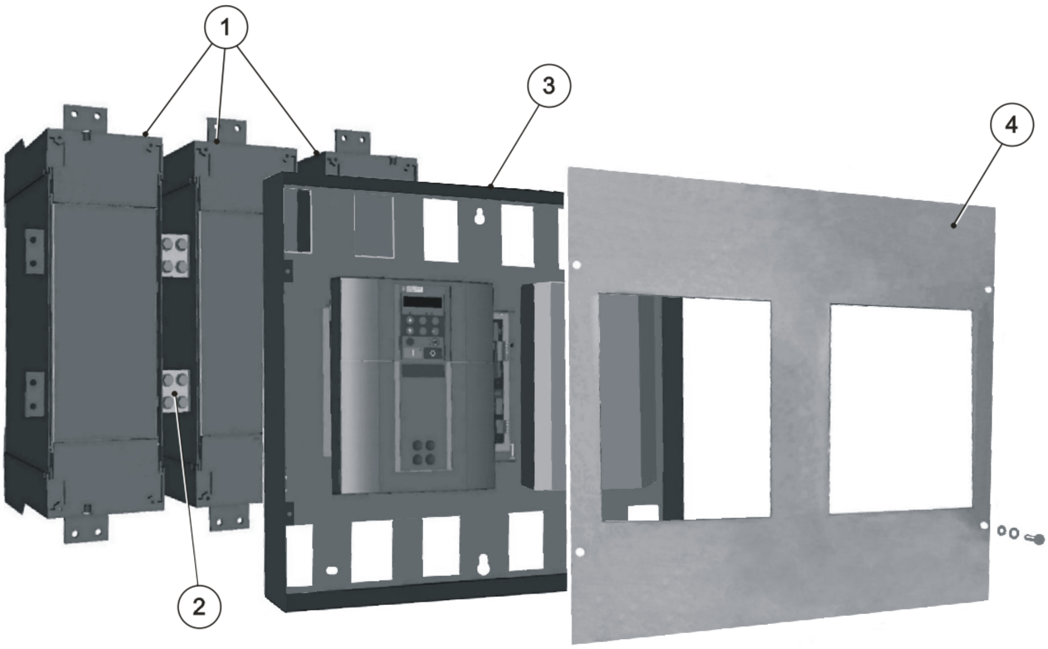
The assembled drive produces power (heat) losses of approximately 3 times the rated power output current. For example, a 2000A output current will produce a power loss of 6000W.

It is necessary to remove this heat by fitting fans in the roof of the enclosure. A suitable fan assembly is available from Parker SSD Drives, part number LA466038. The assembly contains two fans that can be connnected in parallel or series to achieve 115Vac or 230Vac operation.

Fan Rating : 115V ac 50Hz, 1.67A, 177W, 2750 rpm, motor run capacitor 18µF.

Assembling the Drive

Caution
Use proper lifting techniques when lifting and moving the unit.



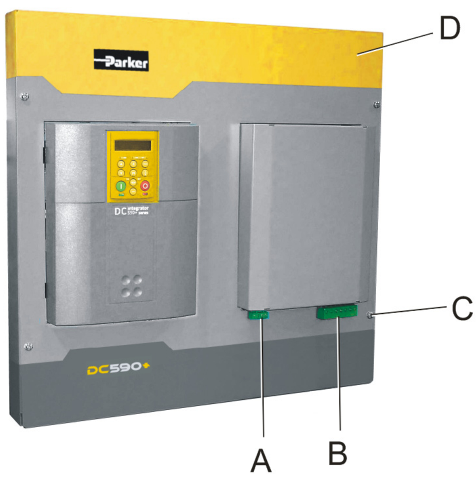
1	Phase assemblies - L1, L2, L3	**3**	Control Panel Assembly
2	Fishplate	**4**	Front Cover

The drive is assembled in the following order:

1. Mount the phase assemblies onto the backplate
2. Inter-connect the phase assemblies using the fishplates
3. Secure the control panel assembly onto the phase assemblies
4. Connect all signal cables and ribbons
5. Fit the front cover
6. Connect the plugs for the control wiring, auxiliary supply and field connections

To prepare for installation:

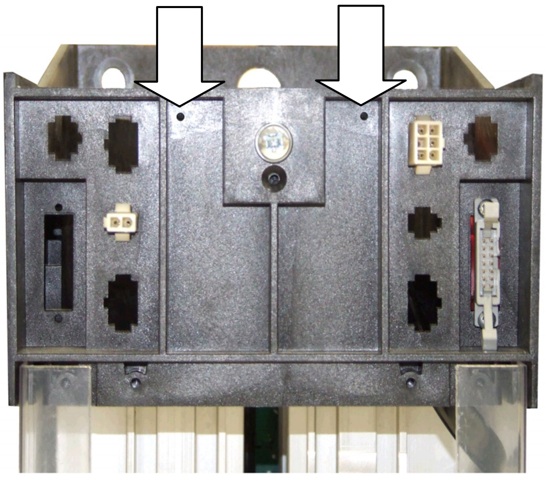
1. Remove the push-fit control terminals (A) from the control panel assembly.
2. Unscrew and remove the Power Terminals (B).
3. Remove the four screws and washers (C) securing the front cover to the control panel assembly.
4. Remove the front cover (D) from the control panel assembly.



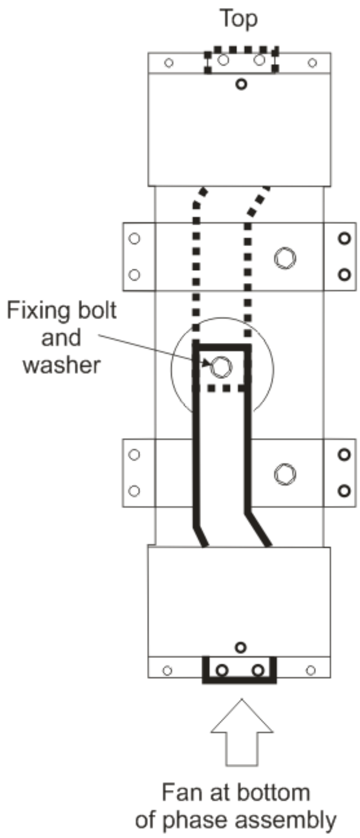
Moving the AC Supply Terminals

The AC supply terminals - L1, L2 & L3 - can be made available at the top or bottom of the drive. The factory-delivered drive has the AC terminals in the lower position.

It only takes a few minutes to rotate the AC terminals to the upper position.

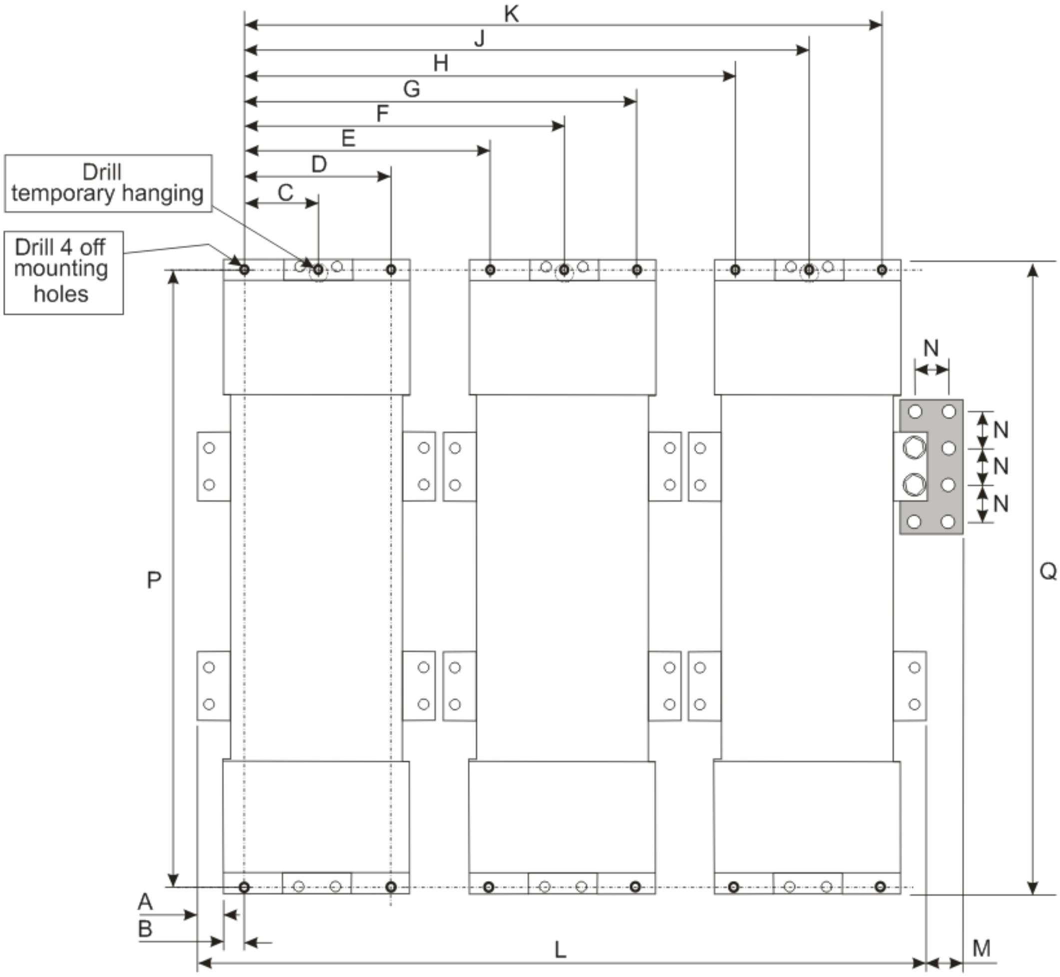


1. Remove the fixings that secure the Phase Assembly front cover.
2. Remove the two screws on the front of the phase assembly moulding that secure the handle in place. The handle is located at the top of the phase assembly. It looks like another AC terminal but it is electrically isolated. It is there to assist in handling the phase assembly and is used when securing the stabilising bracket. Refer to "Offering-Up the Phase Assemblies", page 8.
3. Withdraw the handle from the phase assembly.
4. Slowly remove the central bolt and washer from the AC busbar and catch the ACCT and large washer that are secured by the bolt. Remove the ACCT and large washer.
5. Withdraw the AC busbar from the phase assembly.
6. Flip the AC busbar over (see below) and slide the AC busbar into position through the end of the Phase Assembly (upper position) and secure the ACCT and large washer with the central bolt and washer. Torque to 42Nm (31 ft.lbf).
7. Fit the handle to the lower position and secure using the two screws. Hand-tighten.
8. Refit the Phase Assembly front panel and secure with four screws and washers.



Mounting the Phase Assemblies

The three phase assemblies are mounted vertically onto a solid, flat, vertical backplate inside the cubicle, with the fans at the bottom.



