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***OPERATION MANUAL***

***B2005-6 BASIC HEAT TREATMENT CONSOLE***



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## **B2005-6 BASIC HEAT TREATMENT CONSOLE**

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## **B2005-6 Basic Six Way Heat Treatment Console:**

### **DESCRIPTION:**

The B2005-6 basic six way heat treatment console is designed to control various heat treatment processes by closely monitoring and adjusting the set point temperature and the ramp rate. It incorporates the latest microprocessor based technology and is simple to set up and operate. Control setting is by means of push switches and an LCD screen provides visual indication of the set point and the actual temperature.

The B2005-6 is equipped with a digital amp meter and a 6 position selector switch, which is the utmost importance for checking the current to the ceramic pad heaters to make sure they are all operating.

### **SPECIFICATIONS – B2005-6 Basic Six Way Heat Treatment Console:**

**Length:** 33"  
**Width:** 26.5"  
**Height:** 35"  
**Weight:** Approx. lbs  
**Material:** 12 gauge stainless steel cabinet  
**Wheels:** 900 lbs capacity each with brake (4) (or SS mounting brackets available upon request)  
**Handling:** Two heavy duty top lifting eye lugs and forklift access.

### **Inputs:**

- **Voltage:** 380-415-440-480-575, 3 Phase
- **Current:** 100 amp or optional 125 amps for 380/415 VAC
- **Power:** 75 KVA Isolated Copper Wound
- **Frequency:** 60 Hz / 50 Hz

### **Output Per Zone:**

- **Zones:** 6
- **Voltage:** 65 or 85 VAC, single phase
- **Current:** 192 amps @ 65 V or 156 amps 85V
- **Power:** 12.5 KVA
- **Activation:** 200 amp contactor
- **Control per zone:** Digital temperature controller

### **Control Circuit:**

- **Voltage:** 110 VAC, single phase
- **Current:** 5 amp circuit breaker
- **Power:** 1.2 KVA winding on power transformer
- **Auxiliary:** 110 VAC supply, single phase

**6 x Digital Temperature Controller (6600):**

- **Temperature Range:** 0-2200°F or 0-1200°C
- **Thermocouple:** Type “K”
- **Resolution:** Measurement 0.1 degrees / Display 1.0 degree

**Digital Amp Meter:**

- **Primary Amperage:** Up to 200 amps
- **Secondary Amperage:** 5 amps

**Protection:**

- **120-VAC Control Circuit:** 5 amp circuit breaker
- **Heater Power:** Isolation contactor for each zone
- **Console Power:** 100 amp main circuit breaker
- **Power Transformer:** 392°F (200°C) over temperature thermostat per phase
- **Cooling fan:** 340 CFM - Thermally protected

### **Maintenance Requirements:**

#### **Inspection and Cleaning:**

<b><u>ITEM</u></b>	<b><u>INSPECTION</u></b>	<b><u>FREQUENCY</u></b>	<b><u>ACTION</u></b>
Contactors	Burned or Pitted	Every 6 months	Clean or replace contacts
Temperature Controllers	Calibration	Every 12 months	Check accuracy and adjust if required
System Cleanliness		Every 6 months	Vacuum with power disconnected
System Electrical	Loose connections	Every 6 months	Tighten all terminal connections
Air Vents and fan	Dust or dirt build up	Every 3 months	Clean with vacuum with power disconnected
Check bolts and screws	Loose	Every 6 months	Tighten

## **B2005-6 Basic Six Way Heat Treatment Console Operating Instructions:**

1. Switch 100 amp main circuit breaker to the “ON” position.
2. Make sure zones used are indicating the actual temperature on the controllers prior to start and then turn rocker switches to the “ON” position.
3. Decide on the heat treatment specification and set as follows:

**Step 1:** Press the scroll key (O) until rP appears, then set degrees per hour (**Ramp-Rate**) by using the up or down key. (^, v)

**Step 2:** Press the up to down key (^, v) to set the **Final Set-Point** ie.) the bottom display  
 \*Note\* When the controller temperature reaches the **Final Set-Point** it will hold that temperature continuously.

