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WELD SEQUENCE CONTROLLER

Operation / Installation Manual

Manual Part Number: S8M5012
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1.0 GENERAL DESCRIPTION

1.1 Overview

The following is a brief description of the WSC II™ Weld Sequence Controller. The WSC II controller is based on an embedded micro controller. The Controller provides two 0-10 VDC programmable outputs, one is used to control the power source and the second, controls a Wire Feed Motor Drive Control. The Controller provides 32 user selectable weld schedules.

1.2 Control Outputs

The controller has five solid-state isolated relay outputs. One output is configured as an arc start signal to the power source. The remaining four has the following default configuration:

- **CR1 - Ready** – This output is asserted when the Controller is operating normally. It will reset when the controller is in ESTOP or an Internal/External fault has occurred.

- **CR2 - Arc Active** – This output is asserted after the arc is established. The signal is generated from the power source. The output is cleared if a loss of arc is detected, internal Program fault, or the cycle start signal is reset.

- **CR3 - Cycle Complete** – This output is asserted when the programmed weld cycle has been completed. If a fault or loss of arc has occurred during the cycle the Cycle complete will not be set.

- **CR4 - Cycle Active** – This output is active during the complete weld cycle and will be cleared at the end of all programmed events.

1.3 Control Inputs

The Controller provides nine 24 VDC Optically isolated inputs. Three inputs are dedicated for ESTOP, Arc Active and Cycle Start. The Arc Active input must be provided by the power source. The ESTOP input may be internally set to the active state. The remaining seven inputs may be configured for remote schedule or program control. The nine inputs have the following default configuration:

- **ESTOP** – This input must be active. If the ESTOP is cleared the control performs an emergency stop and halts the weld cycle and resets all outputs. When asserted the controller performs a power up sequence.

- **ARC ACTIVE** – When asserted the controller will initiate the Start Timer Event. If the weld is not initiated within two seconds of cycle start the control will terminate the weld cycle and clear the Ready Output. The user must clear the Cycle start input to reset the Ready output.

- **INP 1 – SCHED 0** – User definable spare input. Under remote schedule mode this input can be used for weld schedule selection (Bit 0).

- **INP 2 – SCHED 1** – User definable spare input. Under remote schedule mode this input can be used for weld schedule selection (Bit 1).

- **INP 3 – SCHED 2** - User definable spare input. Under remote schedule mode this input can be used for weld schedule selection (Bit 2).

- **INP 4 – SCHED 3/ PARAMETER SELECT** – Input 4 is a two function User definable INPUT. When the WSC II is placed in the Remote Schedule Select mode Input 4 can be used for weld schedule selection (Bit 3).

  When the Remote Schedule Select Mode is **not selected** Input 4 is used as a SELECT input for the VOLTS/AMPS Parameter or for the WIRE FEED SPEED Parameter during a Weld Cycle. In this mode, **when Input 4 is OFF**, Input 5 is used to decrease the VOLT/AMP Parameter while welding and Input 6 is used to increase the VOLT/AMP Parameter while welding. **When Input 4 is ON**, Input 5 is used to decrease the WIRE FEED SPEED Parameter while welding and Input 6 is used to increase the WIRE FEED SPEED Parameter while welding. The WIRE FEED SPEED option is only active when the optional wire drive control is installed and when the Remote Schedule Select Mode is not enabled.

- **INP 5 – SCHED 4/ DECREASE PARAMETER/JOG WIRE CCW** – Input 5 is a three function User definable input. When the WSC II is placed in the Remote Schedule Select mode Input 5 can be used for weld schedule selection (Bit 4).

  When the Remote Schedule Select Mode is **not selected** Input 5 is used as a VOLT/AMP or WIRE FEED SPEED Decrease input during the weld process. See Input 4 for parameter select. When the WSC II is not in the weld mode Input 5 is the JOG Wire Reverse (CCW) Input. The WIRE FEED SPEED and JOG WIRE FORWARD options are only active when the optional wire drive control is installed and when the Remote Schedule Select Mode is not enabled

- **INP 6 – JOG WIRE CW/ INCREASE PARAMETER** - Input 6 is a two-function User definable input. When the WSC II is placed in the Remote Schedule Select mode Input 6 can be used for JOG WIRE FORWARD (CW) when not in the Weld Mode.

  When the Remote Schedule Select Mode is **not selected** Input 6 is used as a VOLT/AMP or WIRE FEED SPEED Increase input during the weld process. See Input 4 for parameter select. When the WSC II is not in the weld mode Input 6 is the JOG Wire Forward (CW) Input. The WIRE FEED SPEED and JOG WIRE FORWARD options are only active when the optional wire drive control is installed and when the Remote Schedule Select Mode is not enabled

- **INP 7 – ARC ACTIVE –** This input is for the ARC ACTIVE signal from the Power Source (if available) to the WSC II. If an external ARC ACTIVE Signal is not available a jumper must be installed between TB 9-5 and TB 8-1 of the WSC II Terminal PCB.

- **INP 8 - CYCLE START** – This input, when asserted, will start a weld cycle and must be active during the complete weld cycle. If the input is reset the cycle will be terminated. If the Spot Weld mode is enabled, the weld cycle will be terminated by the user defined weld time. The Cycle start input must be reset before the next weld cycle can be initiated.

1.4 Remote Schedule Select

Note: The values stored in the WSC II weld schedule parameters must be entered and saved by the operator prior to use of the Weld Control. Improper weld schedule parameter values may result in damage to the part being welded and to equipment.

Caution should be used when selecting weld schedules during the weld process. The weld control will load and run the saved values for the schedule selected through the Remote I/O when the Remote Schedule Select Mode is active. Any change in the state of the Remote I/O will generate a schedule change.

When activated the Remote Weld Schedule select function will allow the Binary selection of weld schedules using inputs 1 through 5 (31 Schedules). The user must enter and save the desired Weld Schedule Parameter Values prior to the use of the Weld Control. (See 2.4 Setting and Changing Weld Schedule Parameters) During the Weld Process any changes to the Weld Schedule Parameters will take effect immediately.

If the user wishes to make a change to a weld schedule other than the schedule selected through the Remote I/O, the user must select the correct schedule through the Remote I/O (Binary) and then make the desired changes or disable the Remote Schedule Select Function and load the desired schedule to change using the Front Display Panel and then make the desired changes. (See 2.4 Setting and Changing Weld Schedule Parameters)

BINARY Remote Input Weld Schedule Table

SCHEDULE	IN1	IN2	IN3	IN4	IN5
1	0	0	0	0	0
2	1	0	0	0	0
3	0	1	0	0	0
4	1	1	0	0	0
5	0	0	1	0	0
6	1	0	1	0	0
7	0	1	1	0	0
8	1	1	1	0	0
9	0	0	0	1	0
10	1	0	0	1	0
11	0	1	0	1	0
12	1	1	0	1	0
13	0	0	1	1	0
14	1	0	1	1	0
15	0	1	1	1	0
16	1	1	1	1	0
17	0	0	0	0	1
18	1	0	0	0	1
19	0	1	0	0	1
20	1	1	0	0	1
21	0	0	1	0	1
22	1	0	1	0	1
23	0	1	1	0	1
24	1	1	1	0	1
25	0	0	0	1	1
26	1	0	0	1	1
27	0	1	0	1	1
28	1	1	0	1	1
29	0	0	1	1	1
30	1	0	1	1	1
31	0	1	1	1	1

2.0 CONTROL SPECIFICATION

2.1 WSC II Standard Enclosure Specification

The WSC II consists of three P.C. Board assemblies. A Main CPU P.C. board Weld I/O P.C. Board, Weld I/O Terminal P.C. Board and an optional Display/Keypad P.C. Board and a two-line 16-character LCD display. All external user connections are made via seven P.C. Board mounted screw terminal blocks. The controller is designed to allow the addition of a Capstan PWM motor drive controller, which can be used to control the Capstan Wire Feed system. The PWM module is installed inside the control enclosure. This consists of a transformer, power supply P.C. Board assembly, and PWM motor control P.C. Board assembly and wiring harness.

2.2 Control Cables and Connectors

The enclosure has a 14-pin AMP CPC Power Supply Control connector to interface to a welding power source, a 16-pin CPC Remote I/O connector and a rigid mounted 6 ft 115 VAC molded cable is used to provide power to the controller. Provisions are made to allow a rigid mounted Capstan™ drive motor cable and PWM Motor drive control. This option allows the WSC II to program and control a Capstan™ wire feed drive. An eight-pin Circular connector is provided to allow interconnection of an optional analog remote control feature. A RS-232-C Female DB-9 connector is provided to allow off-line programming of the weld schedules.

2.3 Controls and Status Indicators

The following is a summary of the control switches and status indicators:

- **POWER SWITCH** – Illuminated rocker switch applies power to the controller.
- **PROGRAM/RUN –** Key Lock switch that enables the WSC II program mode. When the switch is in the program position the user has full access to the controller weld schedules and configuration parameters. When set in the program position the operator can only change the parameters enabled within a specified high/low limit. To **save schedule** changes entered in the Program Mode the key switch must be rotated back to the **RUN** Position. If the WSC II is powered down prior to rotating the key switch to the RUN position the **changes will not be saved**.
- **SELECT –** This momentary pushbutton switch is used to select the WSC II parameter to be modified. Editing of the selected parameter is only allowed when the key switch is in the program position.
- **INC /DEC –** These two momentary push buttons are used to increase or decrease the selected parameter. Editing of the selected parameter is only allowed when the key switch is in the program position.
- **ESTOP LED** – Indicates when the controller is in a ESTOP condition.
- **WELD ON LED** – Indicates when the weld contactor is active.
- **READY LED** – Indicates when the WSC II is ready to accept input/output commands.
- **ARC ON LED** – Indicates when the user supplied arc active input is asserted.
- **COMPLETE LED** – Indicates when the weld event cycle is complete.

- **ACTIVE LED** – Indicates when the weld event is active.
- **FAULT LED** - Indicates when an external or internal fault has occurred.
- **INP 1 LED** - Indicates when remote user input 1 is active.
- **INP 2 LED** - Indicates when remote user input 2 is active.
- **INP 3 LED** - Indicates when remote user input 3 is active.
- **INP 4 LED** - Indicates when remote user input 4 “SELECT” is active.
- **INP 5 LED** - Indicates when remote user input 5 “CCW/DEC” is active.
- **INP 6 LED** - Indicates when remote user input 6 “CW/INC” is active.
- **INP 7 LED** - Indicates when remote user input 7 “ARC ON” is active.
- **INP 8 LED** - Indicates when remote user input 8 “CYCLE START” is active.

2.4 Setting and Changing Weld Schedule Parameters

Setting the Weld Schedule Parameter Values is a simple process. Once the Weld Control has been installed and connected to the system the user must enter the desired Weld Schedule Parameter Values for the weld process (See Chapter 6). The parameter values can be entered through the front panel of the WSC II or through the RS-232 connection using a terminal program and the terminal commands. (See Chapter 7 for Terminal Protocol.)

To enter changes to the WSCII **SETUP PARAMETERS** perform the following:

- Rotate the **MODE** Key Switch to the **PGM** position.
- The WSC II Display will read **Weld Parameters**. Press the **INC** or the **DEC** button.
- The WSC II Display will read **Setup Parameters**. Press the **SELECT** button.
- The WSC II Display will read **REMOTE SCHEDULE SELECT=NO** (Default Setting). If you **do not want** to change the REMOTE SCHEDULE SETTING press the **INC** button. If you want to **Enable** the REMOTE SCHEDULE SELECT press the SELECT button and then press the INC or the DEC button. The **NO** will change to a **YES**. Press the SELECT button to save the changed value. Use the same process to change the value to a NO to **disable** the REMOTE SCHEDULE SELECT function. To proceed to the next parameter, press the **INC** button.
- The WSC II Display will read **GTAW Mode=NO** (default setting) If you **do not want** to change the **GTAW Mode** press the **INC** button. If you want to **Enable** the GTAW Mode press the SELECT button and then press the INC or the DEC button. The **NO** will change to a **YES**. Press the SELECT button to save the changed value. Use the same process to change the value to a NO to **disable** the GTAW Mode function. To proceed to the next parameter, press the **INC** button.
- The WSC II Display will read **GMAW Mode=NO** (default setting) If you **do not want** to change the **GMAW Mode** press the **INC** button. If you want to **Enable** the GMAW Mode press the SELECT button and then press the INC or the DEC button. The **NO** will change to a **YES**. Press the SELECT button to save the changed value. Use the same process to

change the value to a NO to **disable** the GMAW Mode function. To proceed to the next parameter, press the **INC** button.

NOTE: If the GTAW and the GMAW Modes are disabled (=NO) the WSC II will enter the PLASMA Mode.

- The WSC II Display will read **MAX AMP=XXX**. If you **do not want** to change the **MAX AMP Value** press the **INC** button. To change the MAX AMP value press the SELECT button and then press and hold the INC or the DEC button until the desired value is displayed. Press the SELECT button to save the changed value. To proceed to the next parameter, press the **INC** button.

- The WSC II Display will read **MIN AMP=XXX**. If you **do not want** to change the **MIN AMP Value** press the **INC** button. To change the MIN AMP value press the SELECT button and then press and hold the INC or the DEC button until the desired value is displayed. Press the SELECT button to save the changed value. To proceed to the next parameter, press the **INC** button.

- The WSC II Display will read **MAX WIRE SPEED=XXX**. If you **do not want** to change the **MAX WIRE SPEED Value** press the **INC** button. To change the MAX WIRE SPEED value press the SELECT button and then press and hold the INC or the DEC button until the desired value is displayed. Press the SELECT button to save the changed value. To proceed to the next parameter, press the **INC** button.

- The WSC II Display will read **MIN WIRE SPEED=XXX**. If you **do not want** to change the **MIN WIRE SPEED Value** press the **INC** button. To change the MIN WIRE SPEED value press the SELECT button and then press and hold the INC or the DEC button until the desired value is displayed. Press the SELECT button to save the changed value. To proceed to the next parameter, press the **INC** button.

To EXIT the SETUP Mode at any time, rotate the MODE Key Switch back to the RUN Position.

NOTE: When the MODE Key is placed from the PGM Position to the RUN position the WSC II will save any and all changes made to the current schedule displayed.

To enter changes to the WSCII **WELD PARAMETERS** perform the following:

- Rotate the **MODE** Key Switch to the **PGM** position.

- The WSC II Display will read **Weld Parameters**. Press the SELECT button.

- The Parameters displayed will change by the weld process selected. See Chapter 6 for a list of Parameters by Weld Process.

- Used the **INC** or **DEC** buttons to move forward or backwards until the desired Parameter is displayed. Press the **SELECT** Button. Use the **INC** or **DEC** key to change the Parameter to the desired value. Press the **SELECT** button to save the value to the schedule.

- To EXIT the Weld Parameter Mode and save changes, rotate the MODE Key Switch back to the RUN Position.

2.5 System Specifications

The following are the system specifications:

Weld Sequence Controller:

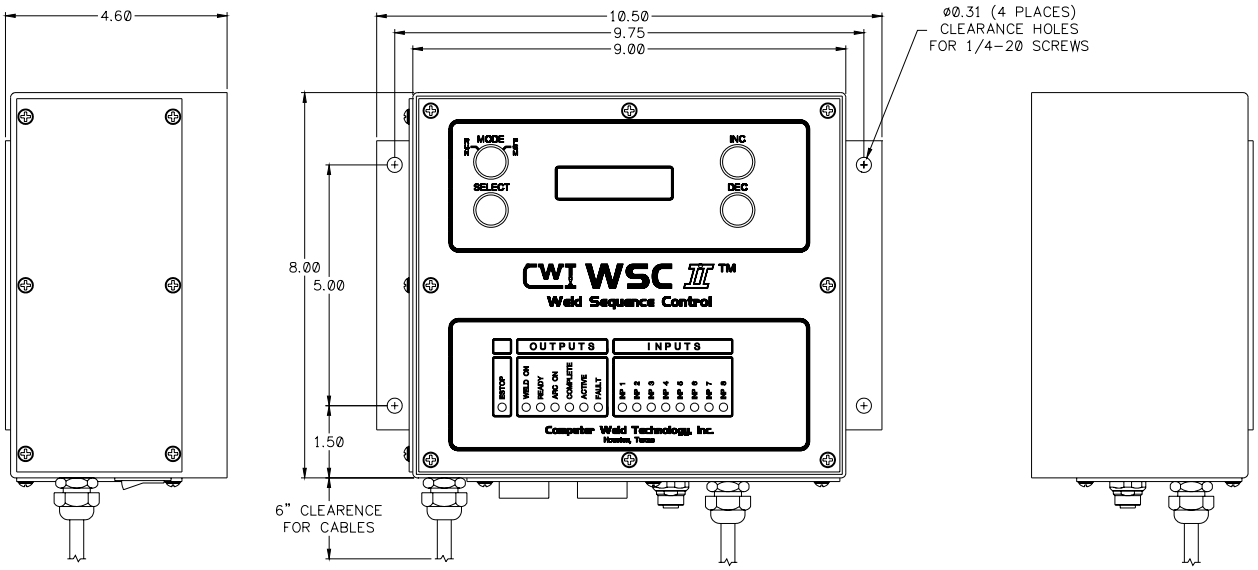
Dimensions:	8.0” H x 10.5” W x 4.6” D (203mm x 267mm x 117mm)
Power Input:	110 or 240 vac 50/60 hz @ 0.2kw
Operating Temp:	-10 ° F to +140° F (-23°C to +60°C)
Relay Outputs:	24vdc @ 1 amp normally open contact
Switch Inputs:	5 - 24 vdc @ 1.0 - 8.0 ma.
Analog Outputs:	10 vdc precision reference output. 10 bit resolution (10 mv resolution) Maximum output current 10 ma. Output is short circuit protected.
Encoder Input:	Pulse accumulator input 5.0 vdc TTL level with 4.7K pull-up. Maximum input frequency 15 khz.
Analog Inputs:	0-10 vdc input, 8-bit resolution, 10 K ohm impedance, non-isolated with over-voltage and polarity protection.

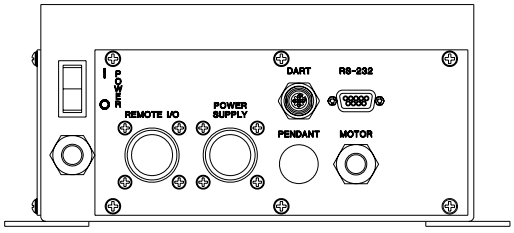
3.0 CONTROL INSTALLATION

3.1 Enclosure Installation

Install the Enclosure in a convenient location that allows easy operator access to the front control panel. Allow a minimum clearance of 6" (152mm) from the bottom of the enclosure to allow access for the external cable connections. Permanently mount the enclosure using the four mounting holes and ¼-20 mounting hardware. Connect the Power cable to a suitable source of AC power. Connect the Power supply remote cable to the "POWER SUPPLY CONTROL" receptacle. Connect the remote control I/O cable to the user supplied PLC or Robotic controller. If the applications requires an analog remote control of the Run time Volt/Current and Wire speed then connect the optional DART analog control cable to the user supplied 0-10 vdc source and the DART connector on the WSC II enclosure. If the Wire feed option has been installed connect the motor control cable to the wire drive motor.

3.2 Standard Enclosure Dimensions





BOTTOM VIEW

4.0 WELD SEQUENCE EVENTS

4.1 Weld Sequence Parameters

The WSC II Weld Sequence Controller provides the following user defined parameters:

- **START VOLTS/CURRENT** – The value of current to be used during the start time event.
- **START TIME** – The amount of time to hold the start current before beginning the Ramp Up Event.
- **RAMP UP TIME** – The time required to ramp from the start current to the run current.
- **RUN VOLTS/CURRENT** – The value of current to be used during the Run time of the weld cycle. If the optional Remote Analog option is enabled this value will be controlled with the Analog 1 input
- **WELD TIME** – The user defined spot weld time when enabled.
- **% TAPER VOLTS/CURRENT** - The % of Run current used as the end current level for the taper time and the start of the Ramp Down Event.
- **TAPER TIME** – The amount of time required for the Current Taper Event.
- **RAMP DOWN TIME** – The amount of time required to ramp from the % Taper current value to the End current value prior to the End Current Event.
- **END VOLTS/CURRENT** - The end cycle current level to be used during the End Cycle Time.
- **END TIME** – The amount of time required for the end weld event.