A	B	C	D
24 (0.94)	23 (0.91)	72 (2.83)	144 (5.67)
E	**F**	**G**	**H**
247.5 (9.74)	319.5 (12.58)	391.5 (15.41)	495 (19.49)
J	**K**	**L**	**M**
567 (22.32)	639 (25.16)	732 (28.82)	35.5 (1.40)
N	**P**	**Q**	
35 (1.38)	678 (26.69)	712 (28.03)	
Dimensions are in millimetres (inches)			

Temporary Hanging: A temporary hanging point is provided to hang the unit on before securing the phase assembly to the backplate at the four corners.

Backplate Drilling Procedure

Cover any units already mounted to the backplate to protect them from stray metal filings before drilling the mounting holes.

Refer to the diagram on the previous page and drill the mounting holes into the backplate. The holes must be positioned accurately.

For each phase assembly:

- Drill 5 holes to suit M10 flush-fitting inserts. Fit the nut inserts.

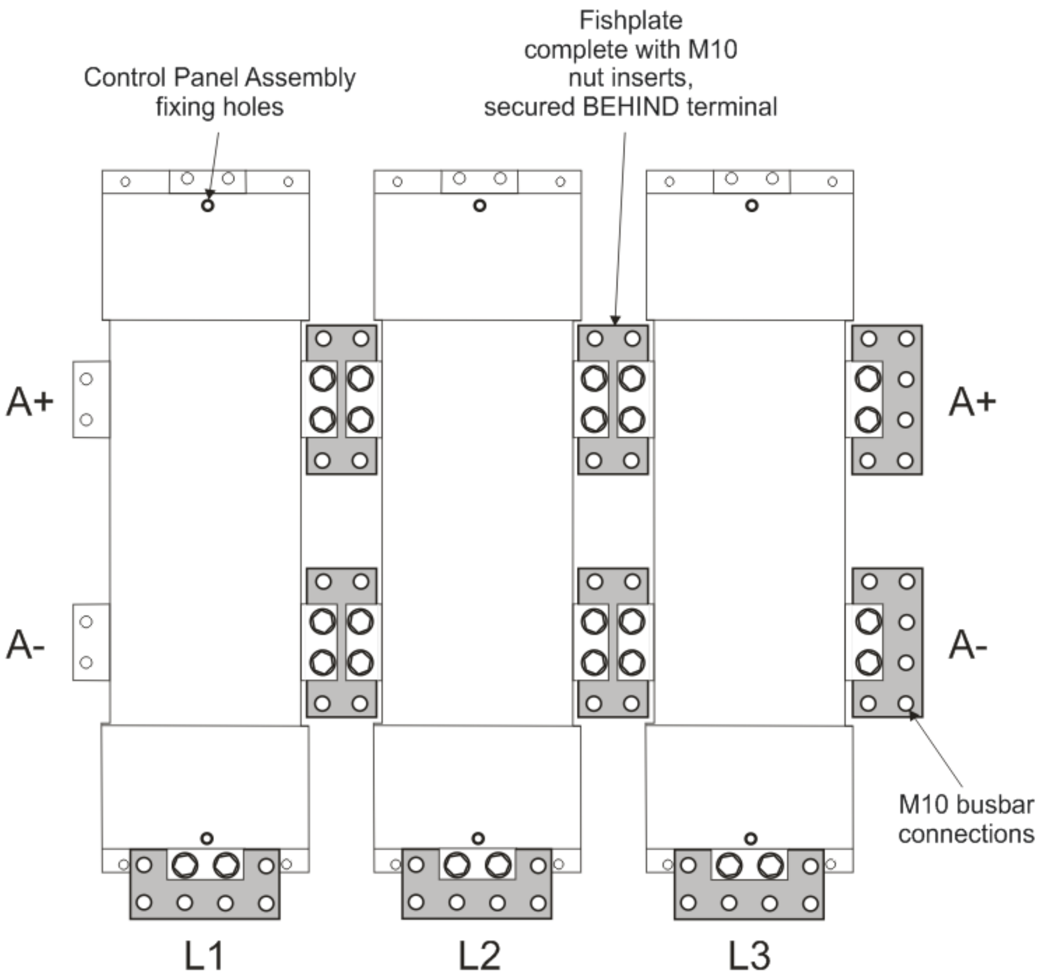
IMPORTANT: The nut inserts MUST be flush-fitting so that the phase assembly foot rests on the backpanel. If the phase assembly is mounted incorrectly it will damage the moulding.

Connecting the Fishplates

Before fitting the Phase Assemblies to the back panel, loosely fit the fishplates to the right hand side terminals (A+, A-) of each Phase Assembly.

The fishplates are fitted with M10 nut inserts. Secure the fishplates **behind** the terminals using M10 bolts (6:6 steel grade) and spring disc washers (preferred, or single coil spring washer). Hand tighten only.

Fitting the fishplate behind the terminal allows the phase assembly to easily be lifted away from adjacent phase assemblies and any associated busbar connections.



Note: *6:6 minimum steel grade bolts are recommended for all busbar connections and mounting duties.*

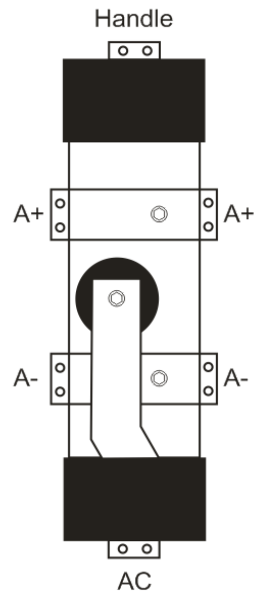
Temporary Hanging Bolts

IMPORTANT: We strongly recommend using the temporary mounting hole to hang the unit on the backplate - the phase assemblies are heavy. This mounting point is not intended for permanent fixing.

- Fit M10 x 20mm long bolts to the three "temporary hanging" mounting holes. Screw them in part of the way so that you can still see 12mm of thread.

The phase assembly will temporarily hang on this portion of thread.

Offering-Up the Phase Assemblies

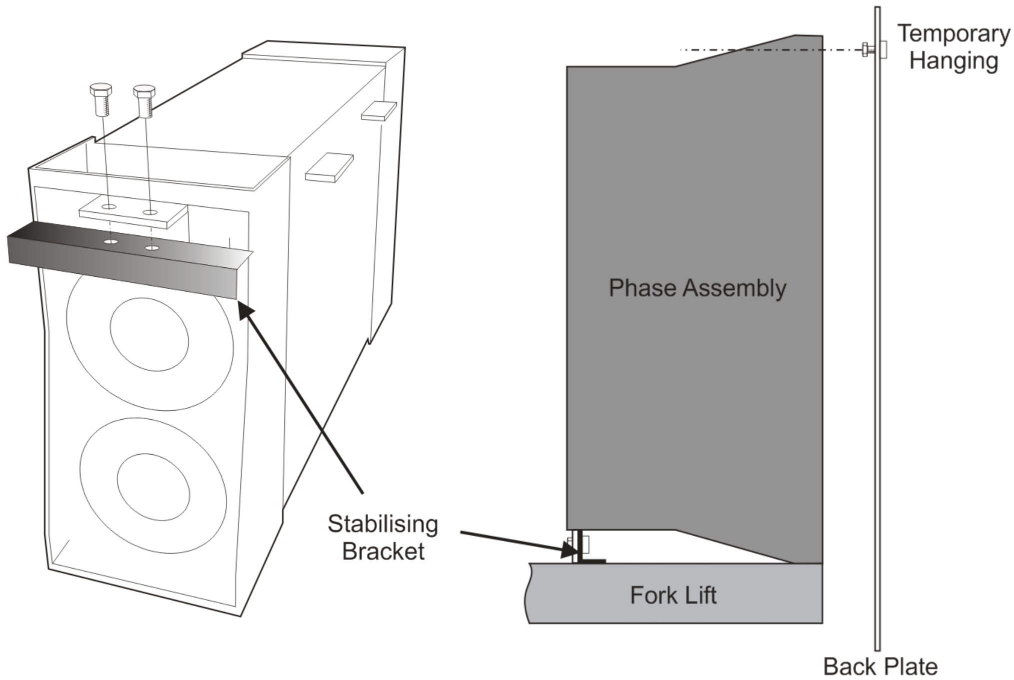


The phase assemblies are heavy. Use a proper lifting procedure to load them on to the fork lift. Note that the Phase Assembly is fitted with a handle, opposite the AC terminal, to improve handling.

A stabilising bracket is supplied to steady the phase assembly when using the fork lift. Secure the bracket to the AC terminal using two M10 bolts as shown below.

For each phase assembly:

- Lift the phase assembly by fork lift and hang it on the "temporary hanging" bolt.
- Secure the phase assembly on the backplate using 4 off M10 bolts and lock washers. Hand tighten only.
- Remove the "temporary hanging" bolt.
- Remove the stabilising bracket.



Attach the remaining fishplates:

- To DC motor terminals A+ and A- (whichever pair are to be used)
- To L1, L2 and L3 AC supply terminals

Tightening the Drive

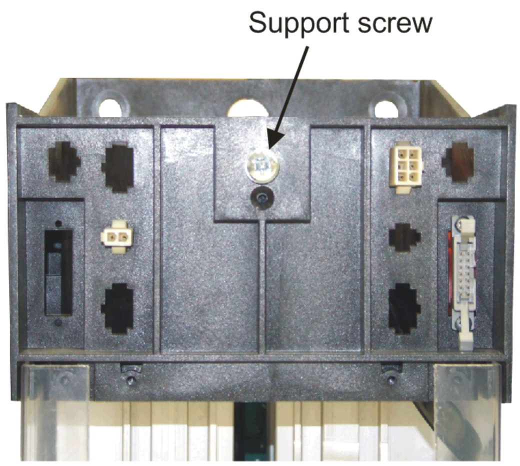
When all the bolts are in place, tighten them to the following torques:

- mounting bolts (4 per phase assembly) : 32Nm (23.6 ft.lbf)
- fishplate bolts : 32Nm (23.6 ft.lbf)

Reminder : Remove the "temporary hanging" bolts.

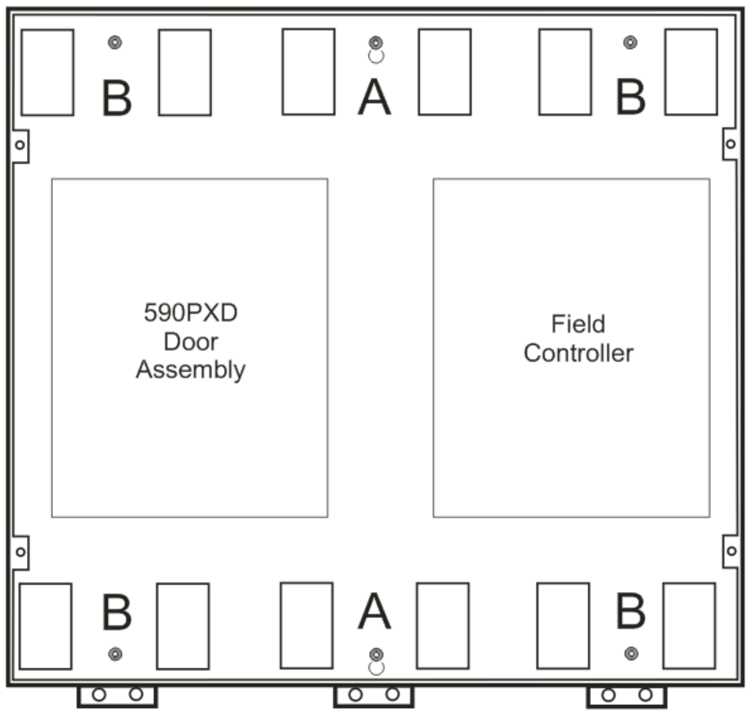
Fitting the Control Panel Assembly

Fit the M6 x 16mm support screw assemblies [screw, single coil spring washer & plain washer] (A) to the central phase assembly (as shown below) and to the equivalent position at the bottom of the phase assembly. Screw them in only part of the way so that the control panel assembly can hang from them.