**Step 3:** Make sure the **SPrP (set point-ramp/Initial Set-Point)** is the same as the actual temperature of the controller. If not, turn controller off then back on (by toggling the rocker switch, to off position, then back on CONT position). This will change the SPrP (Initial Set-Point) to the actual temperature.

**Step 4:** For heating or cooling turn the **Final Set-Point** up or down and adjust **Ramp-Rate** (rP) as per requirements.

**Step 5:** Turn percentage timer between 7-10 on scale if equipped.

**NOTE:** When the controller is turned on, it automatically sets the **SPrP (set point-ramp/Initial Set-Point)** from the thermocouple (t/c) temperature. At this point in time it starts to count up or down to the **Final Set-Point**. The **SPrP (set point-ramp/Initial Set-Point)** **cannot** be changed manually, except by turning the controller off, then on. – **ALWAYS:** Change the **Ramp-Rate** before changing the **Final Set-Point** when changing stages. The controller **cannot** be **paused/held** at a temperature during the ramp stage, except by changing the **Final Set-Point** to the desired temperature.

## **6600 CONTROLLER** **CALIBRATION INSTRUCTIONS:**

$\frac{1}{4}$ -DIN,  $\frac{1}{8}$ -DIN &  $\frac{1}{16}$ -DIN Temperature Controllers - Input Calibration Procedure

### **$\frac{1}{4}$ -DIN, $\frac{1}{8}$ -DIN & $\frac{1}{16}$ -DIN TEMPERATURE CONTROLLERS INPUT CALIBRATION PROCEDURE**

September 1996

**NOTE:** Calibration should be attempted only on Controllers on which calibration errors have been encountered (see **CALIBRATION CHECK**) and should only be performed by personnel who are technically competent and authorised to do so.

#### **CALIBRATING THE UNIVERSAL INPUT**

##### **Equipment Required**

1. Input source with an accuracy better than  $\pm 0.05\%$  of reading:
  - (a) Thermocouple inputs - complete with  $0^{\circ}\text{C}$  reference facility, appropriate thermocouple functions and compensating leads (or equivalent).
  - (b) DC linear inputs - 0 - 5V and 0 - 20mA.
  - (c) RTD inputs - decade resistance box with connections for three-wire input (or equivalent)
2. Appropriate case assembly ( $\frac{1}{4}$ -DIN,  $\frac{1}{8}$ -DIN or  $\frac{1}{16}$ -DIN) wired for appropriate input supply (90 - 264V AC 50/60Hz, 20 - 50V AC 50/60Hz or 22 - 65V DC).

##### **Calibration Procedure**

1. Ensure that the Controller is powered-off and that the mains (line) lead is disconnected. On the CPU PCB, fit the appropriate link jumpers (see Table 1 and Figure 1, Figure 2 or Figure 3 as appropriate to the type of Controller). Connect the appropriate input lead (see Figure 4 or Figure 5).
2. Connect the mains (line) lead to the Controller. Power-up the Controller and leave switched on for five minutes (for RTD and DC Linear inputs) or 30 minutes (for thermocouple inputs), then power-down.
3. Put the Controller in Calibration Mode by powering-up the Controller and, within 30 seconds of power-up, holding down the Lower and Function keys simultaneously for approximately five seconds. The upper display will then show Input Type Number, in the form:

The upper display shows the text 'IP\_1' in a digital font, indicating Input Type 1.

and the lower display will show:

The lower display shows the text 'CAL' in a digital font, indicating Calibration Mode.

Using the Raise/Lower keys, change the input type number as required (see Table 1).

**NOTE:** If required, only one input type may be calibrated. **Exception:** If it is required to calibrate the thermocouple input (Input Type 5), it is necessary first to calibrate the DC 0 - 50mV input (Input Type 1).

4. Press the Auto/Manual key to change the upper display to show:

The upper display shows four dashes '----', indicating a successful calibration.