4.2 Pulse Weld Mode Parameters

If the Pulse mode is enabled, in the GTAW/PAW mode, the following parameters will be used to define the pulse conditions:

- **PULSE ON TIME** – Specifies the Pulse On time period when the Pulse mode is enabled.
- **PULSE OFF TIME** – Specifies the Pulse Off time period when the Pulse mode is enabled.
- **% PULSE CURRENT** – Specifies the percent of the Run current that will be used during the Pulse Off time period.

4.3 Weld Cycle Events

The Weld cycle is initiated by asserting the Cycle Start Input. The controller will monitor the Arc Active input and will assert the Active output when active. The controller will set the power source to the value specified by the Start Volt/Current Parameter. After the Start time has expired the Volt/Current output would be ramped to the Run Volt/Current value over the Ramp Up time specified. At the end of the Ramp Time the Run Volt/Current value will be active. If the Pulse mode is enabled, in the GTAW/PAW mode, the Pulse On time will be used to specify the time at Peak Current. The Pulse Off Time and Percent Current will be used to define the background pulse condition. If the Spot Time is Disabled the controller will continue to operate in the Run Event. When the Cycle Start

is reset the controller will begin the Taper Time and ramp the Run Volt/Current to the level specified by the Percent Taper parameter. If the Pulse mode is enabled in the GTAW/PAW mode, the pulsing will start during the Ramp Up event and will continue through the ramp down event. At the end of the ramp down time the controller will set the End Volt/Current value and will hold this value for the time specified by the End Time parameter. The Cycle Complete will be asserted at the end of the weld cycle when the Arc Active Signal has been cleared by the power source. The Cycle complete will remain set until the next Cycle start is asserted. To disable any weld event set the associated time to zero.

4.4 Spot Weld Mode

If the Spot Time mode is enabled the Taper Event will be started at the end of the Spot Weld Time. Then the normal end events will be executed. In this mode the Cycle Start must be active until the end of the weld cycle. The Controller will not reset the weld event until the Cycle input has been cleared. The Cycle complete will be asserted when the Arc Active Signal is cleared. The Cycle Complete Output will be cleared when the Cycle start is cleared. To enable the spot weld mode enter a time into the “Spot Weld Time” parameter. To disable the spot-weld mode set the “Spot Weld Time” to zero.

4.5 Arc Active Test

If the Arc Active input from the power source is not active within the user specified start time after the cycle start has been asserted, the controller will clear the weld event and reset the Ready Output. The Cycle Start input must be cycled off before the Ready Output can be asserted. If the Cycle start input is cleared prior to the weld event the controller will terminate the arc and will not set the Cycle Complete output.

5.0 USER INTERFACE

5.1 Remote Control Interface Specification

The WSC II Controller provides a remote control interface that allows the user to connect an external PLC or robotic control to the WSC II. The interface provides remote schedule select, cycle start and operational status indication. The WSC II inputs are opto-isolated and configured to operate from an 8 to 36 VDC power source. The inputs by default are configured for Pull-Up (Sourcing). They can be configured for Pull Down (Sinking) by setting the internal jumper JP22 to the "A" position on the terminal PC board.

A 12 VDC @ 200MA power supply (TB8) is provided to allow dry contact closures to activate the WSC II inputs. An external user supplied 24 VDC power source may also be used to power the WSC II I/O by setting the JP19 jumpers to "A&B" on the Terminal PC board.

All Relay Outputs are opto-isolated solid-state relays and will switch AC/DC loads up to 120 VAC at 1 amp. The User Outputs are, by Default, configured for Pull-Up (Sourcing). They can be configured for Sinking (Pull-Down) by setting the internal jumper JP21 to the "B" position on the Terminal PC board. To use the relay outputs as a dry contact remove the jumper from JP21. All of the Output relays are connected to a single Output common on the I/O remote connector.

An optional analog remote control cable can be used to control the run time Volt/Current and the Wire speed. The analog 0-10 VDC inputs are scaled by the user defined Max/Min ranges for the Volt/Current and Wire Speed, as set in the WSC II "Config System" menu. To activate this option the user must connect the two analog inputs to a 0-10 VDC source and connect the two enable wires Blue and Red together using a dry relay contact or wire nut.

5.2 Remote Control Interface

The WSC II controller allows remote control capabilities for use with PLC or robotic controllers, or manual user pendant. The control provides a 24-vdc interface that allows the user to Start/Stop the welding sequence, an ESTOP interface and Increment/Decrement control of selected weld parameters. The controller provides a simple hand shaking output that allows the Host controller to validate the weld sequence. Four 24 VDC sourcing relay outputs provide the following information to the host controller:

- **CR1 - Ready** – This output is asserted when the Controller is operating normally. The output will reset if the controller is in OFF or an Internal/External fault has occurred. May be used to provide a 24 VDC output for I/O control.

- **CR2 - Arc Active** – This output is asserted after the arc is established. The signal is generated from the external welding power source. The output is cleared if a loss of arc is detected, internal Program fault, or the cycle start signal is reset.

- **CR3 - Cycle Complete** – This output is asserted when the programmed weld cycle has been completed. If a fault or loss of arc has occurred during the cycle the Cycle complete will not be set. Output is cleared when Cycle Start input is reset.

- **CR4 - Cycle Active** – This output is active during the complete weld cycle and will be cleared at the end of all programmed events.

The interface also provides an ESTOP circuit and seven 24 VDC inputs that provide the following control functions:

- **ESTOP** – This input must be active. If the ESTOP is cleared the control performs an emergency stop and halts the weld cycle and resets all outputs. When asserted the controller performs a power up sequence. To enable the ESTOP function remove the jumper from JP18 located on the Weld Control I/O PC Board.

- **INP 1 – SCHED 0** – User definable spare input. Under remote schedule mode this input can be used for weld schedule selection (Bit 0).

- **INP 2 – SCHED 1** - User definable spare input. Under remote schedule mode this input can be used for weld schedule selection (Bit 1).

- **INP 3 – SCHED 2** - User definable spare input. Under remote schedule mode this input can be used for weld schedule selection (Bit 2).

- **INP 4 – SCHED 3/ PARAMETER SELECT** – Input 4 is a two function User definable INPUT. When the WSC II is placed in the Remote Schedule Select mode Input 4 can be used for weld schedule selection (Bit 3).

  When the Remote Schedule Select Mode is **not selected** Input 4 is used as a SELECT input for the VOLTS/AMPS Parameter or for the WIRE FEED SPEED Parameter during a Weld Cycle. In this mode, **when Input 4 is OFF**, Input 5 is used to decrease the VOLT/AMP Parameter while welding and Input 6 is used to increase the VOLT/AMP Parameter while welding. **When Input 4 is ON**, Input 5 is used to decrease the WIRE FEED SPEED Parameter while welding and Input 6 is used to increase the WIRE FEED SPEED Parameter while welding. The WIRE FEED SPEED option is only active when the optional wire drive control is installed and when the Remote Schedule Select Mode is not enabled.

- **INP 5 – SCHED 4/ DECREASE PARAMETER/JOG WIRE CCW** – Input 5 is a three function User definable input. When the WSC II is placed in the Remote Schedule Select mode Input 5 can be used for weld schedule selection (Bit 4).

  When the Remote Schedule Select Mode is **not selected** Input 5 is used as a VOLT/AMP or WIRE FEED SPEED Decrease input during the weld process. See Input 4 for parameter select. When the WSC II is not in the weld mode Input 5 is the JOG Wire Reverse (CCW) Input. The WIRE FEED SPEED and JOG WIRE FORWARD options are only active when the optional wire drive control is installed and when the Remote Schedule Select Mode is not enabled

- **INP 6 – JOG WIRE CW/ INCREASE PARAMETER** - Input 6 is a two function User definable input. When the WSC II is placed in the Remote Schedule Select mode Input 6 can be used for JOG WIRE FORWARD (CW) when not in the Weld Mode.

  When the Remote Schedule Select Mode is **not selected** Input 6 is used as a VOLT/AMP or WIRE FEED SPEED Increase input during the weld process. See Input 4 for parameter select. When the WSC II is not in the weld mode Input 6 is the JOG Wire Forward (CW) Input. The WIRE FEED SPEED and JOG WIRE FORWARD options are only active when the optional wire drive control is installed and when the Remote Schedule Select Mode is not enabled

- **INP 7 – ARC ACTIVE –** This input is for the ARC ACTIVE signal from the Power Source (if available) to the WSC II. If an external ARC ACTIVE Signal is not available a jumper must be installed between TB 9-5 and TB 8-1 of the WSC II Terminal PCB.

- **INP 8 - CYCLE START** – This input, when asserted, will start a weld cycle and must be active during the complete weld cycle. If the input is reset the cycle will be terminated. If the

Spot Weld mode is enabled, the weld cycle will be terminated by the user defined weld time. The Cycle start input must be reset before the next weld cycle can be initiated.

5.3 Remote I/O Connector Pin out

The Remote I/O Connector located on the bottom panel provides the Remote control functions. The user must connect the PLC, Robot I/O, or manual pendant to the Remote I/O Connector using the WSC II I/O cable assembly (P/N S3W5099). The following is the pin out for the Remote Pendant connector.

Pin	Mode	Description
1	Input	INP1 – 24 VDC input .Schedule bit 0 input when enabled
2	Input	INP2 – 24 VDC input .Schedule bit 0 input when enabled
3	Input	INP3 – 24 VDC input .Schedule bit 0 input when enabled
4	Input	INP4 – 24 VDC input .Schedule bit 0 input when enabled
5	Input	INP5/DEC – 24 VDC Input. When Asserted the specified parameter is decremented.
6	Input	INP6/INC – 24 VDC Input. When asserted the specified parameter is incremented.
7	Input	INP8/CYCLE START – 24 VDC input. When asserted the WSC II will start a weld cycle event.
8	Input	ESTOP – 24 VDC Input when asserted the WSC II operates normally. To enable jumper JP18 must be removed on Weld I/O PCB assembly.
9	Output	+24 I/O – Isolated unregulated 24 vdc @ 400 ma I/O power supply
10	Input	I/O COMMON – Common for Input and Output signals
11	Output	READY - 24 VDC output asserted when WSC II is functioning correctly
12	Output	ARC ON – 24 VDC Output is asserted when the Weld Arc Active input signal is asserted. Cleared when Weld Input Arc Active is cleared.
13	Output	CYCLE COMPLETE – 24 VDC Output is asserted when the WSC II weld event has successfully completed the weld event. Cleared when the CYCLE START input is cleared.
14	Output	CYCLE ACTIVE - 24 VDC Output is asserted during the WSC II weld event cycle. Will be cleared when cycle is complete
15	Output	FAULT – 24 VDC output is asserted if a internal or external fault occurs
16		Chassis Ground – Shield connection for control cable

Table 1 – Remote Pendant Connector Pin out

5.4 Optional Analog DART connector pin out

The Optional DART remote control cable (P/N X3W5110) is used to connect an external 0-10 VDC source to control the run time Volt/Current and Wire Speed parameters. The following is the pin out for the DART connector.

Pin	Mode	Description	Color
1	Output	(WHT) 12 VDC output asserted when WSC II is functioning correctly	WHT
2	Output	(BRN) COM – Return for the 12 VDC output signal	BRN
3	Input	ANL 1 – 0-10 VDC input. This input will set the RUN Volt/Current value. The input is scaled by the user defined Max/Min Volt/Current limit set in the WSC II.	GRN
4	Input	ANL COM – the common return for ANL 1 and ANL 2	YEL
5	Input	ANL 2 – 0-10 VDC input. This input will set the RUN Wire Speed value. The input is scaled by the user defined Max/Min Wire Speed limit set in the WSC II.	GRY
6	Input	ANL 3 – 0-10 VDC input. This input is not used and should be connected to ANL COM Pin 4.	PNK
7	Output	ENABLE – This 5 VDC TTL level, when tied to the DCOM input will enable the remote analog option. Use a dry contact closure or tie directly to PIN 8	BLU
8	Input	DCOM – Return for the Enable analog remote output	RED

Table 2 – DART analog cable/connector pin out

5.5 RS-232 Serial Port

All weld schedule programming can be performed off-line via a RS-232 serial port or using the internal display and program buttons. The Internal display allows the user to program all of the WSC II weld sequence parameters and to configure the controller operational modes. It can also be used to Save and Load internal weld schedules.

Pin	Mode	Description
1	Output	Null modem jumper to PC input DCD (Pin 1)
2	Output	TD – Transmit data output to PC RD (Pin 2)
3	Input	RD – Receive Data Input from PC TD (Pin3)
4	Input	Null modem jumper to PC input DTR (Pin 4)
5	Input	COM – Signal common from PC COM (Pin 5)
6	Output	DSR – Data Set Ready to PC DSR (Pin 6)
7	N/C	No Connection
8	Output	Null modem jumper to PC input CTS (Pin 8)
9	N/C	

Table 3 – RS-232 Terminal Port Connector Pin out

5.6 Automated User Interface

The WSC II controller allows full remote control capabilities for use with PLC or robotic controllers. The control provides a 24-vdc interface that allows the users to select weld schedules and to Start/Stop the welding sequence. The controller provides a simple hand shaking output that allows the Host controller to validate the weld sequence. Four relay outputs provide the following information to the host controller:

- **CR1 - Ready** – This output is asserted when the Controller is operating normally. It will reset when the controller is in ESTOP or an Internal/External fault has occurred.

- **CR2 - Arc Active** – This output is asserted after the arc is established. The signal is generated from the power source. The output is cleared if a loss of arc is detected, internal Program fault, or the cycle start signal is reset.

- **CR3 - Cycle Complete** – This output is asserted when the programmed weld cycle has been completed. If a fault or loss of arc has occurred during the cycle, the Cycle complete will not be set.

- **CR4 - Cycle Active** – This output is active during the complete weld cycle and will be cleared at the end of all programmed events.

The interface also provides an ESTOP circuit and six 24 VDC inputs that provide the following control functions:

- **ESTOP** – This input must be active. If the ESTOP is cleared the control performs an emergency stop and halts the weld cycle and resets all outputs. When asserted the controller performs a power up sequence.

- **INP 1 – SCHED 0** – User definable spare input. Under remote schedule mode this input can be used for weld schedule selection (Bit 0).

- **INP 2 – SCHED 1** - User definable spare input. Under remote schedule mode this input can be used for weld schedule selection (Bit 1).

- **INP 3 – SCHED 2** - User definable spare input. Under remote schedule mode this input can be used for weld schedule selection (Bit 2).

- **INP 4 – SCHED 3/ PARAMETER SELECT** – Input 4 is a two function User definable INPUT. When the WSC II is placed in the Remote Schedule Select mode Input 4 can be used for weld schedule selection (Bit 3).

  When the Remote Schedule Select Mode is **not selected** Input 4 is used as a SELECT input for the VOLTS/AMPS Parameter or for the WIRE FEED SPEED Parameter during a Weld Cycle. In this mode, **when Input 4 is OFF**, Input 5 is used to decrease the VOLT/AMP Parameter while welding and Input 6 is used to increase the VOLT/AMP Parameter while welding. **When Input 4 is ON**, Input 5 is used to decrease the WIRE FEED SPEED Parameter while welding and Input 6 is used to increase the WIRE FEED SPEED Parameter while welding. The WIRE FEED SPEED option is only active when the optional wire drive control is installed and when the Remote Schedule Select Mode is not enabled.

- **INP 5 – SCHED 4/ DECREASE PARAMETER/JOG WIRE CCW** – Input 5 is a three function User definable input. When the WSC II is placed in the Remote Schedule Select mode Input 5 can be used for weld schedule selection (Bit 4).

  When the Remote Schedule Select Mode is **not selected** Input 5 is used as a VOLT/AMP or WIRE FEED SPEED Decrease input during the weld process. See Input 4 for parameter select. When the WSC II is not in the weld mode Input 5 is the JOG Wire Reverse (CCW) Input. The WIRE FEED SPEED and JOG WIRE FORWARD options are only active when the optional wire drive control is installed and when the Remote Schedule Select Mode is not enabled

- **INP 6 – JOG WIRE CW/ INCREASE PARAMETER** - Input 6 is a two function User definable input. When the WSC II is placed in the Remote Schedule Select mode Input 6 can be used for JOG WIRE FORWARD (CW) when not in the Weld Mode.

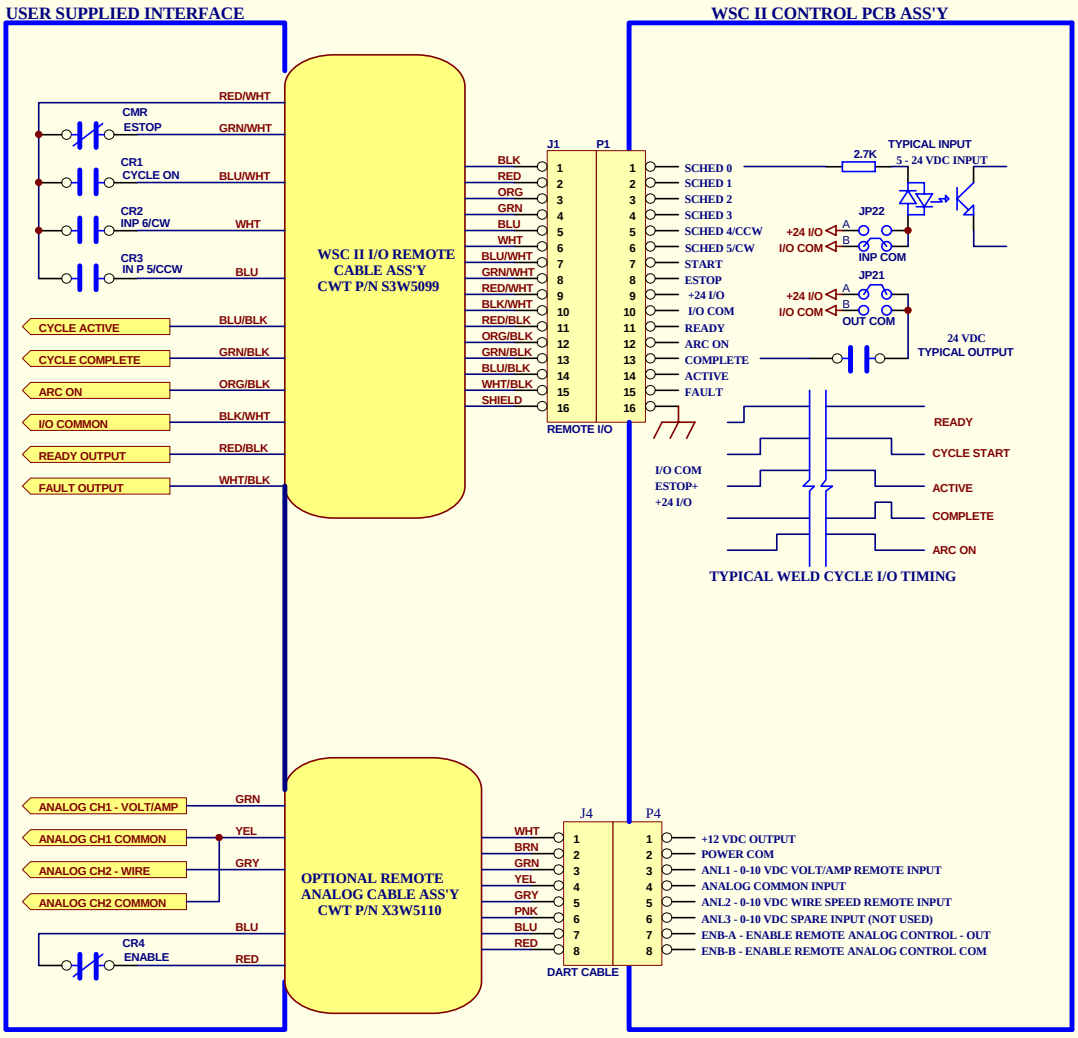
  When the Remote Schedule Select Mode is **not selected** Input 6 is used as a VOLT/AMP or WIRE FEED SPEED Increase input during the weld process. See Input 4 for parameter select. When the WSC II is not in the weld mode Input 6 is the JOG Wire Forward (CW) Input. The WIRE FEED SPEED and JOG WIRE FORWARD options are only active when the optional wire drive control is installed and when the Remote Schedule Select Mode is not enabled

- **INP 7 – ARC ACTIVE –** This input is for the ARC ACTIVE signal from the Power Source (if available) to the WSC II. If an external ARC ACTIVE Signal is not available a jumper must be installed between TB 9-5 and TB 8-1 of the WSC II Terminal PCB.