Top of central phase assembly

Offer-up the control panel assembly and hang it from the two central support screws (A).



Secure the gantry using the M6 x 16mm support screw assemblies (B).

Tighten all screws to 4.5Nm (3.3 ft.lbf).

Terminal Connections

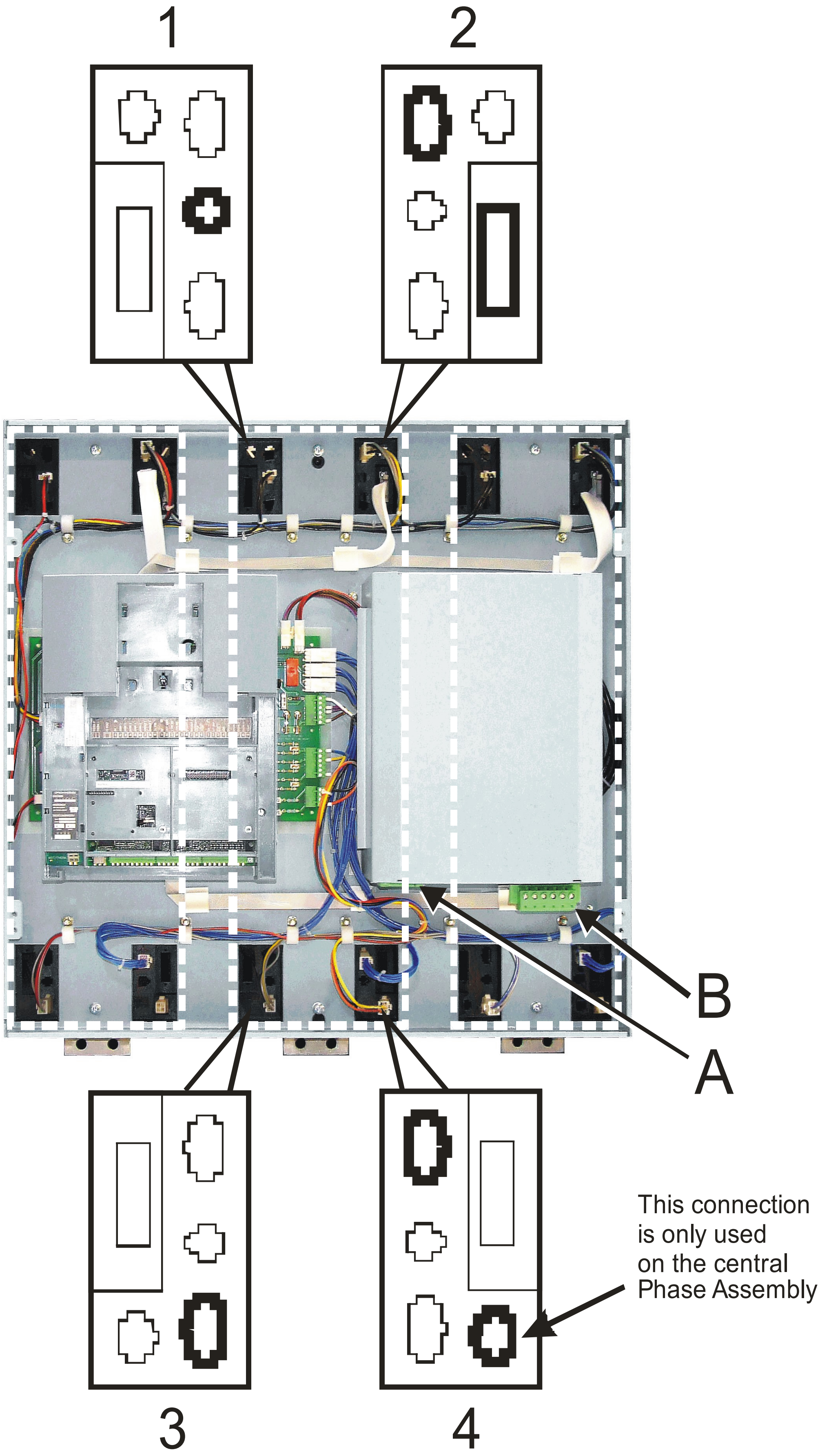
The control panel assembly has connectors for each phase assembly. These are secured in such a way that the cables will only reach the correct terminals set: 1, 2, 3 or 4.

Note: *Terminal sets 3 & 4 feature similar 6-way connectors, however one is a male connector and the other a female, so they can't be fitted incorrectly.*

Complete the same connections for each phase assembly, plus make the additional armature voltage feedback connection to the central Phase Assembly (shown below). Make sure the terminals are clipped together correctly.

Fit the push-fit control terminals (A) from the control panel assembly. Fit the screw-in power terminals (B).

This completes the building of the 590+ Drive (other than attaching the front cover).

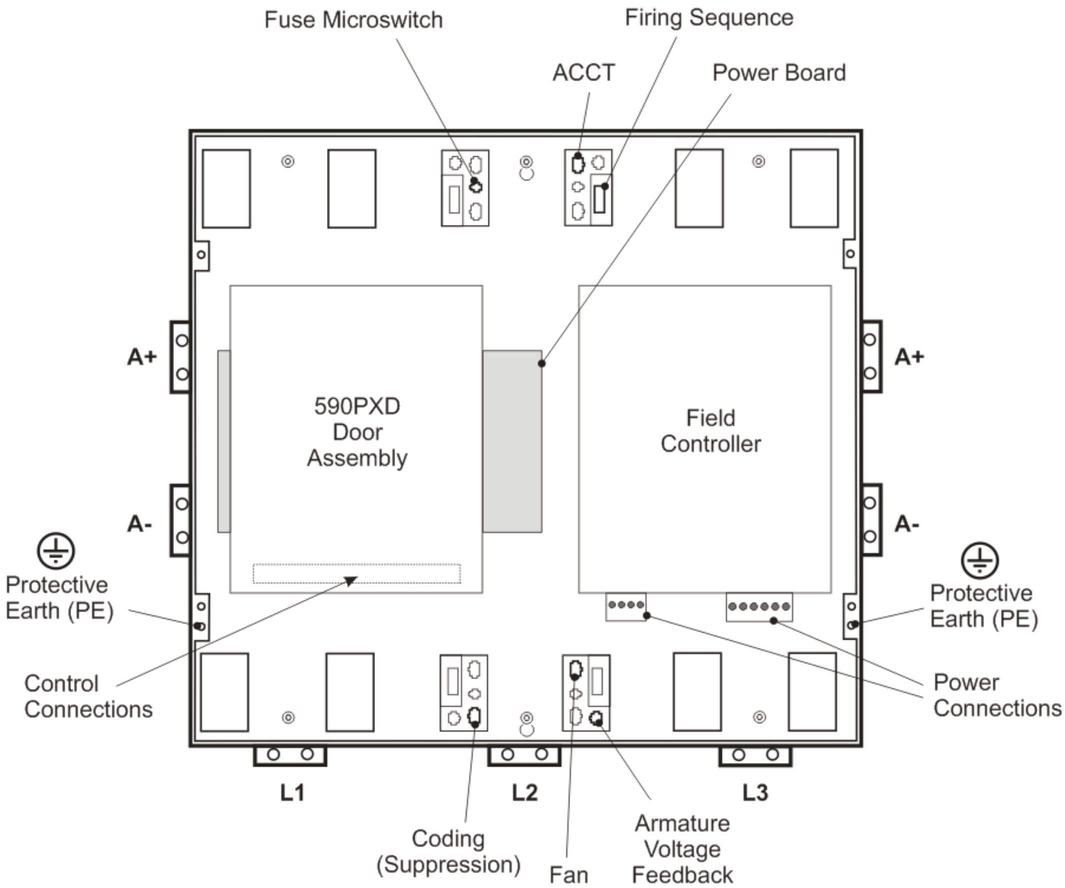

1
2
B
A
This connection is only used on the central Phase Assembly
3
4

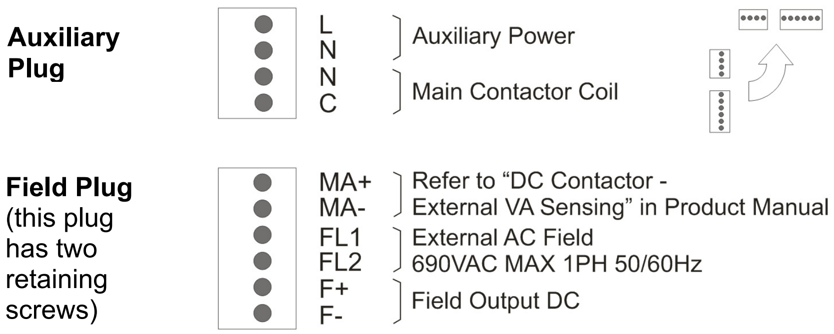
Electrical Installation

IMPORTANT: Please read the Safety Information on page Cont. 3 & 4 before proceeding.

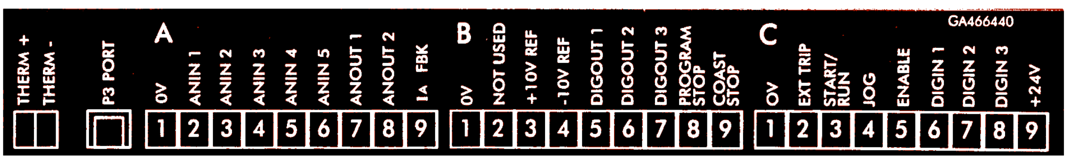
> **WARNING!**
> Ensure that all wiring is electrically isolated and cannot be made "live" unintentionally by other personnel. The phase assembly metalwork (L1, L2 & L3) is LIVE when the unit is switched on.

Refer to the Product Manual Chapter 3: "Installing the Converter" - Electrical Installation. Follow the wiring instructions for Frame H.