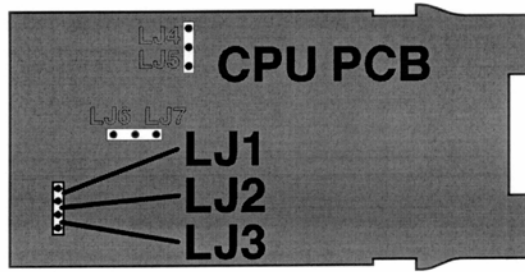
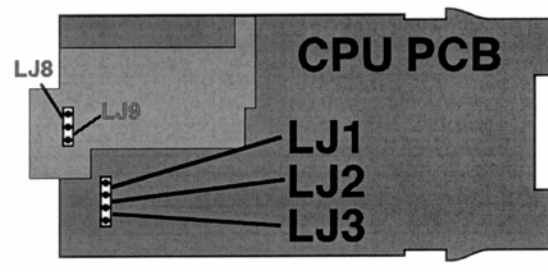
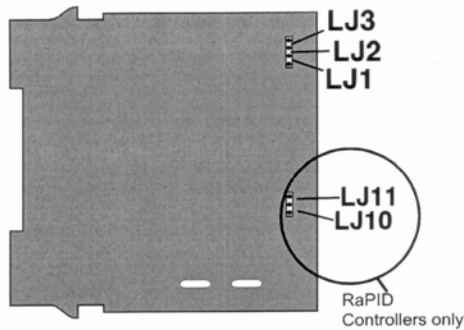
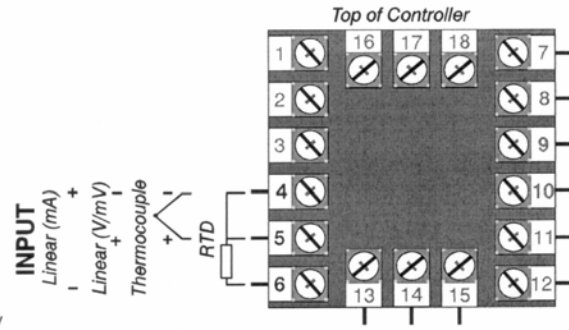
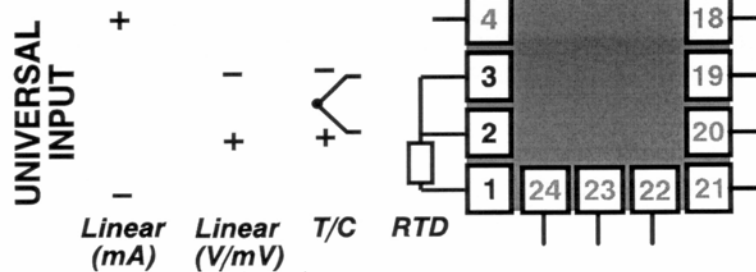
After a few seconds, the upper display will either (a) return to the initial Input Type Number display if calibration was successful, or (b) display:

The upper display shows the text 'FAIL' in a digital font, indicating a failed calibration.

In the latter case, the link jumpers and wiring should be checked.

Table 1 Universal Input Type Selection

Input Type No.	Input Type	Calibration Input	Link Jumper Settings		
			LJ1	LJ2	LJ3
1	DC - 0 - 50mV	50mV DC	Parked	Parked	Parked
2	DC 0 - 10V	10V DC	Fitted	Parked	Parked
3	DC 0 - 20mA	20mA DC	Parked	Fitted	Parked
4	RTD Three-wire	200 $\Omega$	Parked	Parked	Parked
5	Thermocouple	0°C "K"	Parked	Parked	Fitted

Figure 1  $\frac{1}{16}$ -DIN Link Jumpers (Relay/SSR Output 1)Figure 2  $\frac{1}{16}$ -DIN Link Jumpers (DC Output 1)Figure 3  $\frac{1}{4}$ -DIN/ $\frac{1}{8}$ -DIN Series Link JumpersFigure 4  $\frac{1}{16}$ -DIN Universal Input ConnectionsFigure 5  $\frac{1}{4}$ -DIN/ $\frac{1}{8}$ -DIN Universal Input Connections



$\frac{1}{4}$ -DIN,  $\frac{1}{8}$ -DIN &  $\frac{1}{16}$ -DIN Temperature Controllers - Input Calibration Procedure

5. To calibrate all inputs, repeat Steps 1 to 4 for each of the other input types (see Table 1) until all five input types have been successfully calibrated.