- **INP 8 - CYCLE START** – This input, when asserted, will start a weld cycle and must be active during the complete weld cycle. If the input is reset the cycle will be terminated. If the Spot Weld mode is enabled, the weld cycle will be terminated by the user defined weld time. The Cycle start input must be reset before the next weld cycle can be initiated.

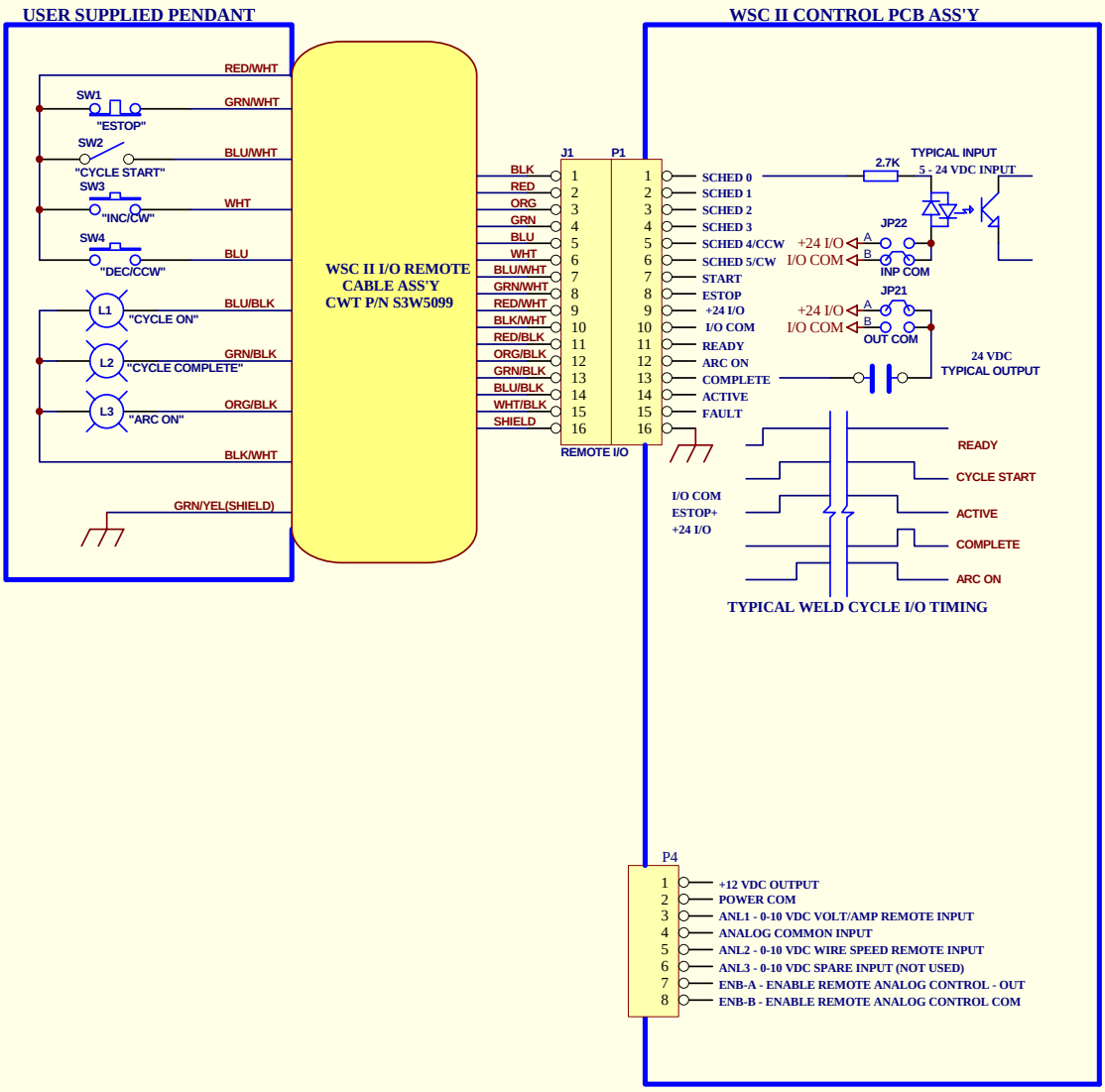
To use the Remote control interface the user must connect the PLC or Robot I/O to the remote I/O cable provided with the WSC II control assembly. The Remote Control function must be enabled via the RS-232 serial port terminal command. See Section 7 for additional information.

5.7 Typical User Interface for Automated Operation



PLC/ROBOTIC I/O WELD CONTROL INTERFACE

5.8 Typical User Interface for Manual Operation



MANUAL OPERATOR CONTROL INTERFACE

5.9 Power Source Control Connector

The Power Source Control Connector located on the rear panel provides the Remote Power Source control functions. The user must connect the welding power supply to the Power Source Connector using a power source specific control cable. Contact the factory for information and part numbers for various power source control cables. The following is the pin out for the Power Source Control connector.

Pin	Mode	Description
1	Output	DAC 1 – 0-10 VDC analog output for Voltage/Current control. Connect to power source remote reference wiper input
2	Output	D1COM – DAC 1 signal common connect to Power source remote reference LOW input
3	Output	DAC 2 – 0-10 VDC analog output for Wire speed control. Connect to Power source wire speed reference wiper input if available. May also be used as trim control for synergic power sources.
4	Output	D2COM – DAC 2 signal common connect to Power source remote wire speed LOW input +24 VDC I/O output – Provides a 24 VDC source for I/O control
5	Input	ARC ACTIVE – Arc Active input (10 – 36 VDC) from welding power source (INP7)
6	Input	WCOM – Weld remote Input common – If using PIN 7 for I/O power connect to PIN 8
7	Input	I/0 +24 VDC – Internal I/O power supply
8	Output	I/O COM – Internal 24 VDC power supply return
9	N/C	No internal connection
10	N/C	No internal connection
11	N/C	No internal connection
12	Output	WCR-A – Weld contactor isolated Dry relay contactor output
13	Output	WCR-B – Weld contactor isolated Dry relay contactor return
14	Output	Chassis Ground

Table 4 – Power Source Connector Pin out

6.0 OPERATIONAL DISPLAY AND PROGRAMMING

6.1 Static Weld Display Screens

The WSC II controller provides a two-line 16-character display and four control switches that allow the user to program the weld variables and to select the various weld schedules. When not altering parameters the display will indicate current status of the controller. The first line of the display will show the product type message. The second line will show the current set point value for the analog outputs that are enabled. The values displayed are the final values for each weld cycle event. The values are not varied during the ramp or pulse event but are set to the end or peak values. The actual values displayed are the result of the control mode and options installed. The following are the various Weld active Display screens that will be displayed, during a weld cycle, on the second line of the display.

DISPLAY	MESSAGE DESCRIPTION
AMP=###	This screen will be displayed for PAW and GTAW mode when the wire drive option is not installed. (Where: ### is the current set point value)
AMP=### WFS=###	This screen will be displayed for PAW and GTAW mode when the wire drive option is installed. (Where: ### is The current set point value)
VOL=##.# WFS=###	This screen will be displayed for GMAW mode. (Where: ### is The current set point value)

Table 1 - Static Screen Display Message

6.2 Static Display Screen Error Messages

During the weld cycle the WSC II controller performs diagnostic checks on the system and control inputs. If an error occurs the WSC II will display the error message on the second line of the static message screen. The following is a summary of the error messages:

DISPLAY	ERROR MESSAGE DESCRIPTION
SCHED 1 READY!	No Errors. Normal static message screen displays active schedule number.
PGM EVENT ERROR!	Program Event Error indicates the active weld schedule has an invalid event enabled. Error is automatically reset when Cycle start is cleared.
ARC ACTIVE FAIL!	The Start parameters are being ramped to the run level and the Ramp time delay is active.
SCHEDULE FAULT!	Schedule Fault Error indicates the active weld schedule has an invalid parameter. This error will occur when an out-of-range parameter is detected during a weld cycle. Error is automatically reset when Cycle start is cleared.
SYSTEM ESTOP	ESTOP message indicates that the WSC II controller has been forced into a Emergency stop condition by clearing the WSC II ESTOP input. When the ESTOP mode is active all WSC II outputs and weld events are cleared. The only recovery is to assert the ESTOP input signal.

Table 2 - Displayed Error Messages

6.3 Modifying Weld Schedule and System Parameters

TERMINAL MODE: The WSC II Control provides two methods for programming a weld schedule. The first method is to use a PC and the RS-232 serial port to program the schedules off-line. Refer to Section 7.0 for additional information on serial off-line programming.

> ***NOTE:*** *Removing power to the WSC II while in the PROGRAM MODE may cause errors in the WSC II Weld Schedule Parameters. Place the Front Panel Key-Lock Switch in the RUN position before powering the WSC II OFF.*

WSC II FRONT PANEL or Optional WRP II Pendent: To create, modify or load a schedule set the front panel key-lock switch to the *"PROGRAM"* position. The WSC II/WRP II will display the "*WELD PARAMETER*" menu option. Select this menu by pressing the "SEL" button. To change the Control configuration parameters press the "INC" or "DEC" button. The WSC II/WRP II will display the "*CONFIG PARAMETER*" menu option. To select a specific menu option, press the "SEL" button. After selecting a menu option the WSC II/WRP II will display the menu items and their current values on the display. To move forward through the menu items press the "*INC*" button. To move back to the previous menu item, press the "*DEC*" button. When moving through the menu items the WSC II/ WRP II will display the current value for each of the items selected. To change any selected item press the "*SELECT*" button. A Blinking cursor will be displayed. To increase the displayed value, press the "*INC*" button. To decrease the value, press the "*DEC*" button. To exit the edit routine press the "*SELECT*" button. The Blinking cursor will be cleared from the display. Move to the next item by pressing the "*INC*" or "*DEC*" buttons. To exit the schedule, edit routine turn the key-lock switch to the "RUN" position. If a value has been modified, by pressing the "*SELECT*" button, the display will show a "SAVING SCHEDULE**"** prompt indicating that the changes have been saved to the WSC II nonvolatile Memory. The WSC II/WRP II Display will then return to the normal Static display messages. (See paragraph 2.4)

6.4 Weld Schedule Parameter Menus

The WSC II controller can support several different options. Depending on which options are installed three different menus will be displayed. Each menu is specific to the available functions and features that are installed. Placing the WSC II/WRP II key-lock switch to the "**PGM**" position enables the edit function. One of the following Program menus will be displayed.

6.5 PAW Weld Schedule Menu Screens

DISPLAY	PARAMETER DESCRIPTION	RANGE	UNITS
START CURRENT AMP =	Weld cycle start current level.	1 - 500	Amps
START DELAY TIME =	The time period at the Start current level.	0 – 60.00	Sec.
RAMP UP TIME TIME =	The time that will be used to ramp the welding current from the start to the run value.	0 – 60.00	Sec.
RUN TIME CURRENT AMP =	The current level that will be used during the run time portion of the weld cycle.	1- 500	Amps
SPOT WELD TIME TIME =	The time period at the run current. If set the weld sequence will automatically terminate at the end of this time. If zero the user must clear the Cycle start signal to terminate the weld cycle.	0 – 650.00	Sec.
PERCENT TAPER TAPER % =	The percent of run current that will be reached at the end of the taper event.	1 – 100	%
TAPER DELAY TIME TIME =	The time period to perform the current taper event.	0 – 600.00	Sec.
RAMP DOWN TIME TIME =	The time period used to ramp the current from the Taper % level to the end current level.	0 – 60.00	Sec.
END CURRENT AMPS =	The current level that will be used during the end time period.	1 - 500	Amps
END DELAY TIME TIME =	The time period at the end current level.	0 – 60.00	Sec.
PULSE MODE MODE =	Enable/Disable the pulse weld mode. If enabled the pulse mode will be active from the start of the ramp up event to the end of the ramp down event.	0 – 1	Yes/No
PULSE ON TIME TIME =	The time period at the run current level when the pulse mode is active.	.001-60.000	Sec.
PULSE OFF TIME TIME =	The time period at the background current level when the pulse mode is active.	0.001-60.000	Sec.
% BACKGROUND AMP AMP % =	The percent of the peak current value that is used for the background current level.	1-100	%
SELECT SCHEDULE SCHED =	Select the user defined weld schedule and read the schedule from weld memory into the active weld schedule parameters.	1 – 32	
SAVE SCHEDULE SCHED =	Write the current active weld schedule to the specified schedule number in the weld memory.	1 - 32	

Table 3 - Weld Schedule Menu for PAW Welding Mode

6.6 PAW With Cold Wire Feed Option Weld Schedule Menu Screens

DISPLAY	PARAMETER DESCRIPTION	RANGE	UNITS
START CURRENT AMP =	Weld cycle start current level.	1 - 500	Amps
START WIRE SPEED SPEED =	The wire feed speed to be used during the start time period. To disable set the speed to 0.	0-1000	Ipm
START DELAY TIME =	The time period at the Start current level.	0 – 60.00	Sec.
RAMP UP TIME TIME =	The time that will be used to ramp the welding current from the start to the run value.	0 – 60.00	Sec.
RUN TIME CURRENT AMP =	The current level that will be used during the run time portion of the weld cycle.	1- 500	Amps
RUN WIRE SPEED SPEED =	The wire feed speed to be used during the Run time period. To disable set the speed to 0.	0-1000	Ipm
SPOT WELD TIME TIME =	The time period at the run current. If set the weld sequence will automatically terminate at the end of this time. If zero the user must clear the Cycle start signal to terminate the weld cycle.	0 – 650.00	Sec.
PERCENT TAPER TAPER % =	The percent of run current that will be reached at the end of the taper event.	1 – 100	%
TAPER DELAY TIME TIME =	The time period to perform the current taper event.	0 – 600.00	Sec.
RAMP DOWN TIME TIME =	The time period used to ramp the current from the Taper % level to the end current level.	0 – 60.00	Sec.
END CURRENT AMPS =	The current level that will be used during the end time period.	1 - 500	Amps
END WIRE SPEED SPEED =	The wire feed speed to be used during the end time period. To disable set the speed to 0.	0-1000	Ipm
END DELAY TIME TIME =	The time period at the end current level.	0 – 60.00	Sec.
REV WIRE DELAY TIME =	The time period to reverse the wire feeder and back the wire out of the arc. The Wire speed is the end wire value.	0 - 60.00	Sec.
PULSE MODE MODE =	Enable/Disable the pulse weld mode. If enabled the pulse mode will be active from the start of the ramp up event to the end of the ramp down event.	0 – 1	Yes/No
PULSE ON TIME TIME =	The time period at the run current level when the pulse mode is active.	.001-60.000	Sec.
PULSE OFF TIME TIME =	The time period at the background current level when the pulse mode is active.	0.001-60.000	Sec.
JOG WIRE SPEED SPEED =	The wire drive speed that is used while not welding.	0 – 1000	Ipm
% BACKGROUND AMP AMP % =	The percent of the peak current value that is used for the background current level.	1-100	%
SELECT SCHEDULE SCHED =	Select the user defined weld schedule and read the schedule from weld memory into the active weld schedule parameters.	1 – 32	
SAVE SCHEDULE SCHED =	Write the current active weld schedule to the specified schedule number in the weld memory.	1 - 32	

Table 4 - Weld Schedule Menu for PAW with Cold Wire Feed option enabled

6.7 GMAW Option Weld Schedule Menu Screens

DISPLAY	PARAMETER DESCRIPTION	RANGE	UNITS
PREPURGE TIME TIME =	Pre purge gas flow time period.	0 - 60.00	Sec.
START VOLTAGE VOLTS =	Weld cycle start voltage level.	10.0- 50.0	Volts
START WIRE SPEED SPEED =	The wire feed speed to be used during the start time period.	0-1000	Ipm
START DELAY TIME =	The time period at the Start level.	0 – 60.00	Sec.
RAMP UP TIME TIME =	The time that will be used to ramp the parameters from the start to the run value.	0 – 60.00	Sec.
RUN TIME VOLTAGE AMP =	The voltage level that will be used during the run time portion of the weld cycle.	10.0- 50.0	Volts
RUN WIRE SPEED SPEED =	The wire feed speed to be used during the Run time period.	0-1000	Ipm
SPOT WELD TIME TIME =	The time period at the run level. If set the weld sequence will automatically terminate at the end of this time. If zero the user must clear the Cycle start signal to terminate the weld cycle.	0 – 650.00	Sec.
PERCENT TAPER TAPER % =	The percent of run wire speed that will be reached at the end of the taper event.	1 – 100	%
TAPER DELAY TIME TIME =	The time period to perform the taper event.	0 – 600.00	Sec.
RAMP DOWN TIME TIME =	The time period used to ramp from the Taper % level to the end level.	0 – 60.00	Sec.
END VOLTAGE VOLTS =	The voltage level that will be used during the end time period.	10.0– 50.0	Volts
END WIRE SPEED SPEED =	The wire feed speed to be used during the end time period.	0-1000	Ipm
END DELAY TIME TIME =	The time period at the end level.	0 – 60.00	Sec.
REV WIRE DELAY TIME =	The time period to reverse the wire feeder and back the wire out of the arc. The Wire speed is the end wire value.	0 - 60.00	Sec.
BURN BACK TIME TIME =	The time period, which will be used to hold the weld contactor on after halting the wire feed motor.	.01 - 6.00	Sec.
POST PURGE TIME TIME =	The Post Gas flow time period.	.01-60.00	Sec.
JOG WIRE SPEED SPEED =	The wire drive speed that is used while not welding.	0 – 1000	Ipm
SELECT SCHEDULE SCHED =	Select the user defined weld schedule and read the schedule from weld memory into the active weld schedule parameters.	1 – 32	
SAVE SCHEDULE SCHED =	Write the current active weld schedule to the specified schedule number in the weld memory.	1 - 32	

Table 5 - Weld Schedule Menu for GMAW option enabled

6.8 Setup Parameter Menus

The WSC II controller can support several different options. The setup Parameter menu allows the user to configure various setup control parameters and options. Depending on which options are enabled different Weld parameter menus will be displayed. The user can also specify the current range for a power supply and enable remote I/O weld schedule selections.