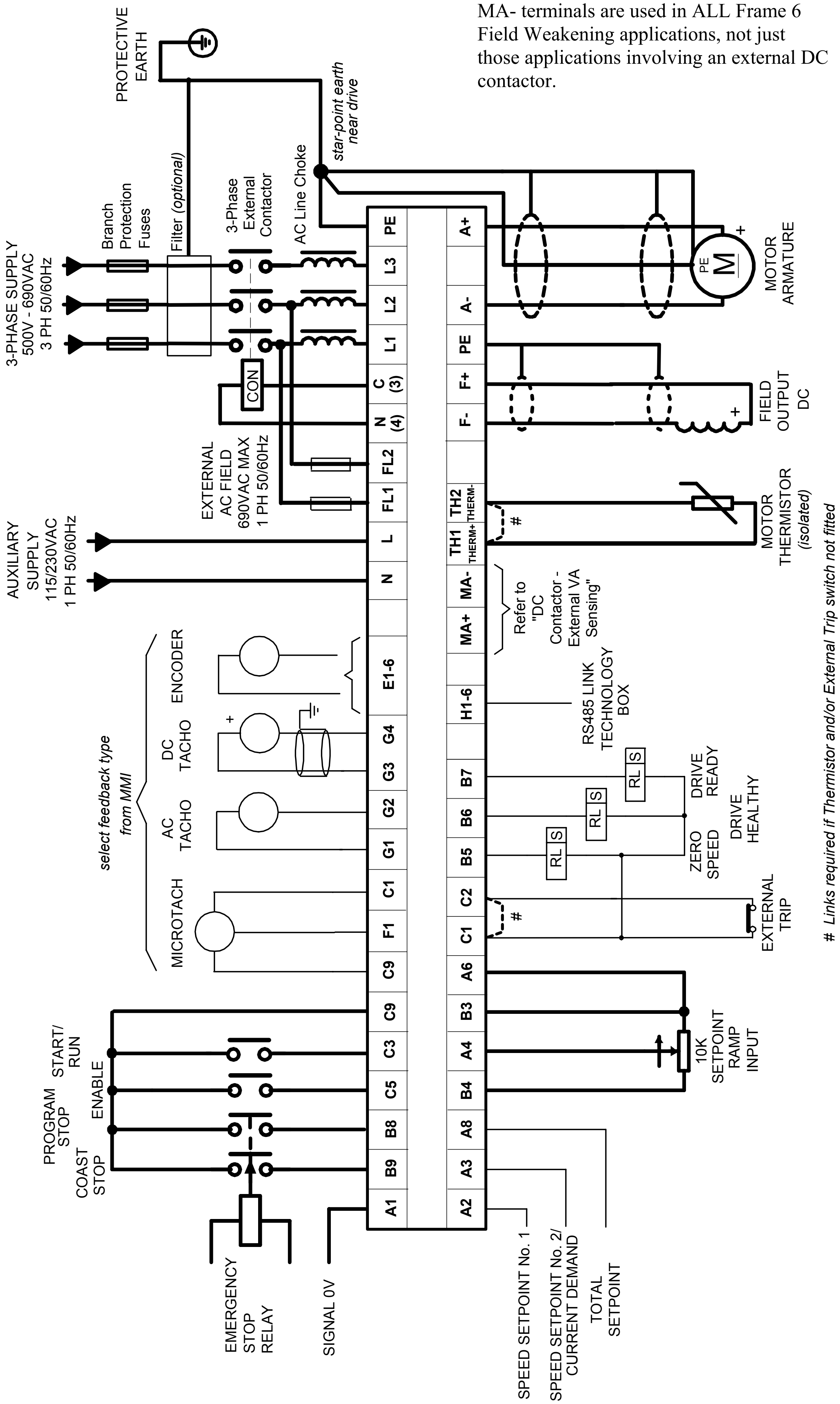
Power Connections



Control Connections

Connection Diagram

Note: We recommend that the MA+ and MA- terminals are used in ALL Frame 6 Field Weakening applications, not just those applications involving an external DC contactor.



WARNING!
The phase assembly metalwork (L1, L2 & L3) is LIVE when the unit is switched on. Isolate the entire 590+drive from electrical power before attempting to work on it.

Only qualified service personnel should attempt to repair or replace parts in the 590+.

AC Fuse Replacement (Non-Regenerative Unit - 2Q)

The AC fuse can be replaced *in-situ*. With the front of the drive removed (the Control Panel Assembly), the replacement should take about 20 minutes. Removing the Control Panel Assembly from the cubicle completely will make access easier, but requires the removal of all connections made to it. It may be possible to support the Control Panel Assembly (11.25kg/25 lbs) and sling it away from the Phase Assemblies far enough to gain access.

Removal

1. Loosen the retaining screws in the Field Controller plug. Unplug all connections to the Door Assembly (control connections) and the Field Controller (Auxiliary Plug and Field Plug).

2. Undo the fixings to remove the front cover from the Control Panel Assembly.

3. Disconnect the flying leads of the Control Panel Assembly from the three Phase Assemblies. Remove the external earth connection(s) made to the Front Cover.

4. Remove the 12mm x M6 fixings in the four corners that secure the Control Panel Assembly. Loosen the top and bottom central support screws (but do not remove) and lift the Control Panel Assembly away from the three Phase Assemblies.

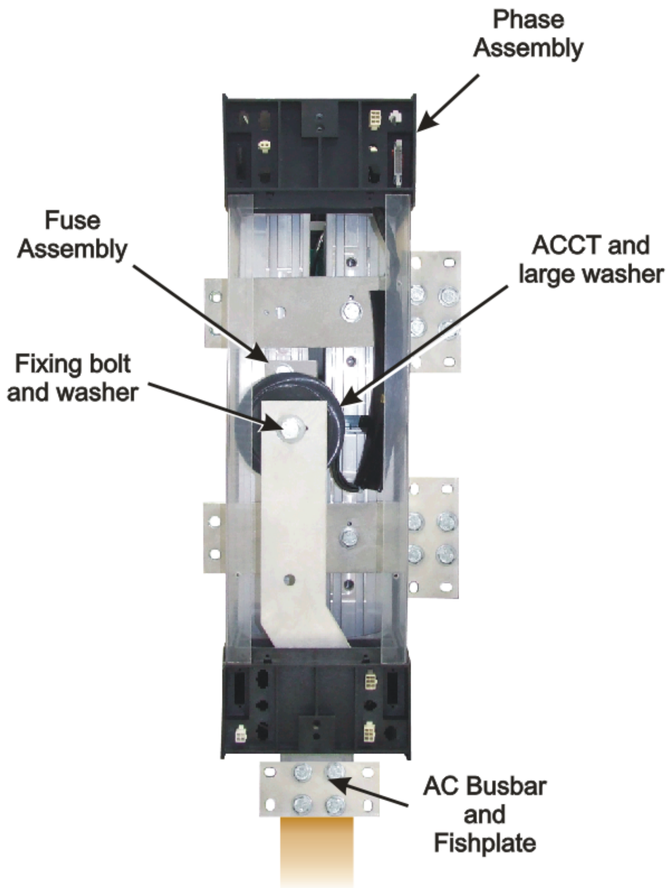
5. Remove the fixings that secure the failed Phase Assembly front cover.

6. Disconnect the fishplate connected to the AC Busbar.

7. Slowly remove the ACCT's fixing bolt and washer from the AC Busbar, supporting the ACCT and large (rubber) washer as you do so. Lower the ACCT to one side and remove the large washer.

8. The fuse is mounted on a plate. Remove this Fuse Assembly from the Phase Assembly.

9. On the bench, undo the central bolt from the Fuse Assembly taking note of the placement of washers and other parts.



Refitting

1. Refit the Fuse to the mounting plate. Torque to 45Nm (33 ft.lbf). Fix the mounting plate to the Phase Assembly, securing it with the two bolts and washers. Torque to 32Nm (23.6 ft.lbf).

2. Slide the AC Busbar into position in the Phase Assembly and secure the ACCT and large washer with the central bolt and washer. Torque to 45Nm (33 ft.lbf).

3. Reconnect the AC Busbar's fishplate carrying the mains connection (L1, L2 or L3). Torque to 55Nm (40.6 ft.lbf).

4. Refit the Phase Assembly front panel and secure with four screws and washers.

5. Offer up the Control Panel Assembly to the three Phase Assemblies and hang on the central support screws. Secure with 12mm x M6 screws and washers.

6. Reconnect the flying leads of the Control Panel Assembly to the three Phase Assembly units. Tighten the retaining screws in the Field Controller plug. Refer to page 10.
7. Refit the front cover to the Control Panel Assembly, securing with the screws and washers. Connect the external earth to the Front Panel.

DC Fuse Replacement (Regenerative Unit - 4Q)

The DC fuse(s) can be replaced *in-situ*. With the front of the drive removed (the Control Panel Assembly), the replacement should take about 20 minutes. Removing the Control Panel Assembly from the cubicle completely will make access easier, but requires the removal of all connections made to it. It may be possible to support the Control Panel Assembly (11.25kg/25 lbs) and sling it away from the Phase Assemblies far enough to gain access.

Removal

1. Loosen the retaining screws in the Field Controller plug. Unplug all connections to the Door Assembly (control connections) and the Field Controller (Auxiliary Plug and Field Plug).

2. Undo the fixings to remove the front cover from the Control Panel Assembly.

3. Disconnect the flying leads of the Control Panel Assembly from the three Phase Assemblies. Remove the external earth connection(s) made to the Front Cover.

4. Remove the 12mm x M6 fixings in the four corners that secure the Control Panel Assembly. Loosen the top and bottom central support screws (but do not remove) and lift the Control Panel Assembly away from the three Phase Assemblies.

5. Remove the four screws that secure the failed Phase assembly front panel. Remove the front panel.

6. Remove the bolts securing the fishplates to the DC Busbar nearest the failed fuse.

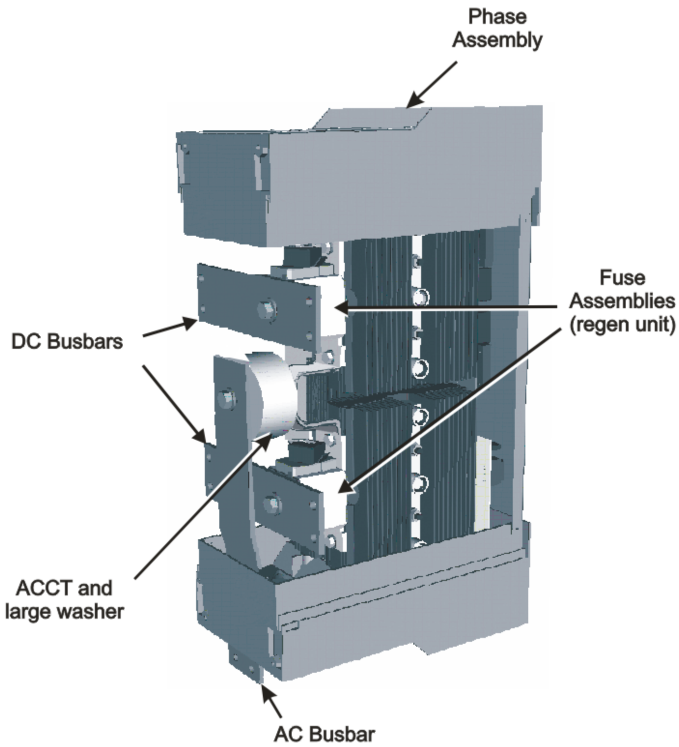
7. If the failed fuse is located underneath the AC busbar: slowly remove the ACCT's fixing bolt and washer from the AC Busbar, supporting the ACCT and large (rubber) washer as you do so. Remove the large washer and lower the ACCT to one side.