**NOTE:** Input Type 5 should be calibrated using the appropriate Type K compensating lead (between Terminals 2 & 3 on  $\frac{1}{4}$ -DIN/ $\frac{1}{8}$ -DIN Controllers, Terminals 4 & 5 on  $\frac{1}{16}$ -DIN Controllers.). The Controller should be powered-up and remain powered up for at least 30 minutes with this lead connected before the input is calibrated.

The universal input calibration procedure is now complete.

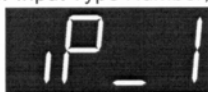
## CALIBRATING THE SECONDARY ANALOGUE INPUT (RaPID CONTROLLERS ONLY)

### Equipment Required

1. DC linear input source (0 - 5V and 0 - 20mA) with an accuracy better than  $\pm 0.05\%$  of reading.
2. Appropriate case assembly ( $\frac{1}{4}$ -DIN or  $\frac{1}{8}$ -DIN) wired for appropriate input supply (90 - 264V AC 50/60Hz, 20 - 50V AC 50/60Hz or 22 - 65V DC).

### Calibration Procedure

1. Ensure that the Controller is powered-off and that the mains (line) lead is disconnected. On the CPU PCB, configure link jumpers LJ10 and LJ11 (see Table 2 and Figure 3). Connect the remote set-point input lead (see Figure 6).
2. Connect the mains (line) lead to the Controller. Power-up the Controller and leave switched on for five minutes, then power-down.
3. Put the Controller in Calibration Mode by powering-up the Controller and, within 30 seconds of power-up, holding down the Lower and Function keys simultaneously for approximately five seconds. The upper display will then show Input Type Number, in the form:



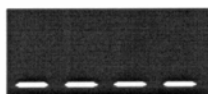
and the lower display will show:



Using the Raise/Lower keys, change the input type number as required (see Table 2).

**NOTE:** If required, only one input type may be calibrated.

4. Press the Auto/Manual key to change the upper display to show:



After a few seconds, the upper display will either (a) return to the initial Input Type Number display if calibration was successful, or (b) display:



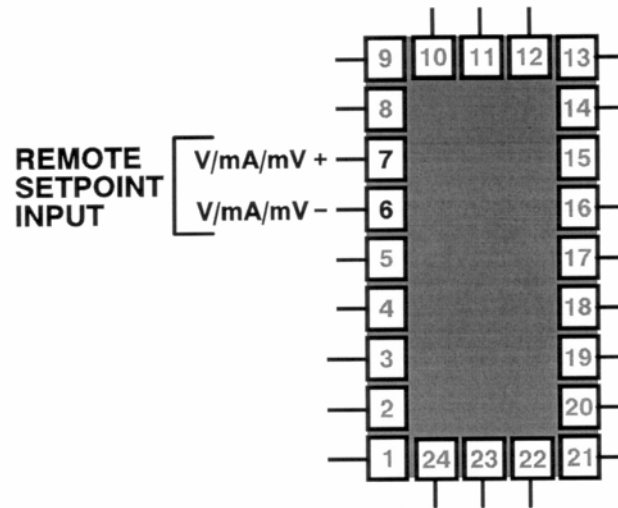
In the latter case, the link jumpers and wiring should be checked.

5. To calibrate all inputs, repeat Steps 1 to 4 for each of the other input types (see Table 2) until all three secondary analogue input types have been successfully calibrated.

Table 2 Secondary Analogue Input Type Selection

Input Type No.	Input Type	Calibration Input	Link Jumper Settings	
			LJ10	LJ11
7	Remote Setpoint, Linear DC mV	50mV DC	Parked	Parked
8	Remote Setpoint, Linear DC V	10V DC	Parked	Fitted
9	Remote Setpoint, Linear DC mA	20mA DC	Fitted	Parked

**NOTE:** No calibration is required if the secondary analogue input is to be used as a Remote Setpoint Potentiometer input or for Dual Setpoint switching.