6.9 Setup GTAW/PAW Mode Parameter Menu Screens

DISPLAY	PARAMETER DESCRIPTION	RANGE	UNITS
REMOTE SCHEDULE SELECT =	Enable remote weld schedule option. When "ON" the user supplied I/O SCHED 0 - 4 inputs (TB5-6- TB5-10) will specify the desired weld schedule. Refer to Section 4.5 for additional information	ON/OFF	
GTAW CONTROL MODE =	Enables the GTAW process mode and weld parameter menus	ON/OFF	
GMAW CONTROL MODE =	Enables the WSC II control for the GMAW (MIG/MAG) process mode and weld parameter menu	ON/OFF	
WIRE DRIVE MOTOR ENABLED =	Enable Wire Feed drive motor control and menu parameters	ON/OFF	
MAX CURRENT AMP =	The Maximum current level that the power source can provide. This value is used to scale the WSC II analog output.	1- 500	Amps
MIN CURRENT AMP =	The Minimum current level that the power source can provide. This value is used to scale the WSC II analog output.	1- 500	Amps
MAX WIRE SPEED IPM =	The Maximum wire speed that the wire feed drive motor can provide. This value is used to scale the WSC II analog output.	1- 100	IPM
MIN WIRE SPEED IPM =	The Minimum wire speed that the wire feed drive motor can provide. This value is used to scale the WSC II analog output.	1- 900	IPM

Table 6- Setup Parameter menu functions

6.9 Setup GMAW Mode Parameter Menu Screens

DISPLAY	PARAMETER DESCRIPTION	RANGE	UNITS
REMOTE SCHEDULE SELECT =	Enable remote weld schedule option. When "ON" the user supplied I/O SCHED 0 - 4 inputs (TB5-6- TB5-10) will specify the desired weld schedule. Refer to Section 4.5 for additional information	ON/OFF	
GTAW CONTROL MODE =	Enables the GTAW process mode and weld parameter menus	ON/OFF	
GMAW CONTROL MODE =	Enables the WSC II control for the GMAW (MIG/MAG) process mode and weld parameter menu	ON/OFF	
MAX VOLTAGE AMP =	The Maximum current level that the power source can provide. This value is used to scale the WSC II analog output.	1- 20.0	Amps
MIN VOLTAGE AMP =	The Minimum current level that the power source can provide. This value is used to scale the WSC II analog output.	1- 90.0	Amps
MAX WIRE SPEED IPM =	The Maximum wire speed that the fire feed drive motor can provide. This value is used to scale the WSC II analog output.	1- 900	IPM
MIN WIRE SPEED IPM =	The Minimum wire speed that the wire feed drive motor can provide. This value is used to scale the WSC II analog output.	1- 100	IPM

Table7- Setup Parameter menu functions

7.0 WSC II OFF-LINE RS-232 TERMINAL PROTOCOL

7.1 General Description

The RS-232 Terminal mode can be used to off-line program the user configurable parameters and operating modes. The protocol is a simple ASCII command string that allows the user to upload or download the various data. The user can use any terminal program to perform the programming function. All program command functions are case sensitive. The serial port is configured for the following data format:

- Baud Rate: 19.2K, Full Duplex
- Word Length: 8 Data Bits, One Stop and no parity
- Hand Shaking: None

7.2 Terminal Protocol

The protocol consists of a command string and optional data bytes. The command string is an alpha character and an option number followed by a "=" or "?", followed by optional data and terminated with a ASCII "cr" (0dh). The "=" will indicate that data is being sent to the selected parameter by the host controller. The "?" will indicate a request for data from the WSC II to the host controller. If the host is sending data to the WSC II the data will be placed after the "=" character and will be an ASCII string terminated with an ASCII "cr" (0dh). The following is an example of reading a parameter value from the WSC II:

From Host type: **V1? (cr)**
Response from WSC: **##**

Where: ## is the current value for the parameter and (cr) is the enter key

The following is an example of how to modify a value in the WSC II using the terminal commands:

From Host type: **V1=#### (cr)**

Where: ## is the new value for the parameter and (cr) is the enter key

7.3 Terminal Commands

The following is a summary of the Terminal Commands supported by the WSC II:

COMMAND	PARAMETER DESCRIPTION	RANGE	UNITS
V1	Prepurge time	0-650.00	. 01 Sec.
V2	Arc start current	0-500	Amps
V3	Arc Start Wire feed speed	0-650	IPM
V4	Arc Start delay time	0-650.00	.01 Sec.
V5	Ramp up Delay time	0-650.00	.01 Sec
V6	Run time current (Pulse Peak current)	0-650.00	Amps
V7	Run Time wire feed speed	0-650	IPM
V8	Spot Weld Time (If Time=0 then Manual control)	0-650.00	.01 Sec.
V9	Percent Taper current	0-100	%
V10	Taper current delay time	0-650.00	.01 Sec.
V11	Ramp down delay time	0-650.00	.01 Sec.
V12	End current value	0-500	Amps
V13	End wire feed speed	0-650	IPM
V14	End delay time	0-650.00	.01 Sec.
V15	Reverse wire speed time delay	0-650.00	Sec.
V16	Wire burn back delay time	0-650.00	.01 Sec.
V17	Post gas flow time delay	0-650.00	.01 Sec.
V18	Pulse current on time	.001 – 65.000	.001 Sec.
V19	Pulse current off time	.001 – 65.000	.001 Sec.
V20	Percent back ground current	0-100	%
V21	Jog wire feed speed	0-650	IPM
V22	Percent back ground wire feed speed	0-100	%

Table 7 - Weld Process and Command Table

COMMAND	PARAMETER DESCRIPTION	RANGE
M1	Read Remote Inputs BIT 0 – Schedule Bit 0 input TB5-6 BIT 1 – Schedule Bit 1 input TB5-7 BIT 2 – Schedule Bit 2 input TB5-8 BIT 3 – Schedule Bit 3 input TB5-9 BIT 4 – Schedule Bit 4 input TB5-10 BIT 5 – Power Supply Ready Input TB7-5 BIT 6 – Arc Active Input TB7-4 BIT 7 – Cycle Start Input TB5-11	0-255
M2	Read/Write Remote Relay Outputs CR1-CR6 BIT 0 – CR0 Weld Contactor Output TB7-7 & TB7-8 BIT 1 – CR1 Control Ready Output TB5-1 BIT 2 – CR2 Arc Active Output TB5-2 BIT 3 – CR3 Weld Cycle Complete Output TB5-3 BIT 4 – CR4 Weld Cycle Active Output TB5-4 BIT 5 – CR5 Enable Wire Drive Output TB4-4	0-255
M3	Read/Write System Configuration Parameters BIT 0 – Enable Remote Schedule Select Function BIT 1 – Enable Wire Feed control functions BIT 2 – Enable GMAW weld mode functions BIT 3 – Enable GTAW weld mode functions	0-15
M4	Terminal Baud Rate control 0 = 76.8K Baud 1 = 38.4K Baud 2 = 19.2K Baud (Default) 3 = 9600 Baud 4 = 4800 Baud 5 = 2400 Baud 6 = 1200 Baud	0-6
M5	Weld Control Error Code 0 - No Error 1 - Weld Sequence Program Fault 2 - Power Supply Not Ready Fault 3 - ARC fail during weld cycle 4 - Schedule Fault – Invalid Parameter Data 5 - ESTOP active	1-5
M6	Reset Weld Memory and reload default values. To clear all memory and restore default set M6=251 then power cycle the control	0 or 251

Table 8 - System Configuration and Mode command table

COMMAND	PARAMETER DESCRIPTION	RANGE
W1	Weld Schedule Mode Flag: Bit 0 – Enable Pulse Weld Mode Bit 1..7 – Not defined	0-255
W2	Active Weld Schedule number	1-32
W3	Active Weld Event number 0 - Cycle Off 1 - Cycle Start 2 - Pre Purge 3 - Start Time 4 - Ramp Up Time 5 - Run Time (Spot Weld Time if enabled) 6 - Taper Current time 7 - Ramp Down Time 8 - End Time 9 - Wire Reverse Time 10 - Burn Back Time 11 - Post Purge Time	0-11
W4	Write current schedule to specified weld schedule number	1-32
W5	Read specified weld schedule from memory to active schedule	1-32

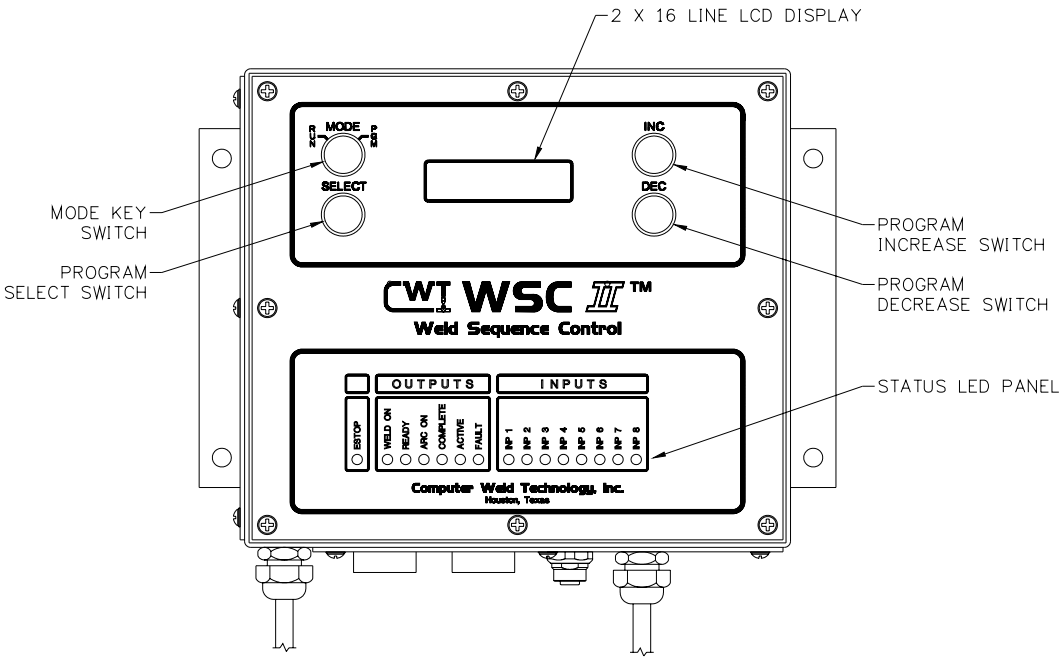
Table 9 - Weld Mode Command Table

COMMAND	PARAMETER DESCRIPTION	RANGE
A1	Minimum Power supply current output (A1 = AMP_{min}) used for DAC 1 scaling.	0-255
A2	Maximum Power supply current (A2=AMP_{max}) used for DAC 1 scaling Where: (DAC 1 Gain = [4000/(AMPmax – AMP_{min})])	0-500
A3	Minimum Wire Feed speed (A3 = $WIRE_{min}$) used for DAC 2 scaling	0-255
A4	Maximum Wire Feed Speed (A5=$WIRE_{max}$) used for DAC 2 scaling Where: (DAC 2 Gain = [4000/(Wiremax – $WIRE_{min}$)])	0-900
A5	Actual Setpoint value for DAC 1	0-500
A6	Actual Set point value for DAC2	0-900

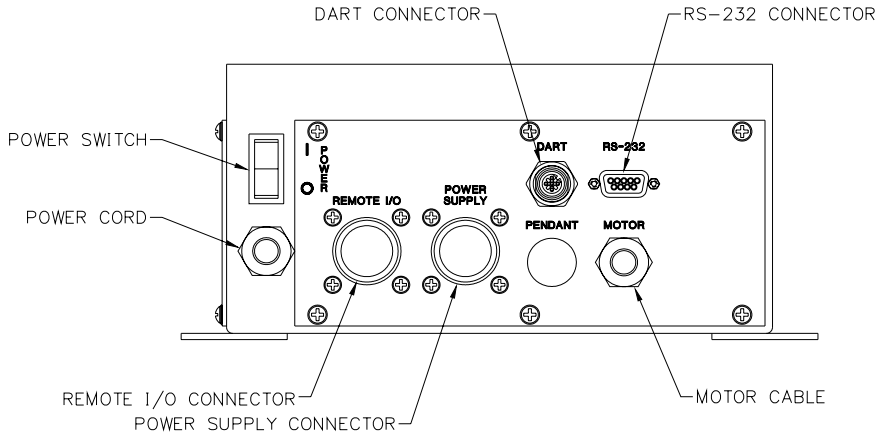
Table 10 - Analog Scaling Command Table

8.0 WSC II ENCLOSURE DRAWINGS

8.1 Front and Bottom Panel Layouts

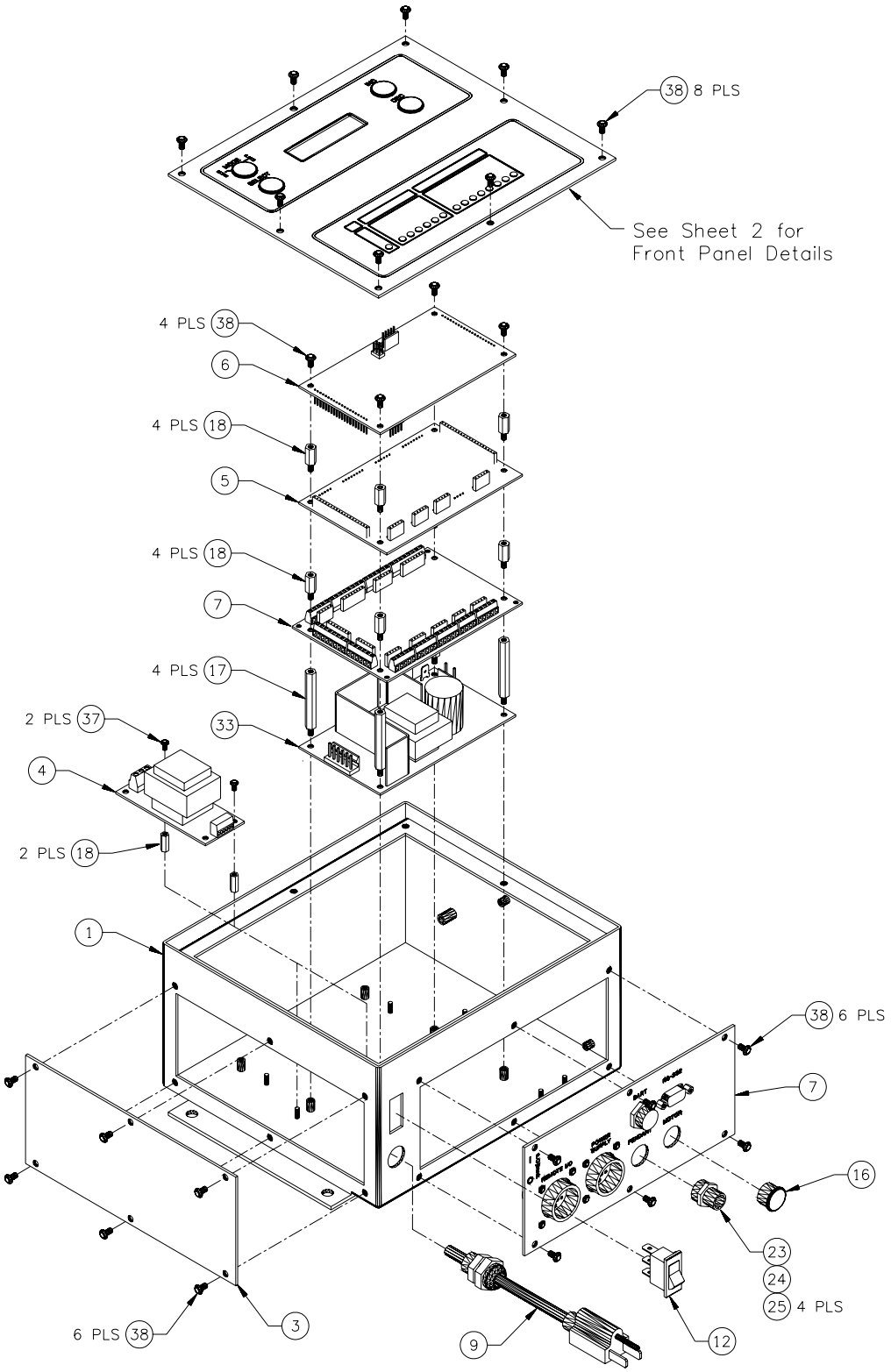


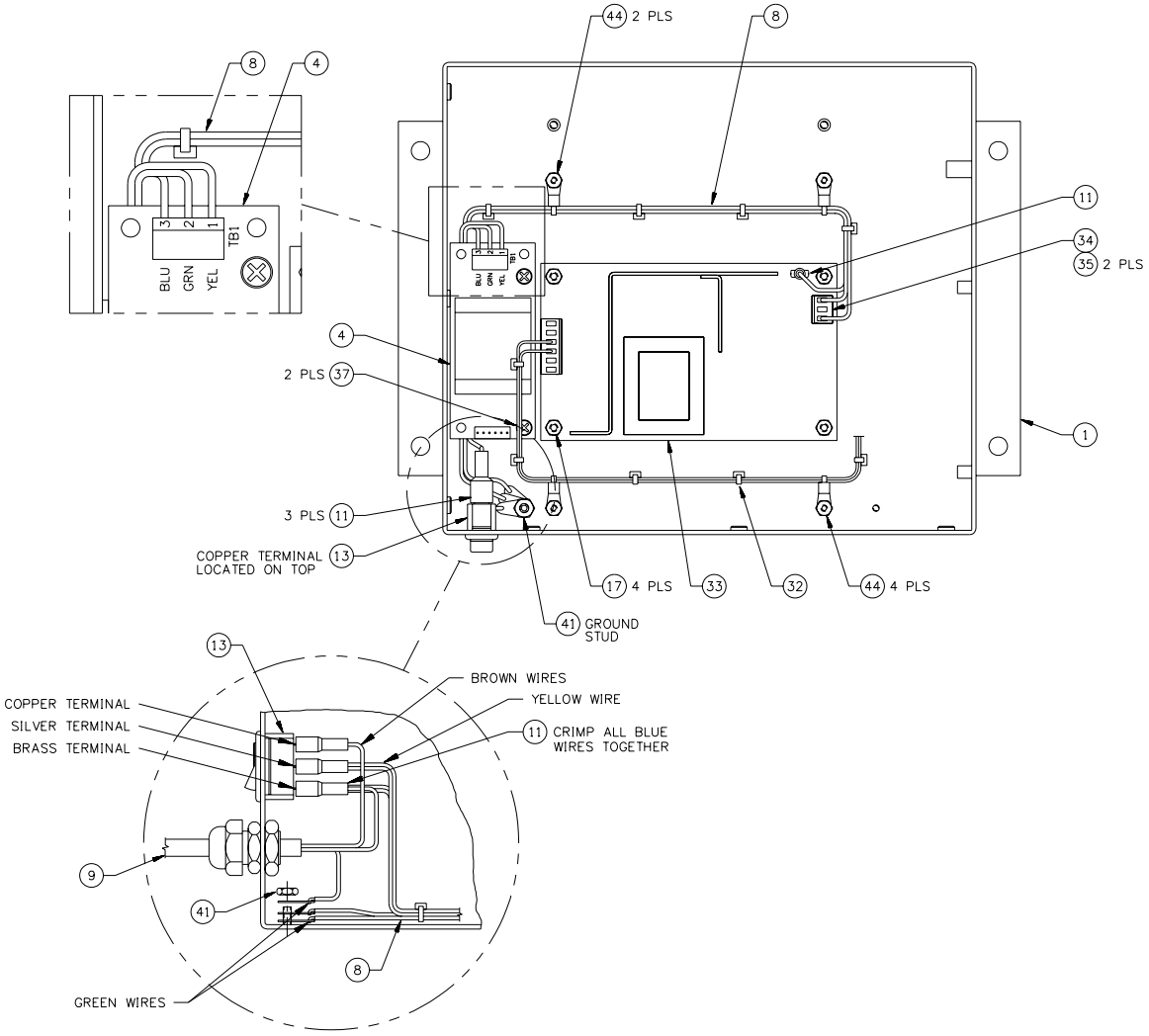
FRONT PANEL LAYOUT



BOTTOM PANEL LAYOUT

8.2 110VAC Enclosure for Remote Display (P/N: S3A5071)