8. Unplug the lead connected to the microswitch that is fitted to the side of the Fuse Assembly.

9. The fuse is mounted on a plate. Remove the two bolts and washers that secure this plate to the Phase Assembly and lift away the Fuse Assembly and DC Busbar.

10. On the bench, undo the central bolt from the Fuse Assembly taking note of the placement of washers and other parts. Re-build the assembly with the new fuse. Tighten the DC Busbar bolt to 45Nm (33 ft.lbf).

Refitting



1. Refit the Fuse to the Mounting Plate. Torque to 45Nm (33 ft.lbf). Fix the mounting plate to the Phase Assembly, securing it with the two bolts and washers. Torque to 32Nm (23.6 ft.lbf).

2. Plug the lead back onto the microswitch (removed earlier).

3. Slide the AC busbar into in the Phase Assembly and secure with the bolt and washer. Torque to 45Nm (33 ft.lbf).

4. Refit the fishplates that connect to the DC Busbars. Torque to 55Nm (40.6 ft.lbf).

5. Offer up the Control Panel Assembly to the three Phase Assemblies and hang on the central support screws. Secure with 12mm x M6 screws and washers.

6. Reconnect the flying leads of the Control Panel Assembly to the three Phase Assembly units. Tighten the retaining screws in the Field Controller plug. Refer to page 10.

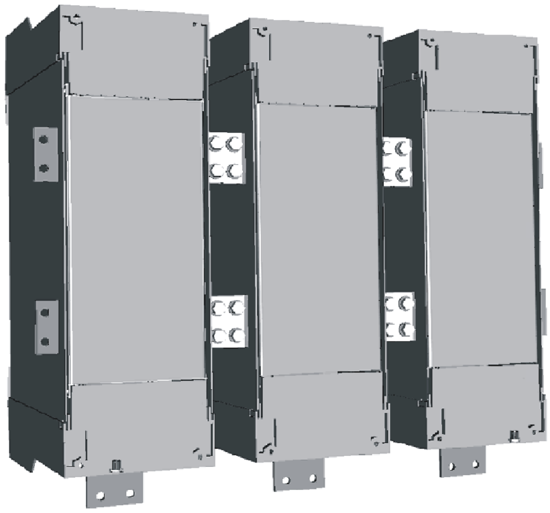
7. Refit the front cover to the Control Panel Assembly, securing with the screws and washers. Connect the external earth to the Front Panel.

Replacing a Phase Assembly

Note: *The Non-Regen Phase Assembly (2Q) weighs 28kg (62 lbs)*
The Regen Phase Assembly (4Q) weighs 33kg (73 lbs)

With the front of the drive removed (the Control Panel Assembly), the replacement should take about 20 minutes. Removing the Control Panel Assembly from the cubicle completely will make access easier, but requires the removal of all connections made to it. It may be possible to support the Control Panel Assembly (11.25kg/25 lbs) and sling it away from the Phase Units far enough to gain access.

Removal



1. Remove the plugs for the control wiring, auxiliary supply and field connections (loosen the screws to remove the field plug). Remove the Protective Earth connections (PE).

2. Undo the fixings to remove the front cover from the Control Panel Assembly.

3. Disconnect the flying leads of the Control Panel Assembly from the three Phase Assemblies.

4. Remove the 12mm x M6 fixings in the four corners that secure the Control Panel Assembly. Loosen the top and bottom central support screws (but do not remove) and lift the Control Panel Assembly away from the three Phase Assemblies.

5. Remove the bolts securing the fishplates to the DC Busbars.

6. Fit an M10 x 20mm long "temporary hanging" bolt to the "temporary hanging" mounting hole (top-centre) of the phase assembly to be removed. Screw it in loosely, leaving a few millimetres of thread still showing.

7. Remove the fixing bolts that hold the failed Phase Assembly onto the back panel. Lift it off the "temporary hanging" bolt. Refer to the note about weights at the top of the page.

Refitting

1. Hang the new Phase assembly onto the "temporary hanging" bolt. The fans should be at the bottom of the unit. Fit the 4 off M10 bolts and torque to 32Nm (23.6 ft.lbf).

2. Remove the "temporary hanging" bolt.

3. Refit the fishplates to the DC Busbars. Torque to 55Nm (40.6 ft.lbf).

4. Refit the front panel and secure with four screws and washers.

5. Offer up the Control Panel Assembly to the three Phase Assemblies and hang on the central support screws. Secure with M6 x12mm long screws and washers.

6. Reconnect the flying leads of the Control Panel Assembly to the three Phase Assembly units. Refer to page 10.

7. Refit the front cover to the Control Panel Assembly, securing with the screws and washers.

8. Connect the plugs for the control wiring, auxiliary supply and field connections (tighten the screws to secure the field plug). Remake the Protective Earth connections (PE).

Replacing a Fan

There are two fans mounted inside the base of each Phase Assembly. These are hard-wired together and are supplied as an assembly. Replacement of both fans is easy and should take about 15 minutes.

Removal

1. Remove the four screws that hold the bottom fan grille in place.

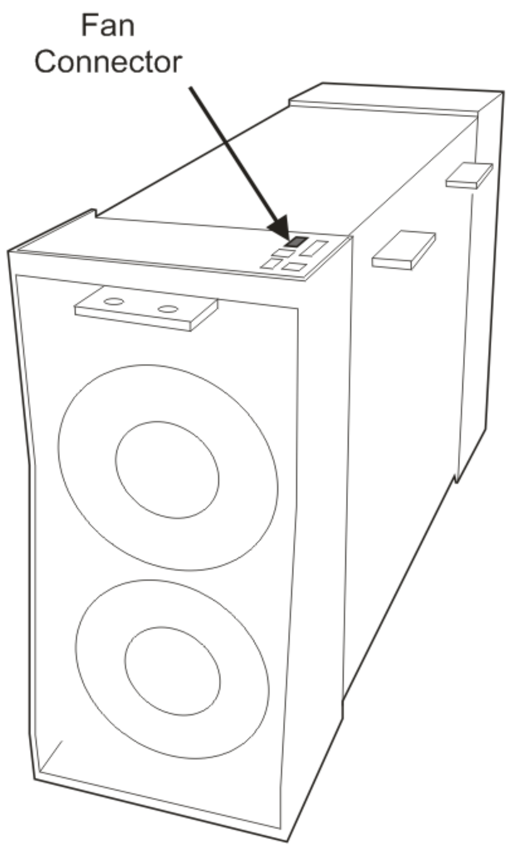
2. Remove the two screws from each fan.

3. Trace the route of the fan cable back to the front of the phase assembly and remove the fan connector from the phase assembly.

4. Remove the fans and cable assembly from phase assembly.

5. Fit the two fans to the phase assembly and secure with the screws. Hand-tighten.

6. Fit the new fan connector to the front of the phase assembly.



Technical Specifications

Environmental Details

Operating Temperature	Frame 6 : 0°C to +40°C Operating temperature is defined as the ambient temperature to the immediate surround of the Converter, when the Converter and other equipment adjacent to it is operating at worst case conditions. Output current values should be derated at 1% per degree Centigrade above rated temperature up to a maximum of 55°C.
Storage Temperature	-25°C to +55°C
Shipping Temperature	-25°C to +70 °C
Product Enclosure Rating	IP00 (Europe) [Frame 1 unit is IP20] UL Open Type (North America/Canada) If the product enclosure is totally enclosed, the exposed metal surface dissipates approximately 50W/m² for a 10°C temperature rise of internal air above ambient.
Vibration	Test Fc of EN60068-2-6 10Hz<=f<=57Hz sinusoidal 0.075mm amplitude 57Hz<=f<=150Hz sinusoidal 1g 10 sweep cycles per axis on each of three mutually perpendicular axis
Altitude	If >500 metres (1650 feet) above sea level, derate Motor Power rating by 1% per 200 metres (660 feet) to a maximum of 5,000 metres (16,500 feet)
Humidity	Maximum 85% relative humidity at 40°C non-condensing
Atmosphere	Non flammable, non corrosive and dust free
Climatic Conditions	Class 3k3, as defined by EN60721-3-3 (1995)
Safety	
Europe	EN50178 (1998), when fitted inside a cubicle
North America/Canada	UL508C
Overvoltage Category	Overvoltage Category III (3-phase supply), Overvoltage Category II (auxiliary supply)
Pollution Degree	Pollution Degree 2

EMC Compliance

All models	European Community Directive 89/336/EEC
All models	EN61800-3 (1997) Table 11 : conducted emissions when installed in accordance with the instructions in Chapter 3. Refer to "Mounting the Converter". EN61800-3 (1997) Immunity requirements EN61800-3 (1997) Table 12 Radiated emissions

Electrical Ratings - Power Circuit

Refer to Chapter 3: "Earth Fault Monitoring Systems" for circuit breaker details.
Motor HP ratings as NEC Table 430-147: "Full Load Current in Amperes, DC Motors"'

Output Current @ 150% and 200% * (A)	Output Current @ 100% Continuous * (A)	Power @ 500V dc (kW)	Motor HP @ 500V dc (HP)	Field Current (A)	Total Losses @ Full Load (W)	Symmetrical Fault Current rms (kA)
1250	1350	600	800	60	4600	100
1600	1750	750	1000	60	5000	100
1950 #	2150	900	1200	60	6000	100

* The output current figures are given at 100% Continuous (no overload), and with overloads of 150% for 30 seconds or 200% for 10 seconds.

Output current values should be derated at 1% per degree Centigrade above rated temperature up to a maximum of 55°C.

Output current values should be derated at an altitude of 500 metres above sea level at a rate of 1% per 200 metres to a maximum of 5000 metres.

† These products are suitable for supplies up to 690V ac and armature voltages of 750V dc, hence output power ratings can be increased by up to 150%

Derated to 1850/1950 on HV assemblies.

Power Supply Details

3-Phase Supply	HV Build	Frame 6	690V ac ±10%, 50/60Hz ± 5%, line-to-line, ground referenced (TN) and non-ground referenced (IT)
	MV Build	Frame 6	500V ac ±10%, 50/60Hz ± 5%, line-to-line, ground referenced (TN) and non-ground referenced (IT)
Supply Current		(0.9 x Idc) Amps ac rms	
Field Supply Current		(1 x Idc) Amps ac rms (build related)	
Field Supply Voltage		Build-related	
3 Phase Input		3-phase rotation insensitive, no adjustment necessary for frequency change	

Auxiliary Power Supply Details

Auxiliary Supply	115-230V ±10%, 50-60Hz ±10%, single phase, Overvoltage Category II
Auxiliary Supply Current:	
SMPS & Contactor	3A ac rms maximum. Nominal current used for power supplies: 0.5A at 115V ac 0.25A at 230V ac The remainder is available for driving the AC Contactor
Fans	Total of 3A ac maximum, 250W
Contactor Output	3A maximum at the auxiliary voltage

AC Line Choke

Always use the recommended external AC Line Choke (2% line impedance).