Figure 6  $\frac{1}{4}$ -DIN/ $\frac{1}{8}$ -DIN Controllers - Secondary Analogue Input

#### EXIT FROM CALIBRATION MODE

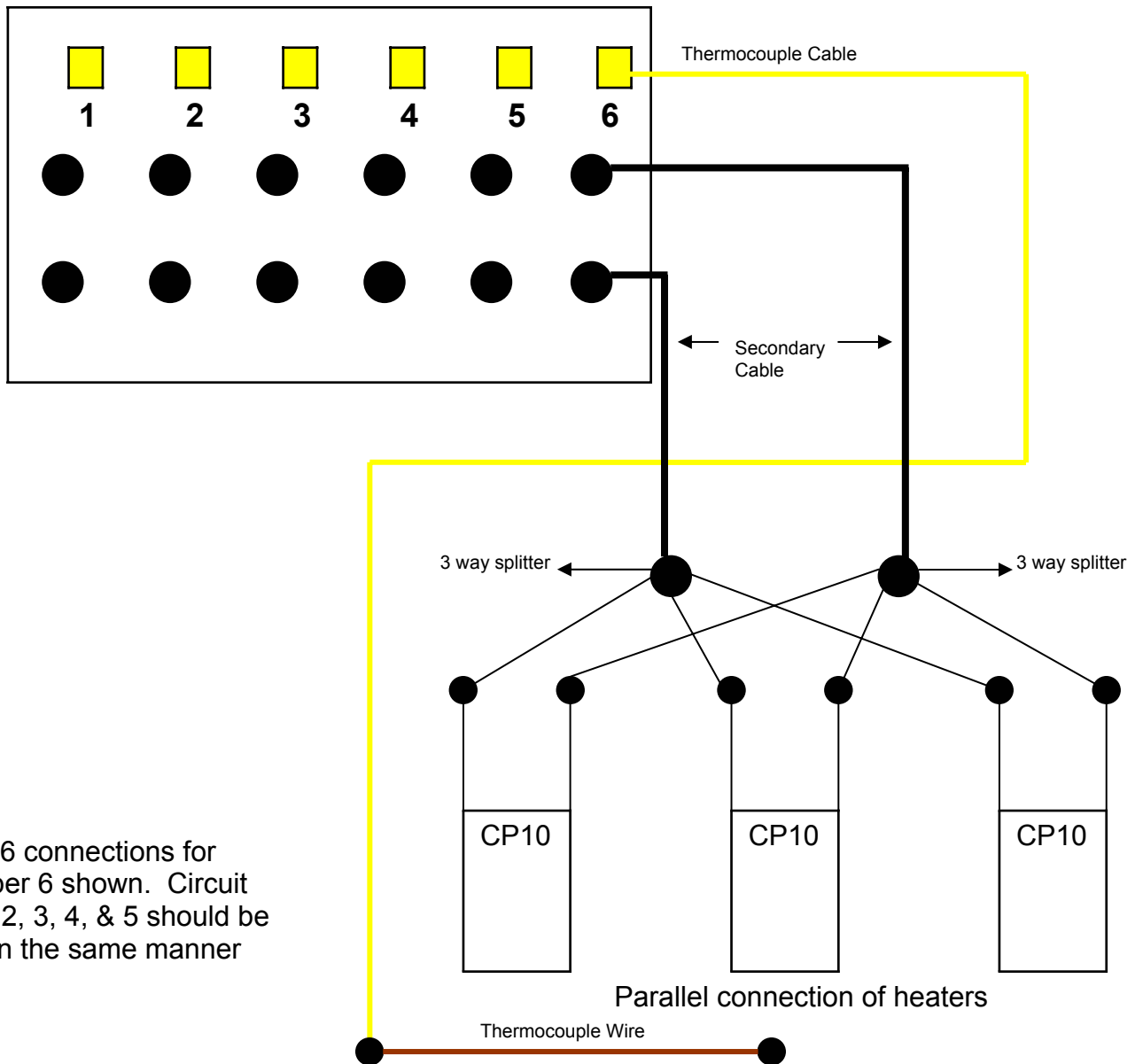
To exit from Calibration Mode, press the Lower and Function keys simultaneously.

**NOTE:** An automatic exit is made from Calibration Mode if there is no key activity for two minutes.

#### CALIBRATION CHECK

1. Set the Controller to the required configuration (using link jumpers and front panel entry) as described in the appropriate Product Manual.
3. Power-up the Controller and leave it powered-up for at least five minutes (for RTD and DC linear inputs) or at least 30 minutes (for thermocouple inputs).
2. After the appropriate delay for stabilisation has elapsed, check the calibration by connecting the appropriate input source and checking a number of cardinal points.