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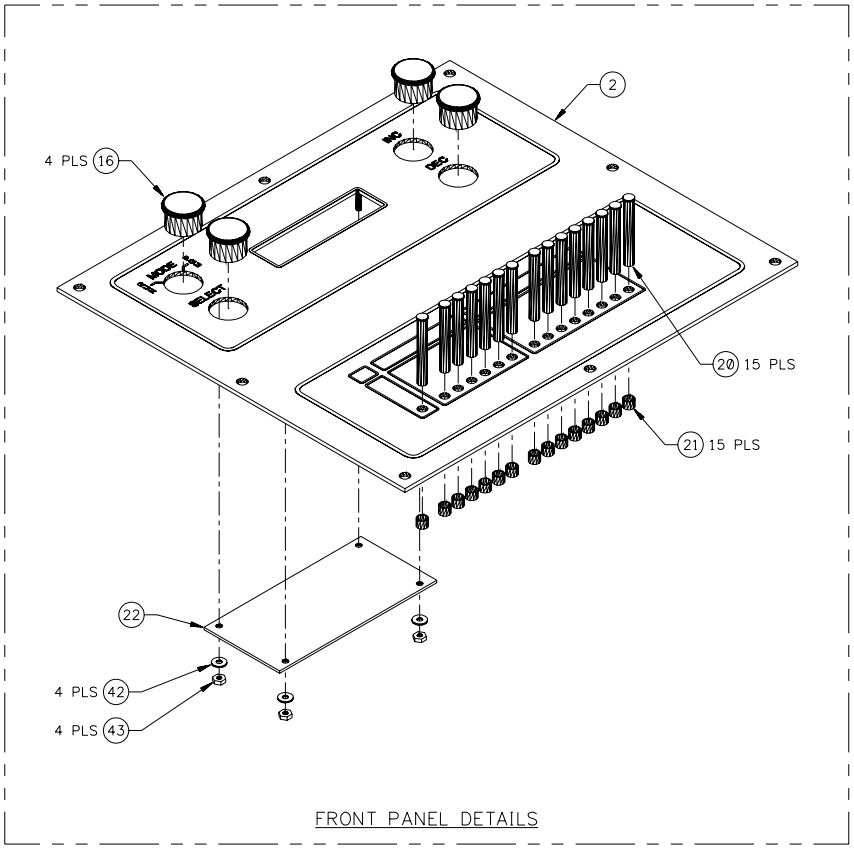
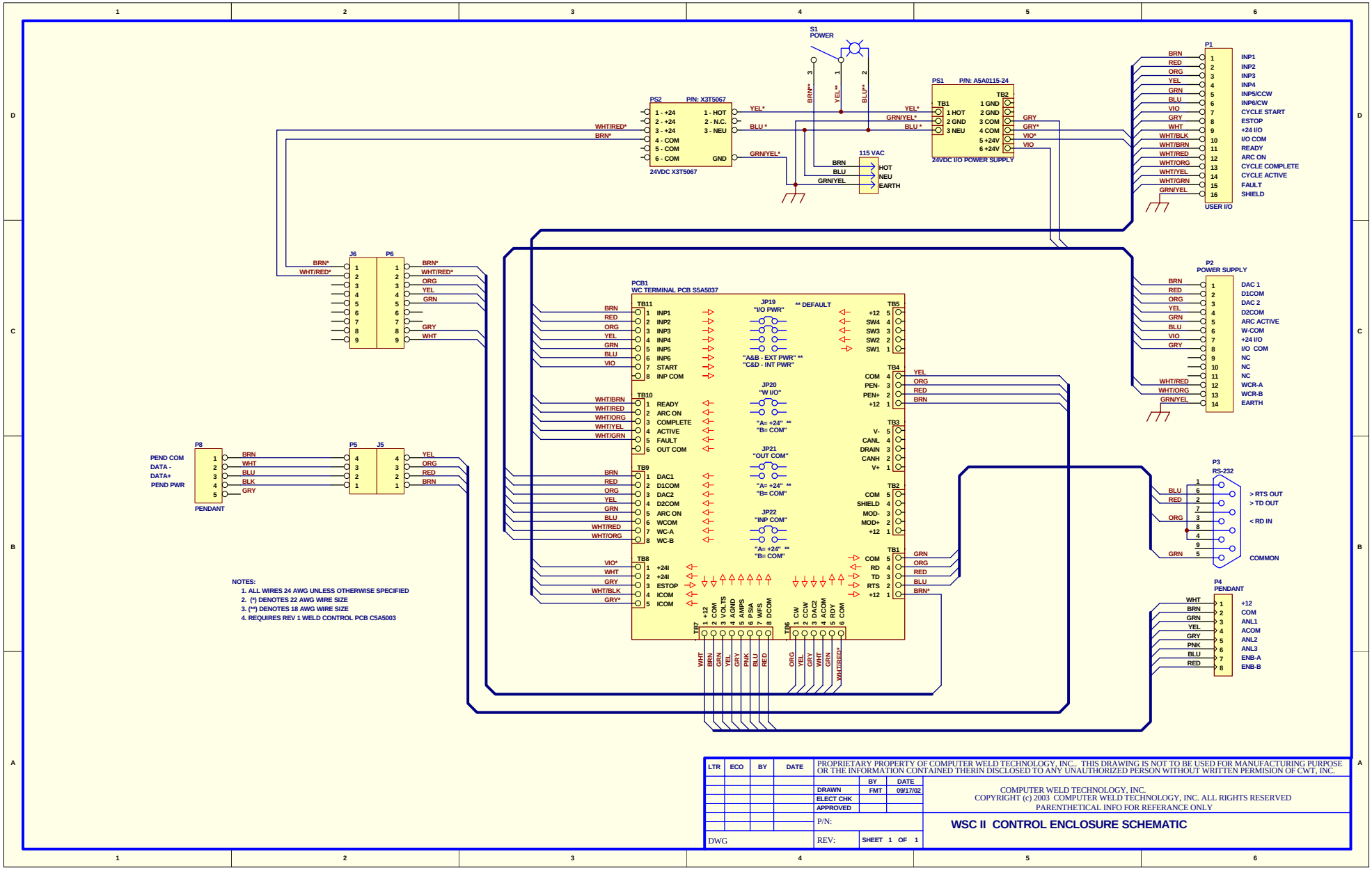
8
8
4
11
34
35 2 PLS
TB1
3
2
1
BLU
GRN
YEL
4
2 PLS 37
1
3 PLS 11
COPPER TERMINAL
LOCATED ON TOP
13
17 4 PLS
33
32
44 4 PLS
41 GROUND
STUD
13
BROWN WIRES
YELLOW WIRE
COPPER TERMINAL
SILVER TERMINAL
BRASS TERMINAL
11 CRIMP ALL BLUE
WIRES TOGETHER
9
41
8
GREEN WIRES



FRONT PANEL DETAILS

COMPUTER WELD TECHNOLOGY – PARTS LIST			
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	S3E5078	Enclosure, 9" X 8" X 4–1/2"
2	1	S3E5079	Cover, WSC–2 Front
3	1	S3E5081	Plate, WSC–2 Large Blank
4	1	A5A0115–24	PCB Assembly, 24VDC Power Supply – Rev 0
5	1	S5A5036	PCB Assembly, Weld Control I/O Module
6	1	S5A5033–WSC2	PCB Assembly, MC6808GP32 WSC–2 FW: S5Z5008
7	1	S3W5095	Harness, WSC–2 Control Wire
8	1	S3W5093	Harness, WSC–2 110VAC Power Supply Wire
9	1	S3W5094	Cable, WSC–2 110vac Power Supply
10			
11	1	X3P5419	Terminal, Push–on Female 1/4" Panduit #DNF18–250FIB
12			
13	1	X3S5078	Switch, Rocker Power Cutler–Hammer #1600R11E
14			
15			
16	5	X6Z5042	Plug, Dome Hole Black 5/8" Heyco #2663
17	4	X6S5062	Spacer, #6–32 X 1–3/4" Long M–F RAF #4554–632–SS–0
18	8	X6S5023	Spacer, #6–32 X 1/2" Long M–F RAF #4534–632–SS–0
19	2	X6S5054	Spacer, #4–40 X 1/2" Long RAF #2057–440–SS–0
20	15	X5Z5035	Litepipe, 1.25" Long Visual Comm. #LPC125CTP
21	15	X5Z5036	Clip, Spring Litepipe Visual Comm. #RTN250
22	1	S3E5084	Plate, WSC–2 Display Cover
23	1	X3P5804	Connector, RCPT 5 circuit female Turck #FK4.5–0.5
24	1	X3P5706	Connector, Plug 4 circuit Amp #172167–1
25	4	X3P5702	Contact, Socket 22–18 awg Amp #770988–3
26			
27			
28			
29			
30			
31			
32	1	S3W5105	Harness, 24V Power Supply Wire
33	1	X3T5067	Supply, Power 24V Artesyn #NFS40–7624
34	1	X3P5720	Connector, 3 circuit housing Molex #26–03–4030
35	2	X3P5719	Terminal, Crimp Molex #08–58–0189
36			
37	2		#4–40 X 1/4" Long Pan Head Screw w/ Int Lock Washer
38	20		#6–32 X 1/4" Long Pan Head Screw w/ Int Lock Washer
39			
40			
41	1		#6–32 Hex Nut
42	4		#2 Internal Lock Washer
43	4		#2–56 Hex Nut
44	6		#4–40 Hex Nut
45			
46			
47			
48			
49	52"		Tape, Foam Black 1/16" thick 1/2" wide
50			
51	3"		Tubing, Heat Shrink White 1/8"
52	1		Label, Serial Number



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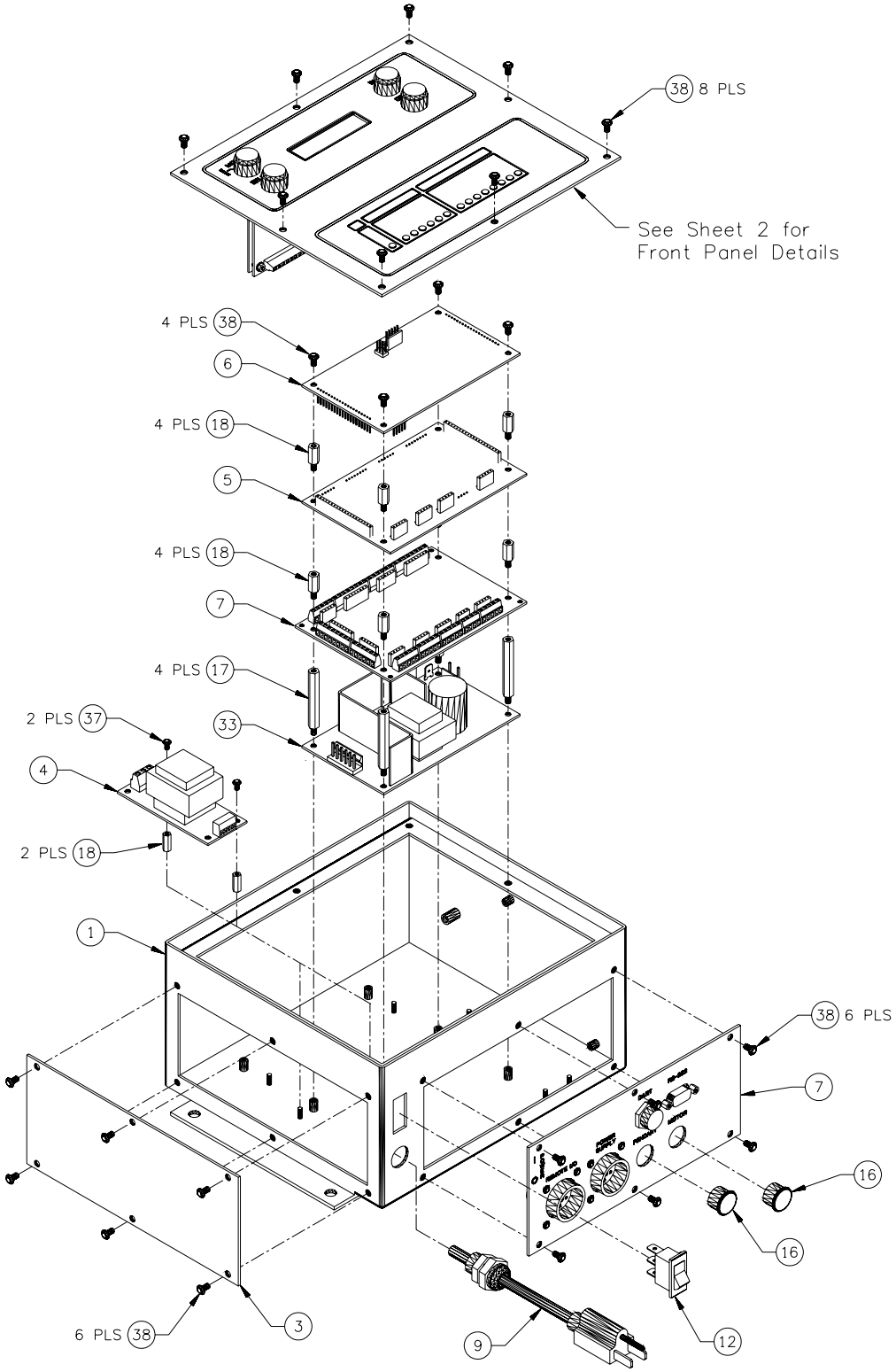
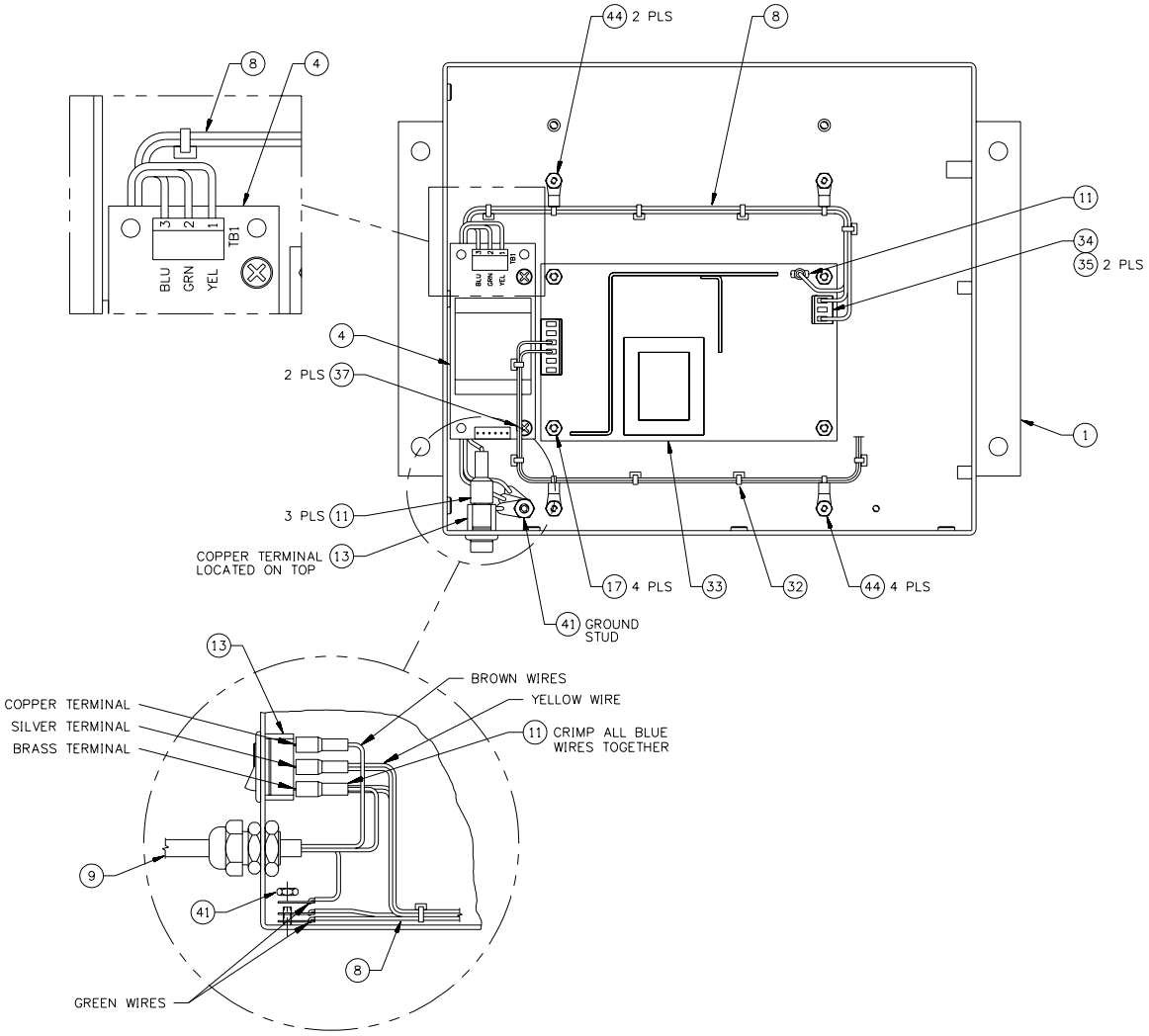
WSC II CONTROL ENCLOSURE SCHEMATIC

8.3 110VAC Enclosure with Local Display (P/N: S3A5072)