DC Rating		AC Current	Inductance	SSD Drives Part No.
1250	500V	1080A	15µH	CO466250U012
	690V	1080A	20µH	CO466251U012
1600	500V	1620A	10µH	CO466250U017
	690V	1620A	15µH	CO466251U017
1950	500V	1980A	10µH	CO466250U022
	690V	1980A	15µH	CO466251U022

External AC Supply (RFI) Filters

Filters must only be fitted on the mains side of the contactor.

AC supply filter part numbers for conformance with BS EN61800-3 Table 9 (1st Env) Restricted Distribution and/or BS EN61000-6-4.

Armature Current Rating (A)	Total Filter Watt Loss (W)	SSD Filter Part No.
1350-2150 (please contact Parker SSD)		

Power Semiconductor Protection Fuses

For fuses where compliance to UL Standards are required, refer to Chapter 12: "Installing the Converter" - Requirements for UL Compliance.

Controller Rating (A)	Line Fuse Rating (A)	SSD Part No.	Limb Fuse Rating	SSD Part No.
1250	1000	CS466260U100	700	CS466261U070
1600	1400	CS466260U140	1000	CS466261U100
1950	1800	CS466260U180	1250	CS466261U125

- the 4Q (590+) units have limb fuses
- the 2Q (591+) units have line fuses

Power Supply Fuses

Power Board	Identification	Fuse Rating	SSD Part No.
AH469419Uxxx	FS1, 5x20mm glass slow-blow (for auxiliary supply, contactor, fan supply)	3A	CH540033

Field Fuses

Identification	Fuse Rating	SSD Part No.
Bussman Zilox 170M 1566	80A	CH570084

Earthing/Safety Details

Grounding	Permanent earthing is mandatory on all units because the earth leakage current exceeds 3.5mA ac/10mA dc under normal operating conditions. Permanent earthing can be made in two ways: 1. By using a copper conductor of at least 10mm² cross-sectional area. 2. By using a second conductor, through separate terminals electrically parallel to the protective conductor. ***Note:*** *Each conductor itself must meet the local requirements for a protective earth conductor.*
Input Supply Details (TN) and (IT)	Units with or without external filters are suitable for use on earth referenced (TN) supplies, but units used with a filter are not recommended for non-earth referenced (IT) supplies..
Earth Leakage Current	>50mA (all models)

Terminal Definitions (Digital/Analog Inputs & Outputs)

User inputs/outputs are IEC1131 compliant.

Digital Input	Rated Voltage: • Off Region: input voltage input current • Transition Region: input voltage input current • On Region: input voltage input current Input Impedance Sample Time	24V dc minimum -3V, maximum 5V minimum not defined, maximum 15mA minimum 5V, maximum 15V minimum 0.5mA, maximum 15mA minimum 15V, maximum 30V minimum 2mA, maximum 15mA 4.7kΩ 10ms
Digital Output These outputs are active high and source current from the terminal to the load. Thus the load must be connected between the output and the signal ground. A free-wheel diode is included in the output to protect the output transistor when switching inductive loads such as relays.	Digital Output Voltage Digital Output Current Output Update Rate Output Impedance Source/Sink Rated Current Temporary Overload Overload Protection Overload Recover Reverse Voltage Protection Operating Voltage Off state leakage current	+24V dc +100mA maximum source 10ms Negligible up to 50mA load, short circuit protection provided. Source 0.1A None Indefinite Automatic Yes <30V dc <0.4mA
Analog Input/Output Terminal blocks A, B, and C are located on the control board each block being a 9 way plug-in connector. In addition to terminal blocks A, B and C, terminal blocks G and H provide connections when the two option modules are fitted on the control board.	Input Resolution Output Resolution Input Impedance Input Impedance Limit Maximum Input Sample Rate Input Overload Capability Output Capacity Output Update Rate Output Overdrive Capability	12 Bit plus sign, i.e. 10mV = 0.025% of full scale deflection 10 Bit plus sign, i.e. 10mV = 0.1% of full scale deflection 100kΩ with a 1ms filter for Analog I/P (A3) and 2ms for others. ≥10kΩ (signal range -10V to +10V) 10ms (typically), 3ms for Analog I/P 2 (A3) 10%, i.e. maximum recognisable voltage 11V. Analog Tachogenerator input should be applied to Terminal G3 on Calibration Option Card only. 10V at 5mA. Short circuit protected 10ms 10%, i.e. maximum output 11V

Terminal Information – Control Board

This Control Board is common to all 590+ units.

Terminal Description	Terminal Function	Signal Level	Configurable	Terminal Number
TERMINAL BLOCK A				
0V (Signal)	Zero Volt Reference	0V	N/A	A1
Analog Input 1	Speed Setpoint No. 1	+10V = Full speed setpoint forward -10V = Full speed setpoint reverse	YES	A2
Analog Input 2	Aux. Speed Setpoint/ Current Demand The function of this input is determined by Digital Input No. 3 at terminal C8. C8 open circuit = Speed Setpoint C8 at +24V = Current Demand	+10V= Full speed setpoint forward -10V = Full speed setpoint reverse in speed setpoint mode. +10V = 100% Positive current demand. -10V = 100% Reverse current demand.	NO	A3
Analog Input 3	Ramped Speed Setpoint	+10V= Full speed setpoint -10V = Full speed setpoint reverse	YES	A4
Analog Input 4	Aux. Current Clamp -ve	+10V= 200% Positive current demand -10V = 200% Reverse current clamp	YES	A5
Analog Input 5	Main Current Limit/ Aux. Current Clamp +ve The function of analog inputs 4 and 5 is determined by digital Input No.1 on terminal C6. C6 open circuit: Analog inputs No.5 = Main Current Limit. C6 at +24V: Analog input No. 5 = Auxiliary Current Clamp Positive. Analog Input No. 4 = Auxiliary Current Clamp Negative.		YES	A6
Analog Output 1	Speed Feedback	+10V= Full speed feedback forward. -10V = Full speed feedback reverse.	YES	A7
Analog Output 2	Total Speed Setpoint	+10V= Full speed feedback forward. -10V = Full speed feedback reverse.	YES	A8
Current Meter Output	Buffered Armature Current Output The output can be selected as either Bipolar or Unipolar by the Armature I parameter.	Bipolar Mode +10V= 200% output current forward. -10V = 200% output current reverse. Unipolar Mode +10V= 200% output current.	NO	A9

Terminal Information – Control Board

This Control Board is common to all 590+ units.

Terminal Description	Terminal Function	Signal Level	Configurable	Terminal Number
TERMINAL BLOCK B				
0V (Signal)	Zero Volt Reference	0V	N/A	B1
Not Connected	Not Connected			B2
+10V DC Reference	User +10V Reference	+10V at 10mA short circuit protected	N/A	B3
-10V DC Reference	User -10V Reference	-10V at 10mA short circuit protected	YES	B4
Digital Output 1	Zero Speed Detected The operating level of this output can be modified by the standstill zero threshold parameter to give the desired accuracy of operation	+24V at zero speed (100mA maximum)	YES	B5
Digital Output 2	Drive Healthy (Drive Operational) This output is true when the controller is Healthy.	+24V when Healthy (100mA maximum)	YES	B6
Digital Output 3	Drive Ready This output is true when the controller is ready to function, i.e., "locked" into the mains.	+24V when Ready (100mA maximum)	YES	B7
Program Stop Input	Program Stop When the Program Stop input is held at +24V, the drive operates as required by the inputs. When the Program Stop is open circuit or at zero volts, the controller provides a controlled or program stop as defined by the Program Stop parameters.	+24V drive run 0V (o/c) drive program stop Threshold +16V	NO	B8
Coast Stop Input	Coast Stop When the Coast Stop input is at +24V, the controller operates normally. When the Coast Stop is at zero volts or open circuit, the main contactor is open and the drive no longer operates. The motor coasts to rest.	+24V drive run 0V (o/c) drive coasts to rest. Threshold +16V	NO	B9

Terminal Information – Control Board

This Control Board is common to all 590+ units.

Terminal Description	Terminal Function	Signal Level	Configurable	Terminal Number
TERMINAL BLOCK C				
0V (Signal)	Zero Volt Reference	0V	N/A	C1
External Trip Input	An external interlock or permissive.	External permissive element should be connected to C1 to run. If not using this feature, connect a jumper between C1 and C2. May be used as an unisolated motor thermal input	NO	C2
Start/Run Input	Start/Run When an input is applied to this terminal, the main contactor will close and the controller will operate provided there are no alarms, program stop/coast stop signals are high and the controller is enabled. When the input is removed the controller will perform a regenerative stop to zero speed. A regenerative stop can only be achieved by a 4 quad regenerative controller; the 2 quad non-regenerative controller will coast to zero speed.	+24V = True/Run 0V (o/c) = False/Normal Stop Threshold + 16V	NO	C3
Jog Input	Jog When the Jog Input is held at +24V, the drive jogs provided input C3 is low. When the Jog Input is removed the drive will ramp down to zero obeying the Jog Ramp Rate.	+24V = True/Jog 0V = False/Stop Threshold +16V	YES	C4
Enable Input	Enable The Enable Input provides a means of electronically inhibiting controller operation. If the enable input is not true all control loops will be inhibited and the controller will not function.	+24V = True/Enable 0V = False/Inhibit Threshold +16V	YES	C5
Digital Input 1	Current Clamp Select This input alters the configuration of the current clamps. With no connection, i.e., false, Analog I/P 5 provides a unipolar current limit. When true, Analog I/P5 is the positive current clamp, Analog I/P 4 is the negative current clamp	+24V = True/Bipolar Clamp 0V = False/Unipolar Clamp Threshold +16V	YES	C6

Terminal Information – Control Board

This Control Board is common to all 590+ units.

Terminal Description	Terminal Function	Signal Level	Configurable	Terminal Number
TERMINAL BLOCK C continued				
Digital Input 2	Ramp Hold If the input is held true the S-Ramp output is frozen at the last value irrespective of the Ramped Setpoint Input. When false the S-Ramp Output follows the Ramped Setpoint Input with a delay determined by the Acceleration and Deceleration Ramped time parameters.	+24V = True/Hold 0V = False/Ramp Threshold + 16V	YES	C7
Digital Input 3	Current Demand Isolate This input alters the drive operation from Speed Control to Current Control. When digital input No. 3 is true, analog input No. 2 provides the current demand and the speed loop is disconnected. When false the speed loop is in control and analog input No. 2 is an auxiliary speed setpoint.	+24V = True/Current 0V = False/Speed Threshold + 16V	YES	C8
+24V Supply	+24V	Maximum output current: 200mA Note that the maximum combined consumption for digital outputs 1, 2 & 3 and C9 should not exceed 300mA. Some typical loads are given below: Microtach : 75mA Relays : 50mA each Fiber Optic ancillaries : 50mA each DeviceNet Technology Box : 50mA	N/A	C9

Terminal Information – Power Terminals

These terminals are located externally on the product.