## **B2005-6 6 Way Heat Treatment Console System Connections:**



### **Note:**

The B2005-6 connections for circuit number 6 shown. Circuit numbers 1, 2, 3, 4, & 5 should be connected in the same manner

### TO CHANGE SECONDARY AND PRIMARY CONNECTIONS FOLLOWS THESE INSTRUCTIONS:

1. Switch off main breaker and disconnect primary power cable supply.
2. Loosen the primary power cable clamp.
3. Remove panel labelled "Back Panel" to change secondary and primary connections.
4. Change connections as per requirements and make sure the connections are tight.
5. Make sure nothing is left inside the enclosure.
6. Put the "Back Panel" back on.
7. Tighten the primary power cable clamp.
8. Hook up primary power cable supply and then switch on main breaker when ready.



- 75 KVA/60 KW
- Primary 380/415/440/480/575, 3 Phase
- Secondary 0/65/85, Single Phase
- (1 P.H.) 110 volt @ 1200 VA, Single Phase
- Isolation
- Copper wound
- Over temperature thermostat per phase

#### Transformer:

Weight: 660 lbs (approx.)  
Dimensions: 24" L x 17" W x 21" H

#### Features:

- All connections in back for easy access.
- Class 220 insulation.
- 150 degrees C. temperature rise.
- CSA certified.
- UL listed.
- Manufactured to ISO9001 quality certification.

#### ORDERING INFORMATION:

**MSPART#** - 75KVA #7 - 3 phase *isolated* copper wound power transformer. Primary 380/415/440/480/575, 50/60 Hz secondary 0/65/85 (Thermal trips per phase to prevent overload).

#### CHANGING TAPPINGS:

PRIMARY VOLTAGE	CURRENT 18 x 80V Heaters	CONNECTION
575 VAC	76 amps	1-1-1
480 VAC	91 amps	2-2-2
440 VAC	99 amps	3-3-3
415 VAC	105 amps	4-4-4
380 VAC	114 amps	5-5-5

SECONDARY VOLTAGE	CURRENT	CONNECTION
65 volts	384 amps per phase	65-65-65 as marked
85 volts	312 amps per phase	85-85-85 as marked

**\*\*NOTE:** Optional 125 amp circuit breaker required for 380VAC/415 Primary Voltage

## **SPARE PARTS FOR B2005-6 HEAT TREATMENT CONSOLE**

<b>MS Part No.</b>	<b>Description Of Part</b>
SS 2005	Stainless Steel Cabinet for B2005-6
900Wheel	Wheel Swivel Caster (900 lb Capacity with brake)
6600	6600 (1/16 DIN) Digital Temperature Controller
75KVA #7	75 KVA - 3 Phase <i>Isolated</i> copper wound power transformer: Primary 380/415/440/480/575, 50/60 Hz Secondary 0/65/85 (Thermal trips per phase to prevent overload)
Amp Meter	Digital Amp Meter 0-200 amps
Selector Switch	Six Channel Selector Switch with Plate & Knob
CT	Current Transformer 0-200 amps
A10	300 amp Female Panel Mount Socket Complete
PP-20-KX	Thermocouple Extension Cable
A37-EL	200 amp contactor (100% Duty Cycle)
A38	110 Volt Neon
46F4171	ON/OFF Rocker Switch
Merlin 100 amp	100 amp - 3 phase Circuit Breaker with 120 volt uv Release
Merlin 125 amp	Optional for 380/415: 125 amp - 3 phase Circuit Breaker with 120 volt uv Release
56F874	5 amp Circuit Breaker
56F876	10 amp Circuit Breaker
F-A18	Female Thermocouple Panel Mount (Type "K")
Fan	340 CFM Cooling Fan
120 V	120 VAC Ground Fault Receptacle
96F4496	3 Pole Terminal Block
#1 Tinned	#1 Tinned Cable with lugs (please specify length)
#4 Tinned	#4 Tinned Cable with lugs (please specify length)
90F7177	Lug 1/0 - 3/8 Hole
AL1/4	Aluminium Lugs 1/4" Hole