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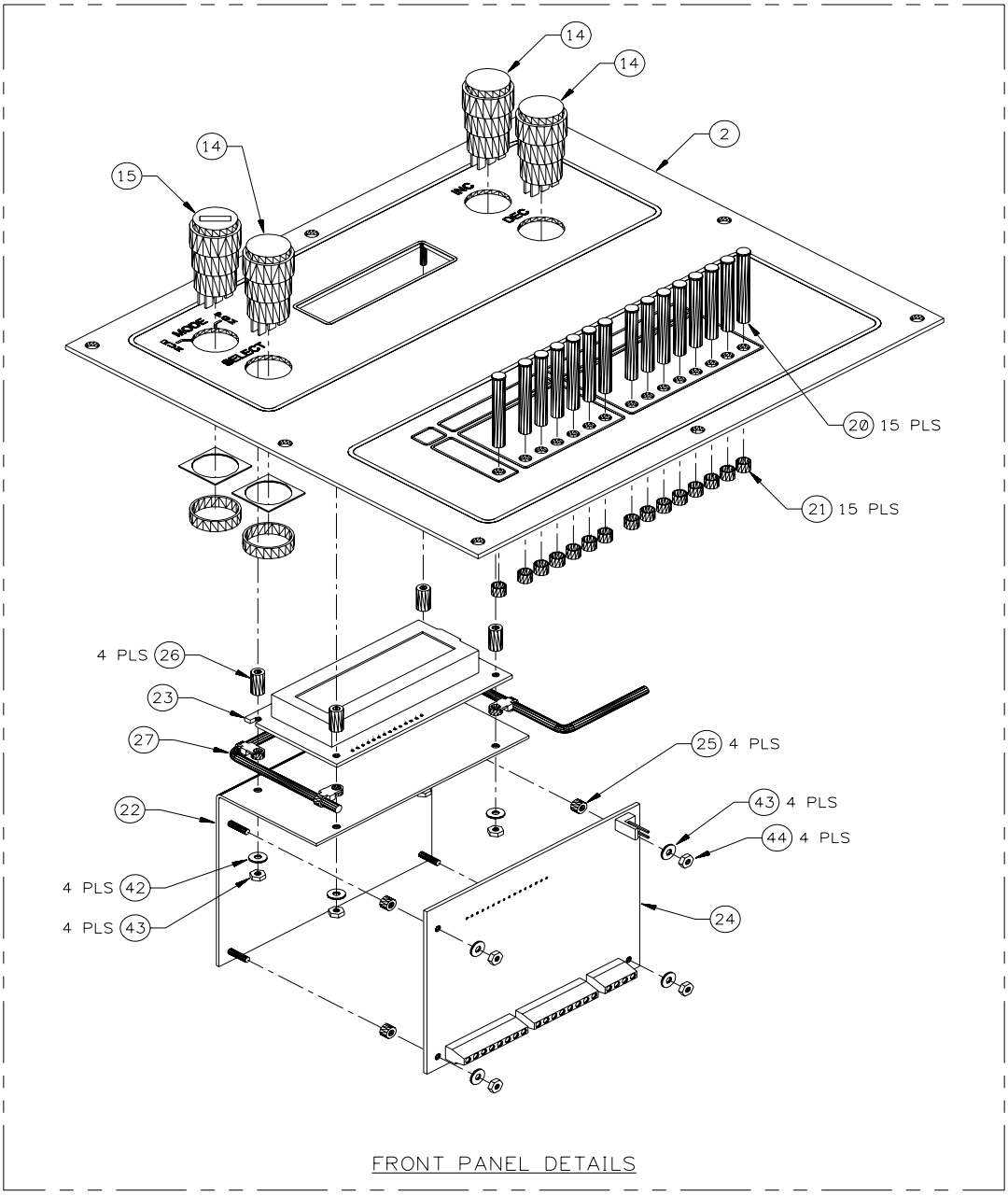
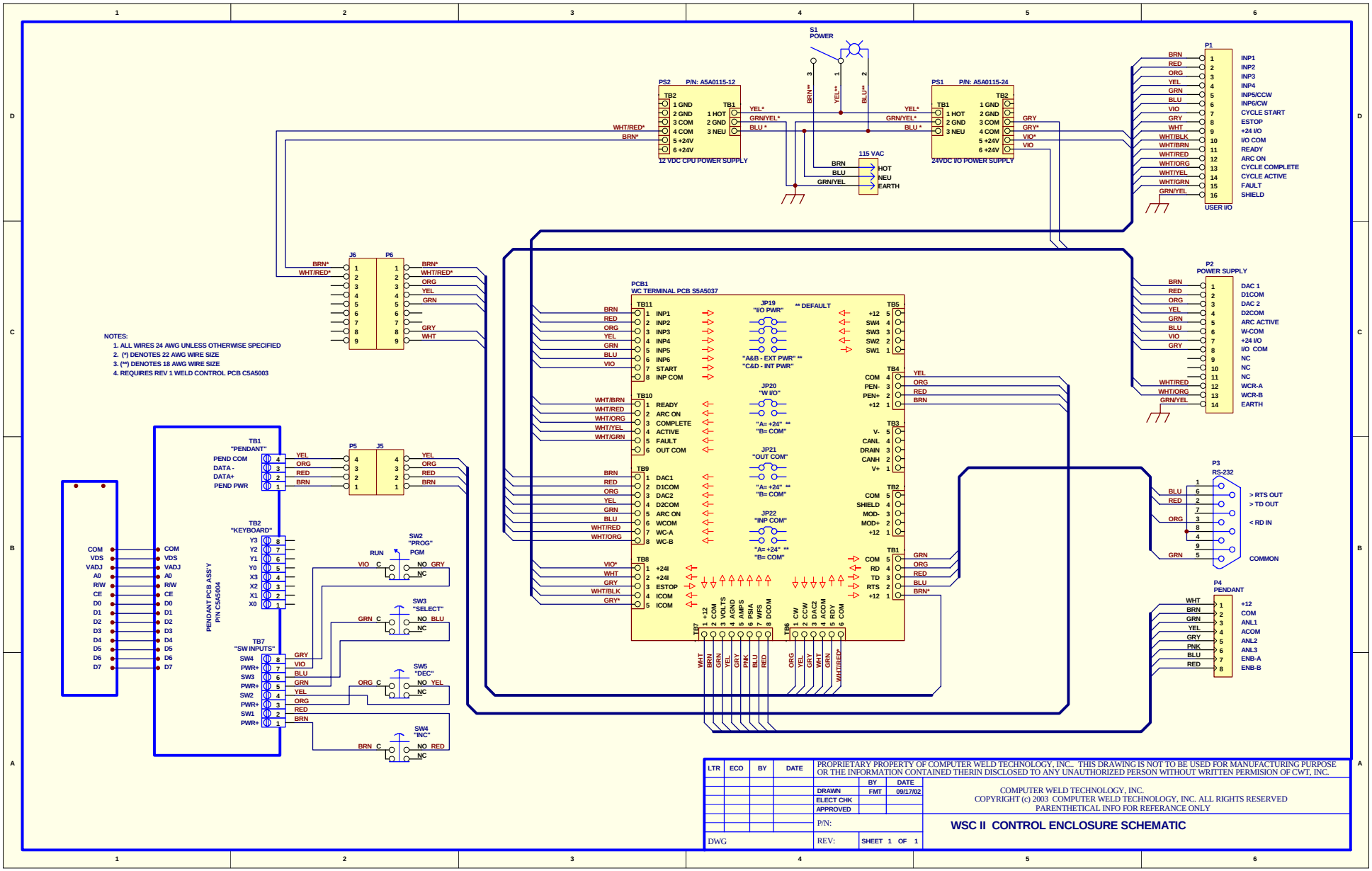
TB1
BLU
GRN
YEL
11
34
35 2 PLS
4
2 PLS 37
1
3 PLS 11
COPPER TERMINAL
LOCATED ON TOP
13
17 4 PLS
33
32
44 4 PLS
41 GROUND
STUD
13
COPPER TERMINAL
SILVER TERMINAL
BRASS TERMINAL
BROWN WIRES
YELLOW WIRE
11 CRIMP ALL BLUE
WIRES TOGETHER
9
41
8
GREEN WIRES



FRONT PANEL DETAILS

COMPUTER WELD TECHNOLOGY – PARTS LIST			
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	S3E5078	Enclosure, 9" X 8" X 4-1/2"
2	1	S3E5079	Cover, WSC-2 Front
3	1	S3E5081	Plate, WSC-2 Large Blank
4	1	A5A0115-24	PCB Assembly, 24VDC Power Supply – Rev 0
5	1	S5A5036	PCB Assembly, Weld Control I/O Module
6	1	S5A5033-WSC2	PCB Assembly, MC6808GP32 WSC-2 FW: S5Z5008
7	1	S3W5095	Harness, WSC-2 Control Wire
8	1	S3W5093	Harness, WSC-2 110VAC Power Supply Wire
9	1	S3W5094	Cable, WSC-2 110vac Power Supply
10			
11	1	X3P5419	Terminal, Push-on Female 1/4" Panduit #DNF18-250FIB
12			
13	1	X3S5078	Switch, Rocker Power Cutler-Hammer #1600R11E
14	3	X3S5125	Switch, Pushbutton Black SPDT IDEC #AB6M-M1-B
15	1	X3S5127	Switch, Keylock SPDT Right Side Remove IDEC #AS6M-2KT2PB
16	2	X6Z5042	Plug, Dome Hole Black 5/8" Heyco #2663
17	4	X6S5062	Spacer, #6-32 X 1-3/4" Long M-F RAF #4554-632-SS-0
18	8	X6S5023	Spacer, #6-32 X 1/2" Long M-F RAF #4534-632-SS-0
19	2	X6S5054	Spacer, #4-40 X 1/2" Long RAF #2057-440-SS-0
20	15	X5Z5035	Litepipe, 1.25" Long Visual Comm. #LPC125CTP
21	15	X5Z5036	Clip, Spring Litepipe Visual Comm. #RTN250
22	1	S3E5083	Plate, WSC-2 Display Board
23	1	S3A5031	Display Assembly, LCD 2 X 16
24	1	C5A5004-WSC	PCB Assembly, WSC-2 Universal Pendant
25	4	X6S5052	Spacer, #2 X 1/8" Long Nylon RAF #1107-2-N
26	4	X6S5063	Spacer, #2 X 3/8" Long Nylon RAF #1111-2-N
27	1	S3W5097	Harness, WSC-2 Display Wire
28			
29			
30			
31			
32	1	S3W5105	Harness, 24V Power Supply Wire
33	1	X3T5067	Supply, Power 24V Artesyn #NFS40-7624
34	1	X3P5720	Connector, 3 circuit housing Molex #26-03-4030
35	2	X3P5719	Terminal, Crimp Molex #08-58-0189
36			
37	2		#4-40 X 1/4" Long Pan Head Screw w/ Int Lock Washer
38	20		#6-32 X 1/4" Long Pan Head Screw w/ Int Lock Washer
39			
40			
41	1		#6-32 Hex Nut
42	8		#2 Internal Lock Washer
43	8		#2-56 Hex Nut
44	6		#4-40 Hex Nut
45			
46			
47			
48			
49	52"		Tape, Foam Black 1/16" thick 1/2" wide
50			
51	3"		Tubing, Heat Shrink White 1/8"
52	1		Label, Serial Number



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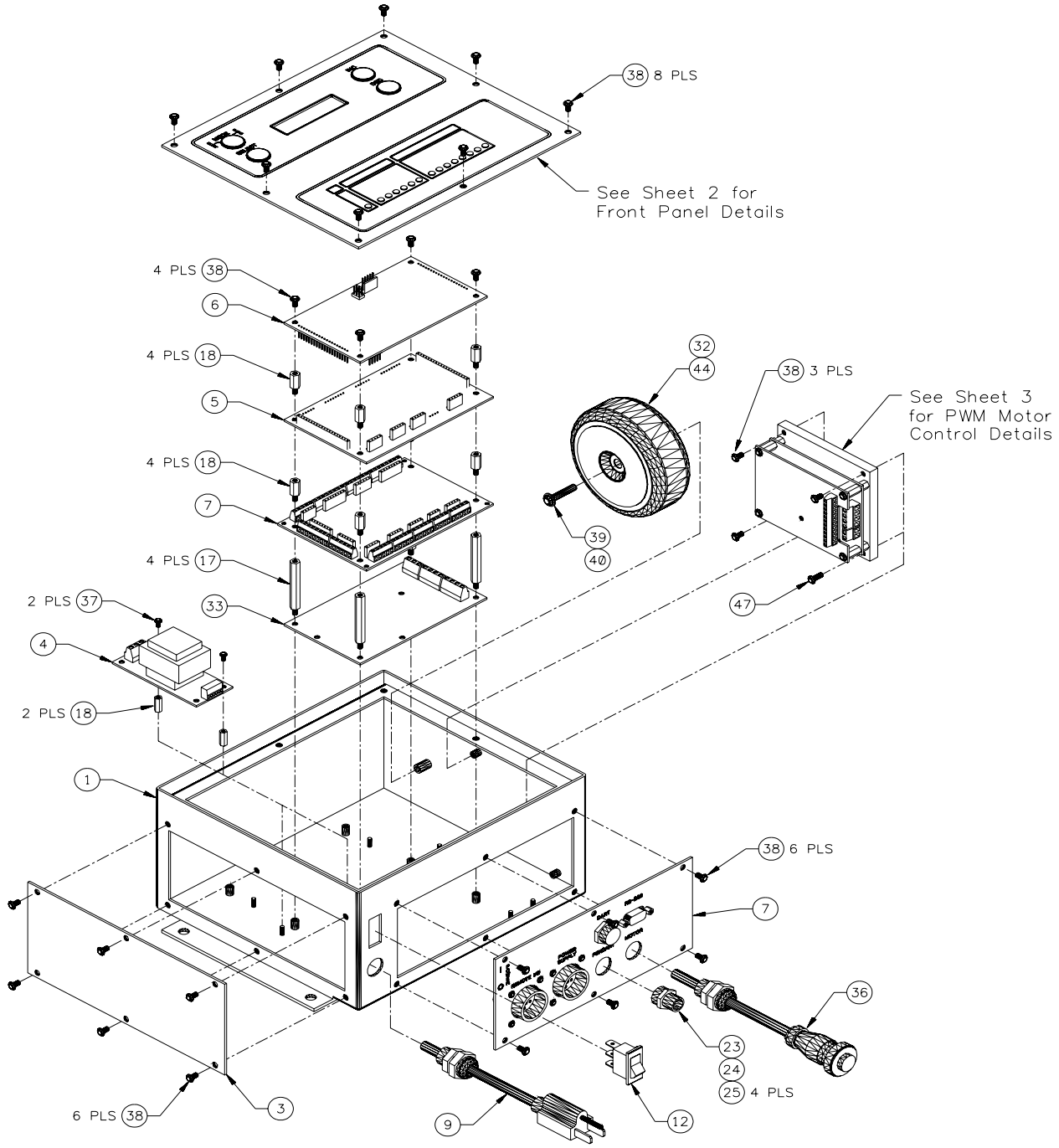
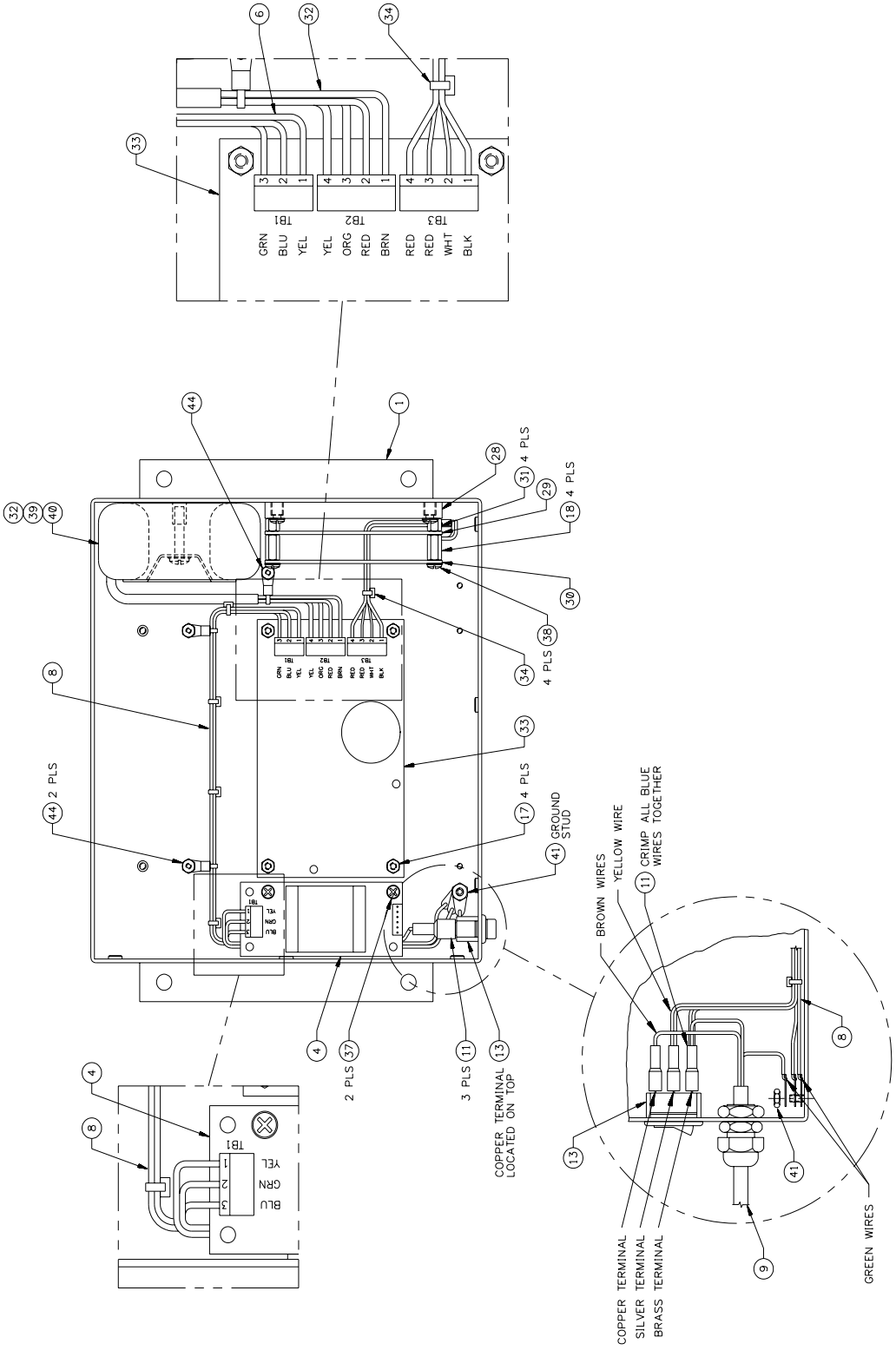
COMPUTER WELD TECHNOLOGY, INC.

PARENTHETICAL INFO FOR REFERANCE ONLY

WSC II CONTROL ENCLOSURE SCHEMATIC

8.4 110VAC Enclosure for Remote Display with 9CM Control (P/N: S3A5073)

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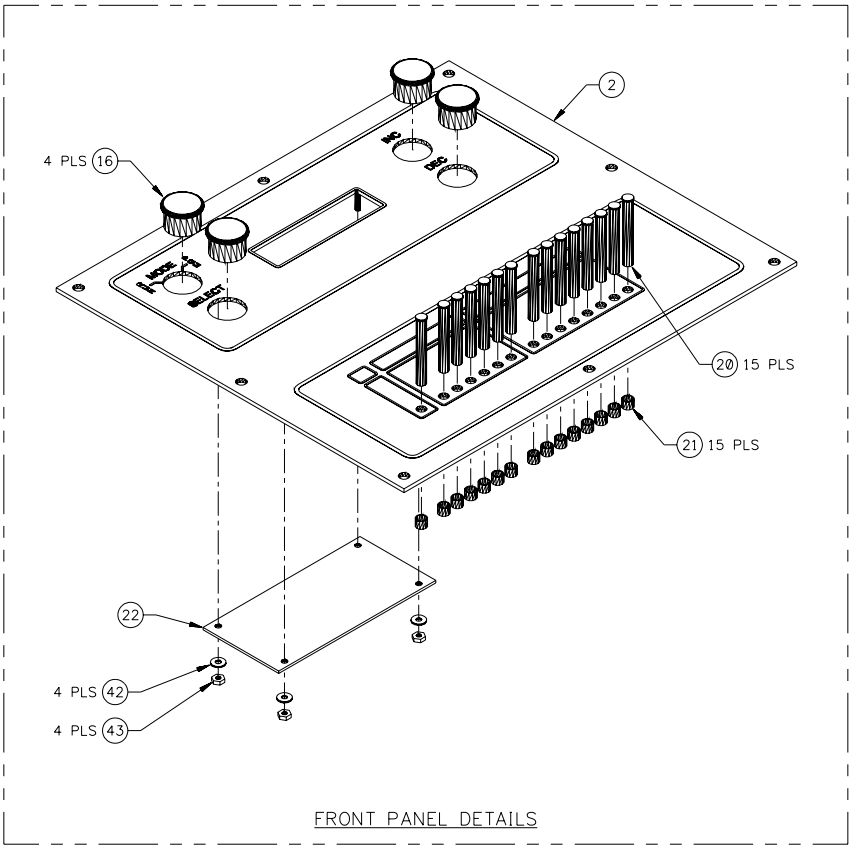
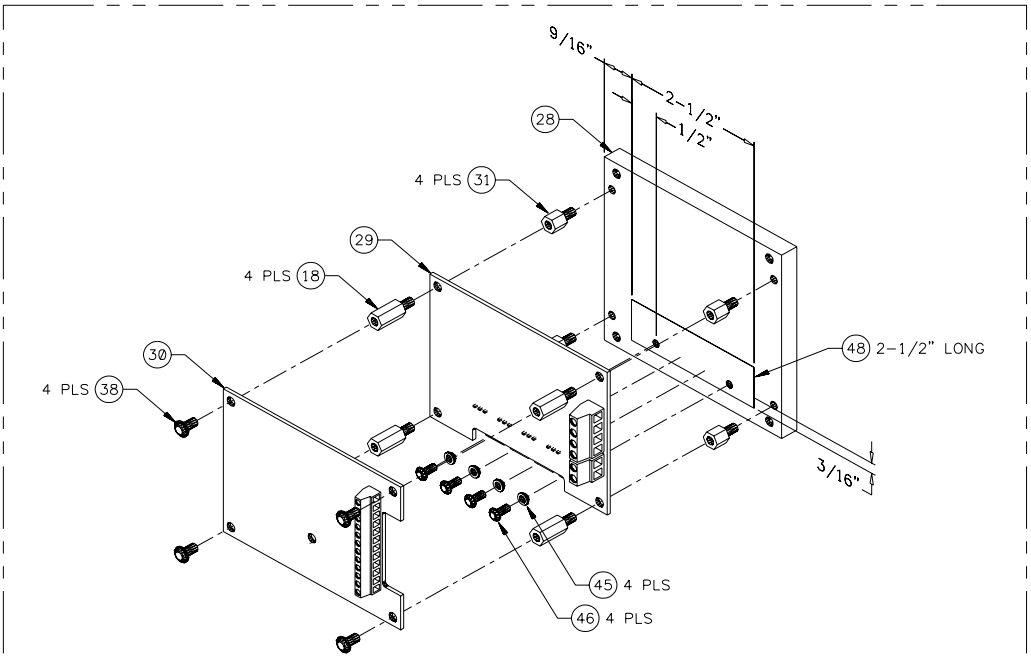
TB2
TB3
GRN
BLU
YEL
YEL
ORG
RED
BRN
RED
RED
WHT
BLK
4 PLS
2 PLS
3 PLS
GROUND STUD
COPPER TERMINAL LOCATED ON TOP
BROWN WIRES
YELLOW WIRE
CRIMP ALL BLUE WIRES TOGETHER
COPPER TERMINAL
SILVER TERMINAL
BRASS TERMINAL
GREEN WIRES