Terminal Description	Terminal Function	Terminal Number
Three phase supply	Drive supply	L1 - L3
Armature +	Drive output to motor armature	A+
Armature -	Drive output to motor armature	A-
External field supply (Red Phase)	External single phase ac Line 1 input to field bridge.	FL1
External field supply (Yellow Phase)	External single phase ac Line 2 input to field bridge. Required AC Input Voltage = 1.11 x Nominal DC Output. The field regulator will control the field current provided that the Nominal DC Output voltage exceeds the field voltage by at least 10%. i.e. $V_{AC} = 1.11 \times V_{DC}$ and $V_{DC} = 1.1 \times V_{FIELD}$ therefore $V_{AC} = 1.22 \times V_{FIELD}$ The external AC supply must be fitted with high speed fuses to protect the field regulator. For controllers with 10A field capability 10A fuses should be used, those with 20A field capability 20A fuses, etc. *Note: When using an external AC input it is important to have the correct phase relationship on the terminals. The supply must be derived from L1 (Red) and L2 (Yellow) phases directly or indirectly through a transformer. L1 must be connected to FL1, and L2 to FL2.*	FL2
Field Output (DC+)	DC supply for motor field connections.	F+
Field Output (DC-)	DC supply for motor field connections. The DC output voltage at these terminals will depend upon the AC supply voltage and the mode of field control. Please refer to the Product Manual for details of the drive capability and operation. Maximum drive field output capability is 60A DC.	F-
External Armature Volts Sense (+)	This terminal should be connected directly to the positive motor armature terminal.	MVA+
External Armature Volts Sense (-)	This terminal should be connected directly to the negative motor armature terminal.	MVA-
Auxiliary Supply Live 115-230V	These terminals are the mains input connections for control supply transformer and contactor relay supply	L
Auxiliary Supply Neutral		N
Main contactor coil V AC	This terminal is internally connected to the auxiliary supply neutral and provides a convenient connection point for the contactor coil neutral connection	N
Main contactor coil V AC	This terminal is the switched output from the contactor control relay and is derived from the auxiliary supply. The output is internally fused at 3A hence contactor coils having a high pick-up current must be operated via a slave relay. *Note: The contacts of the Contactor Control Relay are suppressed by a series connected resistor (680 Ohms) and capacitor (22nF) to protect the relay contacts. Users should be aware that when the contactor Control Relay is "De-energised", a leakage current of approximately 2mA can be expected and this should be considered when interfacing to these terminals. Typically, there could be the energisation of very sensitive relays.*	C

Terminal Information – Option Boards

Terminal Description	Terminal Function	Signal Level	Terminal Number
TERMINAL BLOCK G (SWITCHABLE TACHO CALIBRATION OPTION)			
AC Tacho input	AC		G1
AC Tacho input	AC		G2
+ DC Tacho input	+DC		G3
- DC Tacho input	-DC		G4
Tacho Out	Calibrated Tacho Output		P3
(5701 MICROTACH RECEIVE OPTION - PLASTIC)			
Signal Input	Microtach fibre optic input	There are no other connections to this option module. (The 5701 Microtach should be powered by an external 24V DC at 60mA, 1.4W.)	F1
(5901 MICROTACH OPTION MODULE - GLASS)			
Signal Input	Microtach fibre optic input	There are no other connections to this option module. (The 5901 Microtach should be powered by an external 24V DC at 125mA, 3W.)	F1
TERMINAL BLOCK G (ENCODER OPTION)			
Terminal Block G pinouts will change function depending upon which option board is fitted to the control board. The configuration supplied as standard is with the Switchable Tacho Calibration Option fitted. Further information on the other options may be obtained from the relevant Technical Manual.			
TECHNOLOGY BOX OPTION (SERIAL COMMUNICATIONS)			
Refer to the Technical Manual supplied with the option for details.			

Wiring Requirements for EMC Compliance

	Power Supply Wire	Motor Wire	External Filter to Converter Wire	Signal/Control Wire
Wire Type (for EMC Compliance)	Unshielded	Shielded/ armored	Replace flying leads with shielded/armored when >0.6m	Shielded
Segregation	From all other wiring (clean)	From all other wiring (noisy)		From all other wiring (sensitive)
Length Limitations With External Filter	Unlimited	50 metres	As short as possible	25 metres
Shield to Ground Connection		Both ends	Both ends	Converter end only

Cooling Fans

Maximum Rated Ambient (°C)	Cooling Method	Number of Fans	Fan Voltage	Fan Power	Air Flow per fan
70	Internal fans: 2 per phase assembly	6	24V, 1.8A	48W	215 cfm
Fan SMPS : 115V ±10%, 3A, 300W or 230V ±10%, 1.5A 300W	Assembly Part Number LA466819				

Spares

Regenerative (4Q)

Spares

Drive Model Number		590P/1250/500	590P/1600/500	590P/1950/500
Gantry		590PG/500/0011/UK/000	590PG/500/0011/UK/000	590PG/500/0011/UK/000
Gantry Parts	**Door**	590PXD	590PXD	590PXD
	Power Board	AH469419U012	AH469419U012	AH469419U012
	Field Assembly	LA466030U001	LA466030U001	LA466030U001
	Fan SMPS	LA466819	LA466819	LA466819
Phase Assembly	**Recommended Spare**	590PL/1250/500	590PL/1600/500	590PL/1950/500
Phase Assembly Parts	**Fuse**	CS466261U100	CS466261U100	CS466261U180
	Suppression Assembly	AH469353U102	AH469353U102	AH469353U102
	Trigger Board	AH469354U402	AH469354U402	AH469354U402
	Fan Assembly	LA469905	LA469905	LA469905
	ACCT	CO466109U001	CO466109U001	CO466109U001
	Fuse Microswitch	DC466265	DC466265	DC466265
Possible Spare Parts	***Thyristor***	*CF469820U016*	*CF469821U016*	*CF469822U016*
	Clamp	*LA469670U002*	*LA469670U002*	*LA469670U003*
	Thermostat	*CM469898U002*	*CM469898U003*	*CM469898U004*
Drive Model Number		**590P/1250/690**	**590P/1600/690**	**590P/1950/690**
Gantry		590PG/690/0011/UK/000	590PG/690/0011/UK/000	590PG/690/0011/UK/000
Gantry Parts	**Door**	590PXD	590PXD	590PXD
	Power Board	AH469419U011	AH469419U011	AH469419U011
	Field Assembly	LA466030U002	LA466030U002	LA466030U002
	Fan SMPS	LA466819	LA466819	LA466819
Phase Assembly	**Recommended Spare**	590PL/1250/690	590PL/1600/690	590PL/1950/690
Phase Assembly Parts	**Fuse**	CS466261U070	CS466261U100	CS466261U125
	Suppression Assembly	AH469353U101	AH469353U101	AH469353U101
	Trigger Board	AH469354U401	AH469354U401	AH469354U401
	Fan Assembly	LA469905	LA469905	LA469905
	ACCT	CO466109U001	CO466109U001	CO466109U001
	Fuse Microswitch	DC466265	DC466265	DC466265
Possible Spare Parts	***Thyristor***	*CF469823U022*	*CF469824U022*	*CF469825U022*
	Clamp	*LA469670U002*	*LA469670U003*	*LA469670U003*
	Thermostat	*CM469898U002*	*CM469898U003*	*CM469898U004*

Spares

Non-Regenerative (2Q)

Drive Model Number		591P/1250/500	590P/1600/500	590P/1950/500
Gantry		590PG/500/0011/UK/000	590PG/500/0011/UK/000	590PG/500/0011/UK/000
Gantry Parts	**Door**	590PXD	590PXD	590PXD
	Power Board	AH469419U012	AH469419U012	AH469419U012
	Field Assembly	LA466030U001	LA466030U001	LA466030U001
	Fan SMPS	LA466819	LA466819	LA466819
Phase Assembly	**Recommended Spare**	590PL/1600/500	590PL/1950/500	591PL/1250/500
Phase Assembly Parts	**Fuse**	CS466260U140	CS466260U180	CS466260U100
	Suppression Assembly	AH469353U102	AH469353U102	AH469353U102
	Trigger Board	AH469354U202	AH469354U202	AH469354U202
	Fan Assembly	LA469905	LA469905	LA469905
	ACCT	CO466109U001	CO466109U001	CO466109U001
	Fuse Microswitch	Not required	Not required	Not required
Possible Spare Parts	***Thyristor***	*CF469821U016*	*CF469822U016*	*CF469820U016*
	Clamp	*LA469671U002*	*LA469671U003*	*LA469671U002*
	Thermostat	*CM469898U003*	*CM469898U004*	*CM469898U002*
Drive Model Number		**590P/1250/690**	**590P/1600/690**	**590P/1950/690**
Gantry		590PG/690/0011/UK/000	590PG/690/0011/UK/000	590PG/690/0011/UK/000
Gantry Parts	**Door**	590PXD	590PXD	590PXD
	Power Board	AH469419U011	AH469419U011	AH469419U011
	Field Assembly	LA466030U002	LA466030U002	LA466030U002
	Fan SMPS	LA466819	LA466819	LA466819
Phase Assembly	**Recommended Spare**	590PL/1250/690	590PL/1600/690	590PL/1950/690
Phase Assembly Parts	**Fuse**	CS466260U100	CS466260U140	CS466260U180
	Suppression Assembly	AH469353U101	AH469353U101	AH469353U101
	Trigger Board	AH469354U201	AH469354U201	AH469354U201
	Fan Assembly	LA469905	LA469905	LA469905
	ACCT	CO466109U001	CO466109U001	CO466109U001
	Fuse Microswitch	Not required	Not required	Not required
Possible Spare Parts	***Thyristor***	*CF469823U022*	*CF469824U022*	*CF469825U022*
	Clamp	*LA469671U002*	*LA469671U003*	*LA469671U003*
	Thermostat	*CM469898U002*	*CM469898U003*	*CM469898U004*