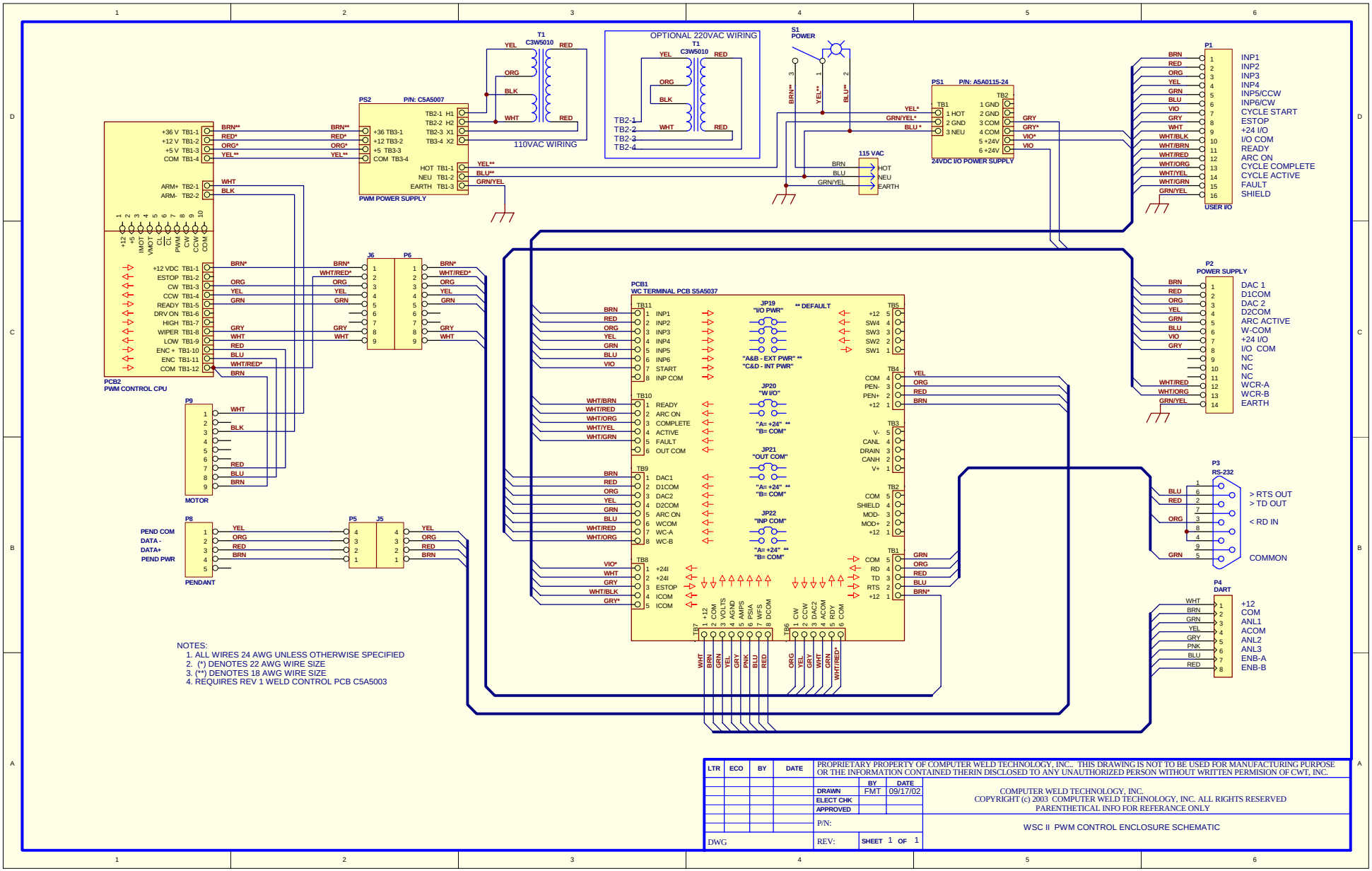


FRONT PANEL DETAILS



PWM MOTOR DRIVE DETAILS

COMPUTER WELD TECHNOLOGY – PARTS LIST			
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	S3E5078	Enclosure, 9" X 8" X 4-1/2"
2	1	S3E5079	Cover, WSC-2 Front
3	1	S3E5081	Plate, WSC-2 Large Blank
4	1	A5A0115-24	PCB Assembly, 24VDC Power Supply – Rev 0
5	1	S5A5036	PCB Assembly, Weld Control I/O Module
6	1	S5A5033-WSC2	PCB Assembly, MC6808GP32 WSC-2 FW: S5Z5008
7	1	S3W5095	Harness, WSC-2 Control Wire
8	1	S3W5093	Harness, WSC-2 110VAC Power Supply Wire
9	1	S3W5094	Cable, WSC-2 110vac Power Supply
10			
11	1	X3P5419	Terminal, Push-on Female 1/4" Panduit #DNF18-250FIB
12			
13	1	X3S5078	Switch, Rocker Power Cutler-Hammer #1600R11E
14			
15			
16	4	X6Z5042	Plug, Dome Hole Black 5/8" Heyco #2663
17	4	X6S5062	Spacer, #6-32 X 1-3/4" Long M-F RAF #4554-632-SS-0
18	12	X6S5023	Spacer, #6-32 X 1/2" Long M-F RAF #4534-632-SS-0
19	2	X6S5054	Spacer, #4-40 X 1/2" Long RAF #2057-440-SS-0
20	15	X5Z5035	Litepipe, 1.25" Long Visual Comm. #LPC125CTP
21	15	X5Z5036	Clip, Spring Litepipe Visual Comm. #RTN250
22	1	S3E5084	Plate, WSC-2 Display Cover
23	1	X3P5804	Connector, RCPT 5 circuit female Turck #FK4.5-0.5
24	1	X3P5706	Connector, Plug 4 circuit Amp #172167-1
25	4	X3P5702	Contact, Socket 22-18 awg Amp #770988-3
26			
27			
28	1	S2M5182	Heatsink, PWM
29	1	C5A5005	PCB Assembly, PWM Driver
30	1	C5A5006-9CM	PCB Assembly, PWM 9CM Motor CPU
31	4	X6S5057	Spacer, #6-32 X 1/4" Long M-F RAF #4530-632-SS-0
32	1	S3A5084	Transformer Assembly, WSC-2 PWM
33	1	C5A5007	PCB Assembly, PWM Power Supply
34	1	S3W5096	Cable, WSC-2 PWM Power Wire
35	1	S3W5104	Cable, WSC-2 PWM Control Wire
36	1	S3W5107	Cable, WSC-2 Motor – WF-100 / Encoder
37	2		#4-40 X 1/4" Long Pan Head Screw w/ Int Lock Washer
38	27		#6-32 X 1/4" Long Pan Head Screw w/ Int Lock Washer
39	1		#10-32 X 1" Long Pand Head Screw
40	1		#10 External Lock Washer
41	1		#6-32 Hex Nut
42	4		#2 Internal Lock Washer
43	4		#2-56 Hex Nut
44	5		#4-40 Hex Nut
45	4	X5Z5007	Washer, Shoulder Thermalloy #7721-7PPS
46	4		#4-40 X 1/4" Long Pan Head Screw
47	1		#6-32 X 3/8" Long Pan Head Screw
48	3"		Tape, Kapton
49	52"		Tape, Foam Black 1/16" thick 1/2" wide
50	A/R		Compound, Thermal Thermalloy #249
51	3"		Tubing, Heat Shrink White 1/8"
52	1		Label, Serial Number



NOTES:
1. ALL WIRES 24 AWG UNLESS OTHERWISE SPECIFIED
2. (*) DENOTES 22 AWG WIRE SIZE
3. (**) DENOTES 18 AWG WIRE SIZE
4. REQUIRES REV 1 WELD CONTROL PCB C5A5003

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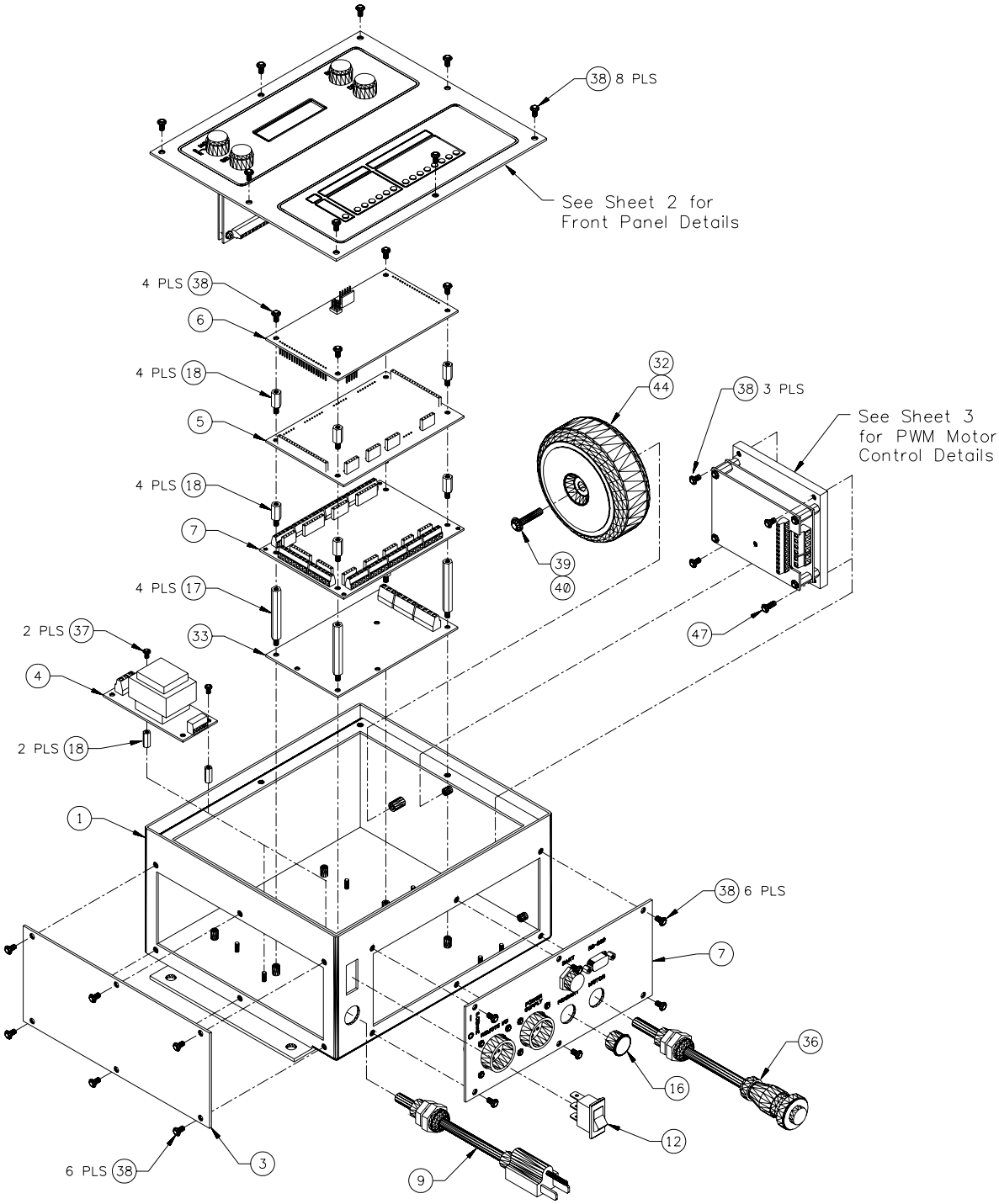
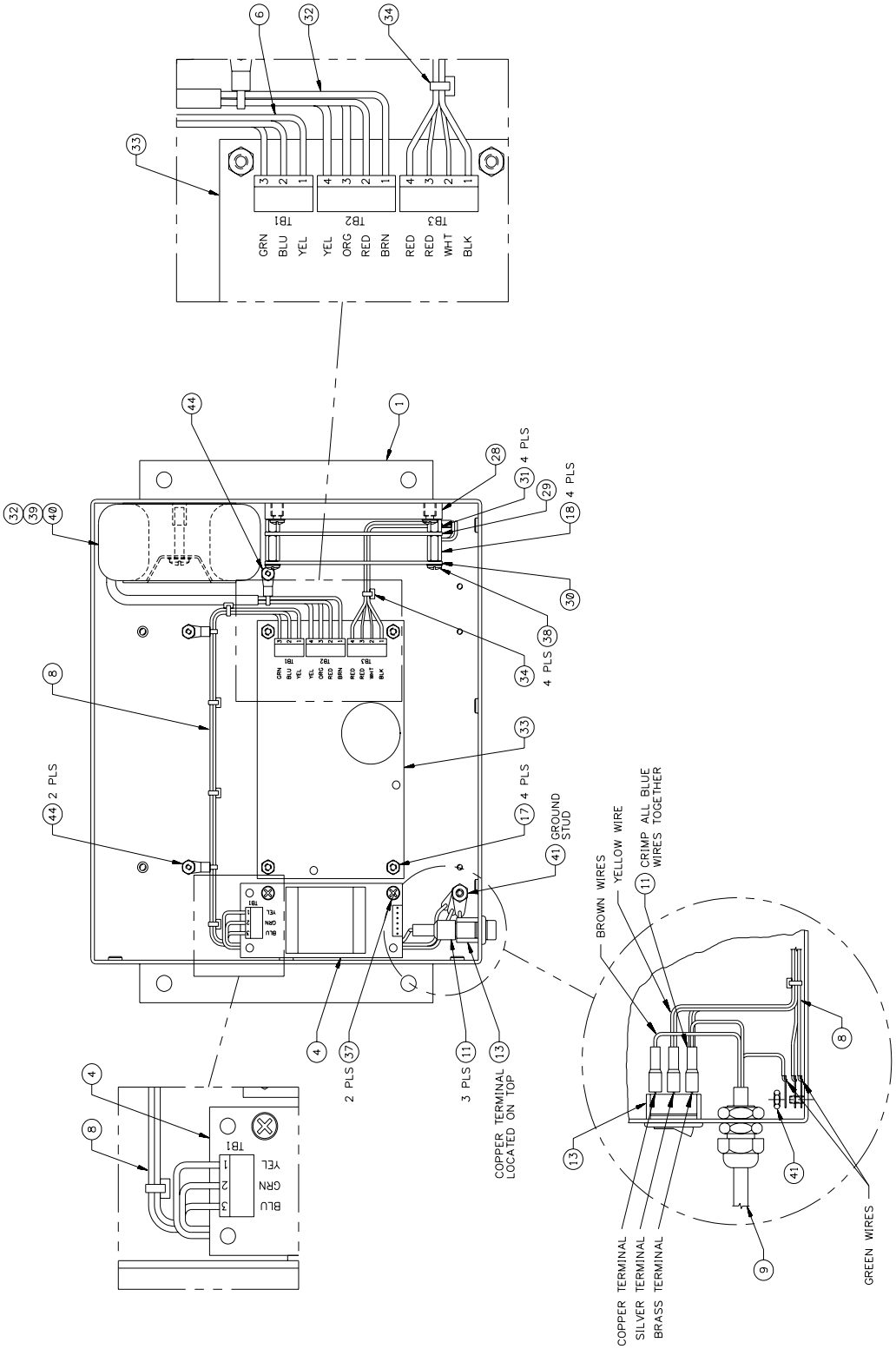
SHEET 1 OF 1

WSC II PWM CONTROL ENCLOSURE SCHEMATIC

8.5 110VAC Enclosure with Local Display and 9CM Control (P/N: S3A5074)

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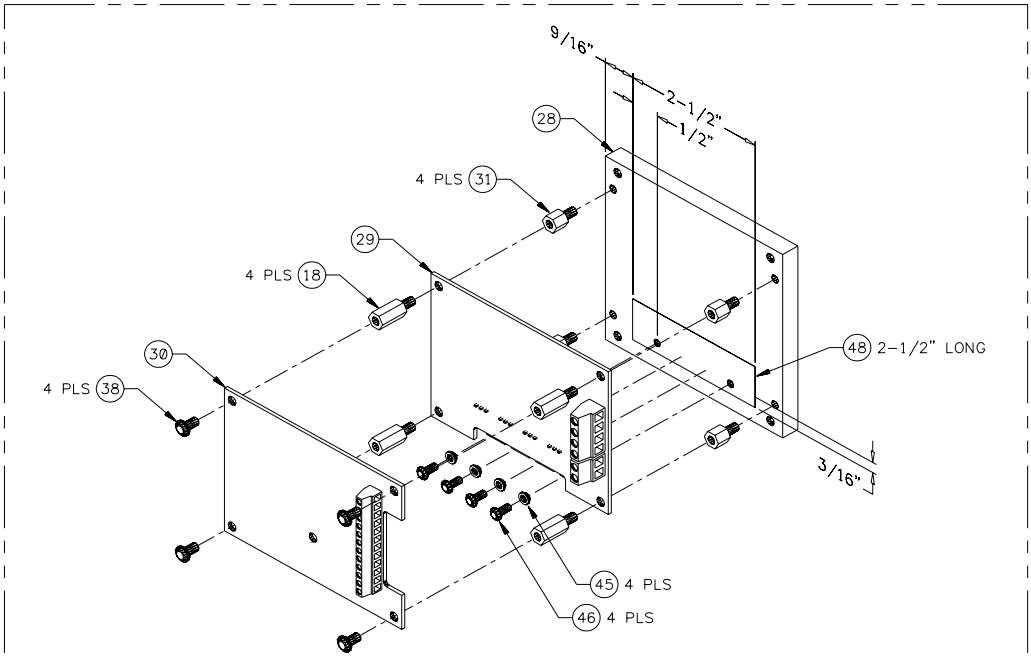
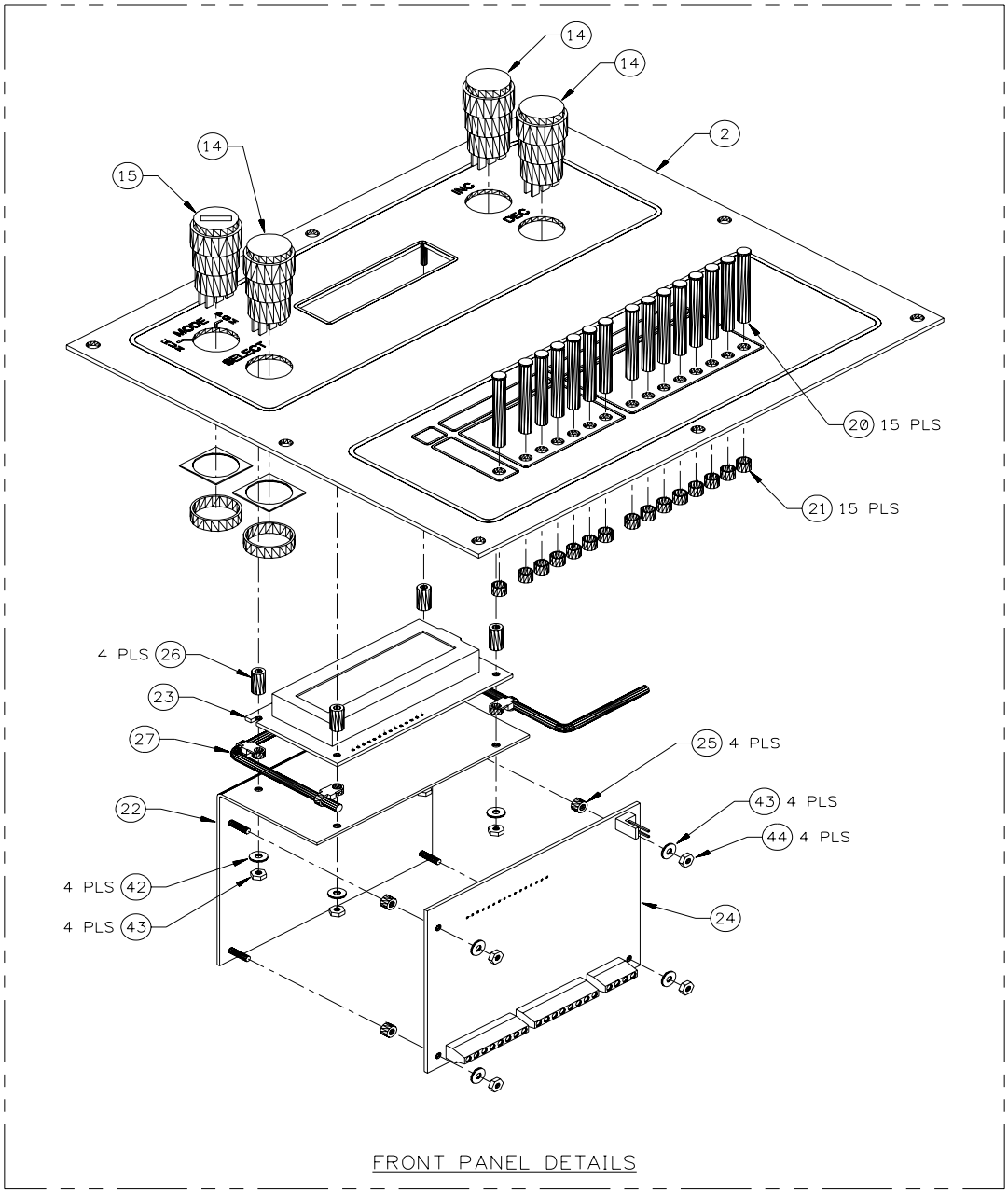
TB2
TB3
GRN
BLU
YEL
YEL
ORG
RED
BRN
RED
RED
WHT
BLK
4 PLS
2 PLS
3 PLS
GROUND STUD
COPPER TERMINAL LOCATED ON TOP
BROWN WIRES
YELLOW WIRE
CRIMP ALL BLUE WIRES TOGETHER
COPPER TERMINAL
SILVER TERMINAL
BRASS TERMINAL
GREEN WIRES