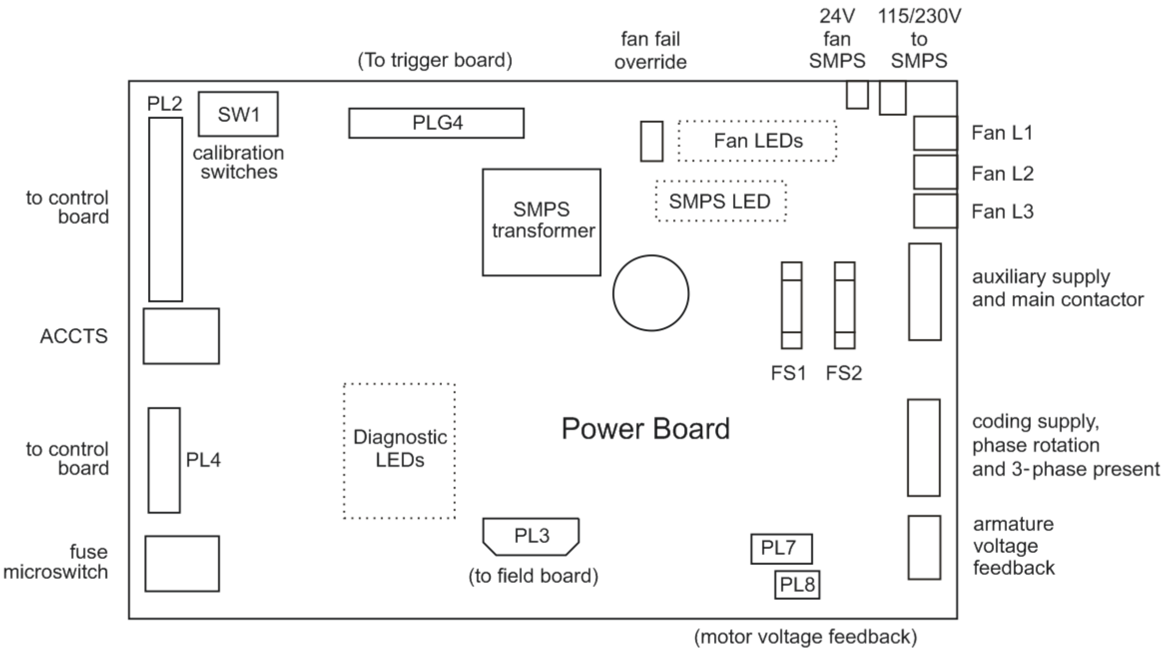
590PXD Control Board		
Software Version	Part Number	Status *
7.x	AH470372U002	CURRENT

** Do not attempt to upgrade by fitting a later software version Control Board. You may experience hardware compatibility problems. If in doubt, contact SSD Drives.*

Standard Equipment

Power Board Circuit Description - AH469419

Power supplies for the controller are generated from the single phase auxiliary supply via a Switched Mode Power Supply. The incoming supply is directly rectified to provide a high voltage dc power rail. A high voltage transistor switches this rail onto the primary of a high frequency transformer, the output of which is rectified and smoothed to provide the dc power supply rails. The 5V dc rail is monitored via a reference element and a control signal returned via an opto-isolator to the control element of the high voltage switching transistor. The other dc rails (-15V & +24V dc) are generated via separate secondary windings which are rectified and smoothed, with individual linear regulators providing ±15V dc rail. The SMPS operates over an input voltage range of 115V to 230V ac ±10%, 50/60Hz.



Power Board LED Trip Information

The HEATSINK TRIP, 3 PHASE FAILED and ACCTS FAILED trips are associated with the following LED indications:

Eight diagnostic LEDs indicate further trip information, and general status of the unit. The LEDs go out to indicate a problem (note that LED1 may also flash as the SMPS attempts to power-up repeatedly, indicating a fault).

Trips		Power Board	
	switched mode power supply on	SMPS OK	O LED1
ACCTS FAILED	trigger board connection status	TRIGGER BOARD PRESENT	O LED9
	ac current transformer connection status	ACCTS PRESENT	O LED10
3 PHASE FAILED	thyristor fuses status	THYRISTOR FUSES	O LED11
HEATSINK TRIP	field heatsink temperature normal	FIELD THERMOSTAT	O LED12
	L1 Phase Assembly heatsink temperature normal	L1 STACK THERMOSTAT	O LED13
	L2 Phase Assembly heatsink temperature normal	L2 STACK THERMOSTAT	O LED14
	L3 Phase Assembly heatsink temperature normal	L3 STACK THERMOSTAT	O LED15
	Fans stalled	L* FAN	O Fan LEDS

* In the event of a trip due to a stalled fan, an unlit fan LED will indicate the failed fan. With the drive stopped, operate the fan fail override switch and restart the drive. Diagnose the failed fan from the fan LEDs status.

Model Number

The 590+ Frame 6 is fully identified using alphanumeric codes which record the attributes of each part. The Product Code appears as the “Model No”. Each block of the Product Code is identified as below:

Frame 6 Drive

590+ Series Product Code

Example ▶ Block 1: 590P - Block 2: 23 2150 1 0 - Block 3: P 00 - Block 4: U 0 A 0

		Output Current (A)	Frame Size	
Family	590+ Series DC Digital Drive - regen			590P
	591+ Series DC Digital Drive - non-regen			591P
Current/Power Ratings	Supply Voltage: 110-220V 3ph			23
		15	1	2150 1
		35	1	2350 1
		40	2	2400 2
		70	2	2700 2
		110	2	3110 2
		165	2	3165 2
		180	3	3180 3
		270	3	3270 3
		380	4	3380 4
		500	4	3500 4
		725	4	3725 4
		830	4	3830 4
		1580	5	4158 5
	220-500V 3ph			53
		15	1	2150 1
		35	1	2350 1
		40	2	2400 2
		70	2	2700 2
		110	2	3110 2
		165	2	3165 2
		180	3	3180 3
		270	3	3270 3
		380	4	3380 4
		500	4	3500 4
		725	4	3725 4
		830	4	3830 4
		1580	5	4158 5
		1250	6	4125 6
		1600	6	4160 6
		1950	6	4195 6
		1200	H	4120 H
		1700	H	4170 H
		2200	H	4220 H
		2700	H	4270 H
	500-600V 3ph			63
		380	4	3380 4
		500	4	3500 4
		725	4	3725 4
		830	4	3830 4
		1580	5	4158 5
	500-690V 3ph			73
		1250	6	4125 6
		1600	6	4160 6
		1950	6	4195 6
		1200	H	4120 H
		1700	H	4170 H
		2200	H	4220 H
		2700	H	4270 H
Auxiliary Supply	Universal 115V-230V 1ph (Frames 1, 2, 6 & H)			0
	115V 1ph (Frames 3 - 5)			1
	230V 1ph (Frames 3 - 5)			2
Mechanical Style	Panel Mounting			P
	Panel Mounting + Airflow Kit (option on Frames 4 & 5 only)			A
Special Option	None			00
	Documented special options (01-99)			
Destination	English (50/60Hz)			U
	German			D
	Spanish			E
	French			F
	Italian			I
Keypad	None			0
	6901 keypad fitted			4
Speed Feedback	Analog Tacho			A
	Glass Fiberoptic encoder			G
	Plastic Fiberoptic encoder			P
	Armature Voltage			V
	Wire-ended Encoder			W
Comms	None			0
	ControlNet			C
	DeviceNet			D
	Ethernet			E
	Link			L
	ModBus +			M
	CanOpen			N
	Profibus			P
	RS485/RS422			R

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Control Panel Assembly

590+ Series Frame 6 Control Panel Assembly Product Code

		Block 1	Block 2	Block 3	Block4
	Example ►	590PG	53 0000 6 0	P 00	U 4
Family	**590+ Series DC Digital Drive - Frame 6 Gantry**	**590PG**			
	Supply Voltage / Frame Size				
Current/Power Ratings	220-500V 3ph		**53**		
	6		**0000 6**		
	500-690V 3ph		**73**		
	6		**0000 6**		
Auxiliary Supply	Universal 115V-230V 1ph		**0**		
Mechanical Style	Panel Mounting			**P**	
Special Option	None			**00**	
	Documented special options (01-99)				
Destination	English (50/60Hz)				**U**
	German				**D**
	Spanish				**E**
	French				**F**
	Italian				**I**
Keypad	6901 keypad fitted				**4**

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Phase Assembly

590+ Frame 6 Phase Assembly Product Code

				Block 1	Block 2	Block 3
			Example ►	590PL	53 4125 6 0	P 00
Family	**590+ Series DC Digital Drive - regen Phase Limb**			**590PL**		
	591+ Series DC Digital Drive - non-regen Phase Limb			**591PL**		
	Supply Voltage	Output Current (A)	Frame Size			
Current/Power Ratings	220-500V 3ph				**53**	
		1250	6		**4125 6**	
		1600	6		**4160 6**	
		1950	6		**4195 6**	
	500-690V 3ph				**73**	
		1250	6		**4125 6**	
		1600	6		**4160 6**	
		1950	6		**4195 6**	
Auxiliary Supply	None				**0**	
Mechanical Style	Panel Mounting					**P**
Special Option	None					**00**
	Documented special options (01-99)					

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Certificates

590+

EC DECLARATIONS OF CONFORMITY

Date CE marked first applied: 11.10.2007

Issued for compliance with the EMC Directive when the unit is used as *relevant apparatus*.

EMC Directive

In accordance with the EEC Directive

2004/108/EC

We Parker SSD Drives, address as below, declare under our sole responsibility that the above Electronic Products when installed and operated with reference to the instructions in the Product Manual (provided with each piece of equipment) is in accordance with the relevant clauses from the following standard:-

* BSEN61800-3 (2004)

Low Voltage Directive

In accordance with the EEC Directive

2006/95/EC

We Parker SSD Drives, address as below, declare under our sole responsibility that the above Electronic Products when installed and operated with reference to the instructions in the Product Manual (provided with each piece of equipment), is in accordance with the relevant clauses from the following standard :-

EN61800 (2003)

The drive is CE marked in accordance with the low voltage directive for electrical equipment and appliances in the voltage range when installed correctly.

MANUFACTURERS DECLARATIONS

This is provided to aid your justification for EMC compliance when the unit is used as a *component*.

EMC Declaration

We Parker SSD Drives, address as below, declare under our sole responsibility that the above Electronic Products when installed and operated with reference to the instructions in the Product Manual (provided with each piece of equipment) is in accordance with the relevant clauses from the following standard:-

* BSEN61800-3 (2004)

Machinery Directive

The above Electronic Products are components to be incorporated into machinery and may not be operated alone. The complete machinery or installation using this equipment may only be put into service when the safety considerations of the Directive 89/392/EEC are fully adhered to. Particular reference should be made to EN60204-1 (Safety of Machinery - Electrical Equipment of Machines). All instructions, warnings and safety information of the Product Manual must be adhered to.

Since the potential hazards are mainly electrical rather than mechanical, the drive does not fall under the machinery directive. However, we do supply a manufacturer's declaration for when the drive is used (as a *component*) in machinery.

Dr Martin Payn (Conformance Officer)

* *Compliant with the immunity requirements of the Standard without specified EMC filters.*
* *690PB only when fitted with an internal or external filter.*

PARKER SSD DRIVES
NEW COURTWICK LANE, LITTLEHAMPTON, WEST SUSSEX BN17 7RZ
TELEPHONE: +44(0)1903 737000 FAX: +44(0)1903 737100
Registered Number: 4806503 England. Registered Office: 55 Maylands Avenue, Hemel Hempstead, Herts HP2 4SJ

ISS.	MODIFICATION	ECN No.	DATE	DRAWN	CHK'D
1	Intitial issue of 590+ Frame 6 Addendum to the 590+ Product Manual, HA466461U003.	18975	01/12/07	CM	GDR
2	New Product Codes. Other small amendments. New Warranty document number.	20281 (20358)	01/04/08	CM	GDR

FIRST USED ON	MODIFICATION RECORD 590+ Series DC Digital Drive, Frame 6	
	DRAWING NUMBER ZZHA466833U001	SHT. 1 OF 1