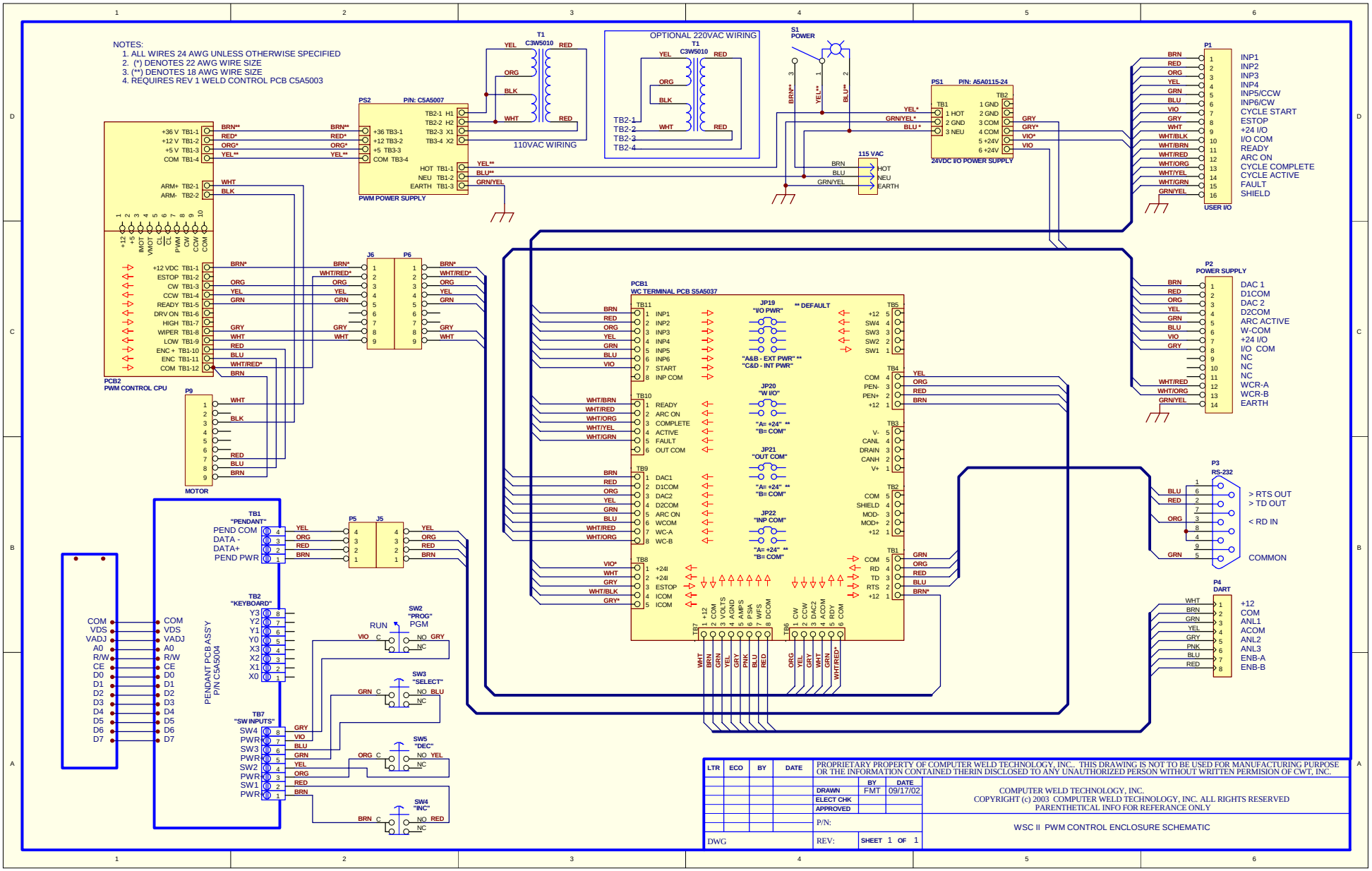


PWM MOTOR DRIVE DETAILS



FRONT PANEL DETAILS

COMPUTER WELD TECHNOLOGY – PARTS LIST			
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	S3E5078	Enclosure, 9" X 8" X 4-1/2"
2	1	S3E5079	Cover, WSC-2 Front
3	1	S3E5081	Plate, WSC-2 Large Blank
4	1	A5A0115-24	PCB Assembly, 24VDC Power Supply – Rev 0
5	1	S5A5036	PCB Assembly, Weld Control I/O Module
6	1	S5A5033-WSC2	PCB Assembly, MC6808GP32 WSC-2 FW: S5Z5008
7	1	S3W5095	Harness, WSC-2 Control Wire
8	1	S3W5093	Harness, WSC-2 110VAC Power Supply Wire
9	1	S3W5094	Cable, WSC-2 110vac Power Supply
10			
11	1	X3P5419	Terminal, Push-on Female 1/4" Panduit #DNF18-250FIB
12			
13	1	X3S5078	Switch, Rocker Power Cutler-Hammer #1600R11E
14	3	X3S5125	Switch, Pushbutton Black SPDT IDEC #AB6M-M1-B
15	1	X3S5127	Switch, Keylock SPDT Right Side Remove IDEC #AS6M-2KT2PB
16	1	X6Z5042	Plug, Dome Hole Black 5/8" Heyco #2663
17	4	X6S5062	Spacer, #6-32 X 1-3/4" Long M-F RAF #4554-632-SS-0
18	12	X6S5023	Spacer, #6-32 X 1/2" Long M-F RAF #4534-632-SS-0
19	2	X6S5054	Spacer, #4-40 X 1/2" Long RAF #2057-440-SS-0
20	15	X5Z5035	Litepipe, 1.25" Long Visual Comm. #LPC125CTP
21	15	X5Z5036	Clip, Spring Litepipe Visual Comm. #RTN250
22	1	S3E5083	Plate, WSC-2 Display Board
23	1	S3A5031	Display Assembly, LCD 2 X 16
24	1	C5A5004-WSC	PCB Assembly, WSC-2 Universal Pendant
25	4	X6S5052	Spacer, #2 X 1/8" Long Nylon RAF #1107-2-N
26	4	X6S5063	Spacer, #2 X 3/8" Long Nylon RAF #1111-2-N
27	1	S3W5097	Harness, WSC-2 Display Wire
28	1	S2M5182	Heatsink, PWM
29	1	C5A5005	PCB Assembly, PWM Driver
30	1	C5A5006-9CM	PCB Assembly, PWM 9CM Motor CPU
31	4	X6S5057	Spacer, #6-32 X 1/4" Long M-F RAF #4530-632-SS-0
32	1	S3A5084	Transformer Assembly, WSC-2 PWM
33	1	C5A5007	PCB Assembly, PWM Power Supply
34	1	S3W5096	Cable, WSC-2 PWM Power Wire
35	1	S3W5104	Cable, WSC-2 PWM Control Wire
36	1	S3W5107	Cable, WSC-2 Motor – WF-100 / Encoder
37	2		#4-40 X 1/4" Long Pan Head Screw w/ Int Lock Washer
38	27		#6-32 X 1/4" Long Pan Head Screw w/ Int Lock Washer
39	1		#10-32 X 1" Long Pand Head Screw
40	1		#10 External Lock Washer
41	1		#6-32 Hex Nut
42	8		#2 Internal Lock Washer
43	8		#2-56 Hex Nut
44	5		#4-40 Hex Nut
45	4	X5Z5007	Washer, Shoulder Thermalloy #7721-7PPS
46	4		#4-40 X 1/4" Long Pan Head Screw
47	1		#6-32 X 3/8" Long Pan Head Screw
48	3"		Tape, Kapton
49	52"		Tape, Foam Black 1/16" thick 1/2" wide
50	A/R		Compound, Thermal Thermalloy #249
51	3"		Tubing, Heat Shrink White 1/8"
52	1		Label, Serial Number


NOTES:
1. ALL WIRES 24 AWG UNLESS OTHERWISE SPECIFIED
2. (*) DENOTES 22 AWG WIRE SIZE
3. (**) DENOTES 18 AWG WIRE SIZE
4. REQUIRES REV 1 WELD CONTROL PCB C5A5003
T1 C3W5010
110VAC WIRING
OPTIONAL 220VAC WIRING
S1 POWER
PS1 P/N: A5A0115-24
24VDC I/O POWER SUPPLY
115 VAC
PS2 P/N: C5A5007
PWM POWER SUPPLY
P1
USER I/O
INP1
INP2
INP3
INP4
INP5/CCW
INP6/CW
CYCLE START
ESTOP
+24 I/O
I/O COM
READY
ARC ON
CYCLE COMPLETE
CYCLE ACTIVE
FAULT
SHIELD
PCB2
PWM CONTROL CPU
P9
MOTOR
J6
P6
PCB1
WC TERMINAL PCB S5A5037
JP19 "I/O PWR"
** DEFAULT
"A&B - EXT PWR" **
"C&D - INT PWR"
JP20 "W I/O"
"A= +24" **
"B= COM"
JP21 "OUT COM"
JP22 "INP COM"
P2
POWER SUPPLY
DAC 1
D1COM
DAC 2
D2COM
ARC ACTIVE
W-COM
+24 I/O
I/O COM
NC
NC
NC
WCR-A
WCR-B
EARTH
P3
RS-232
> RTS OUT
> TD OUT
< RD IN
COMMON
P4
DART
+12
COM
ANL1
ACOM
ANL2
ANL3
ENB-A
ENB-B
TB1 "PENDANT"
PEND COM
DATA -
DATA+
PEND PWR
P5
J5
TB2 "KEYBOARD"
PENDANT PCB ASSY P/N C5A5004
SW2 "PROG" PGM
SW3 "SELECT"
SW5 "DEC"
SW4 "INC"
TB7 "SW INPUTS"
LTR ECO BY DATE
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ELECT CHK
APPROVED
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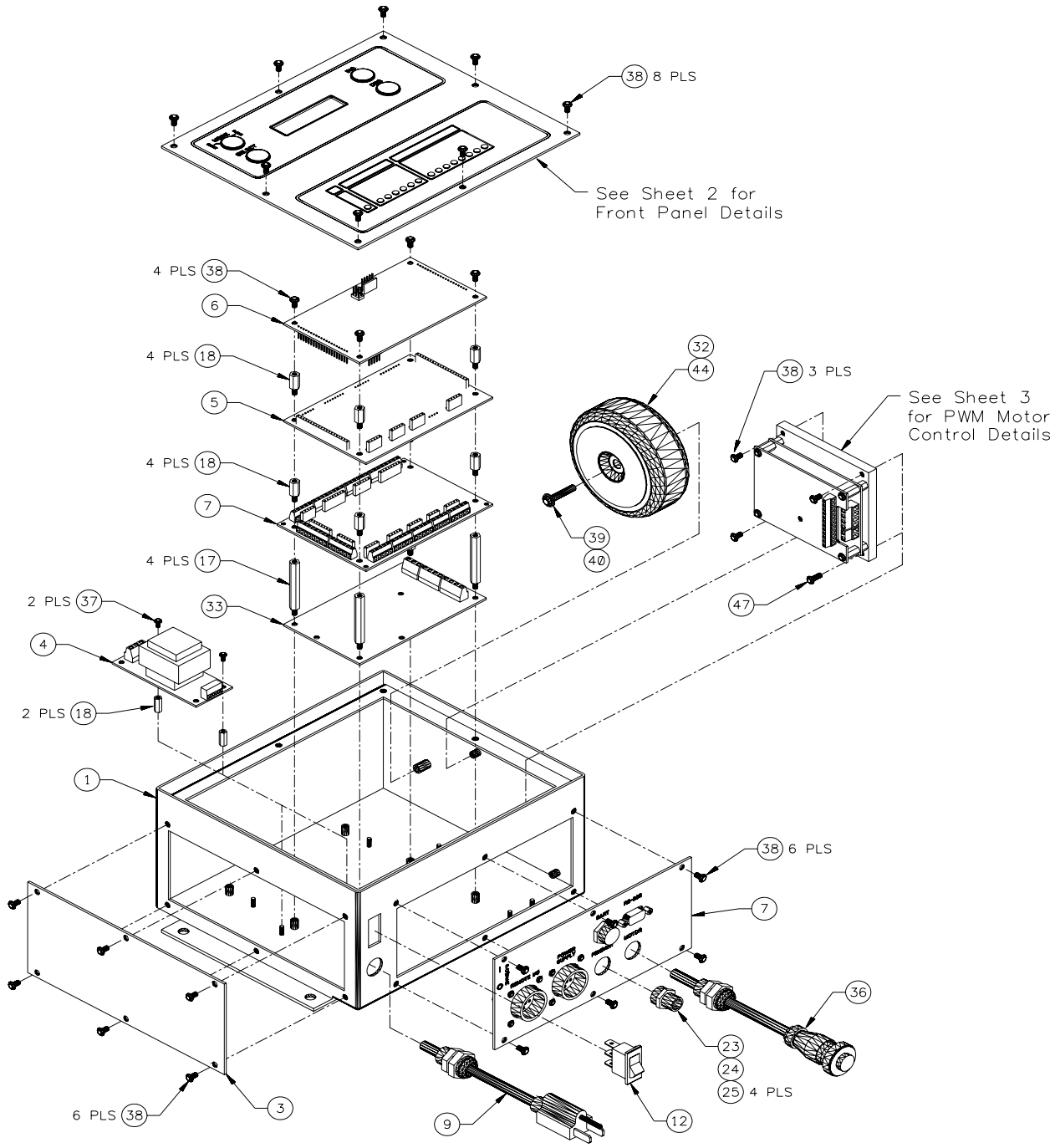
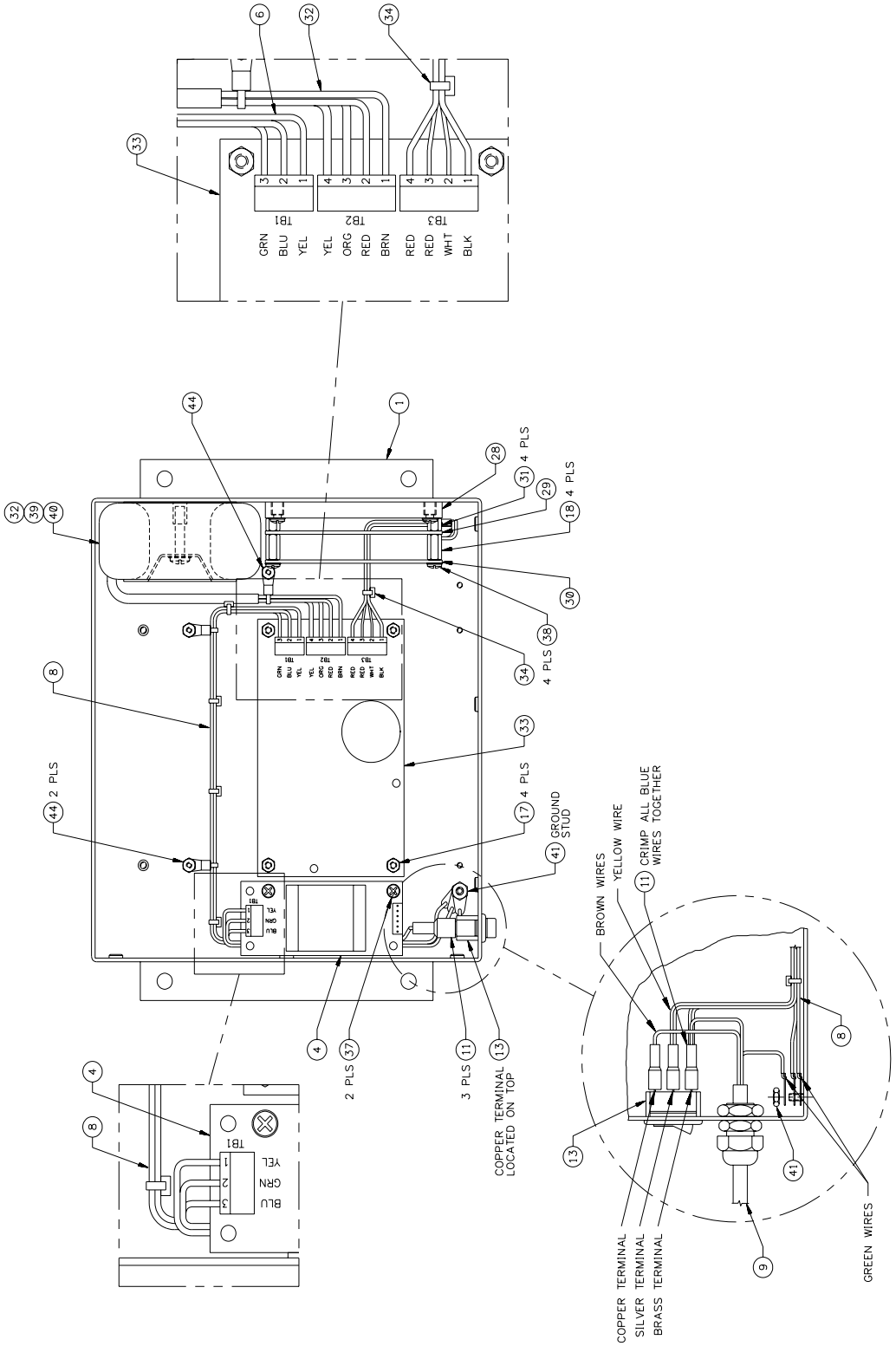
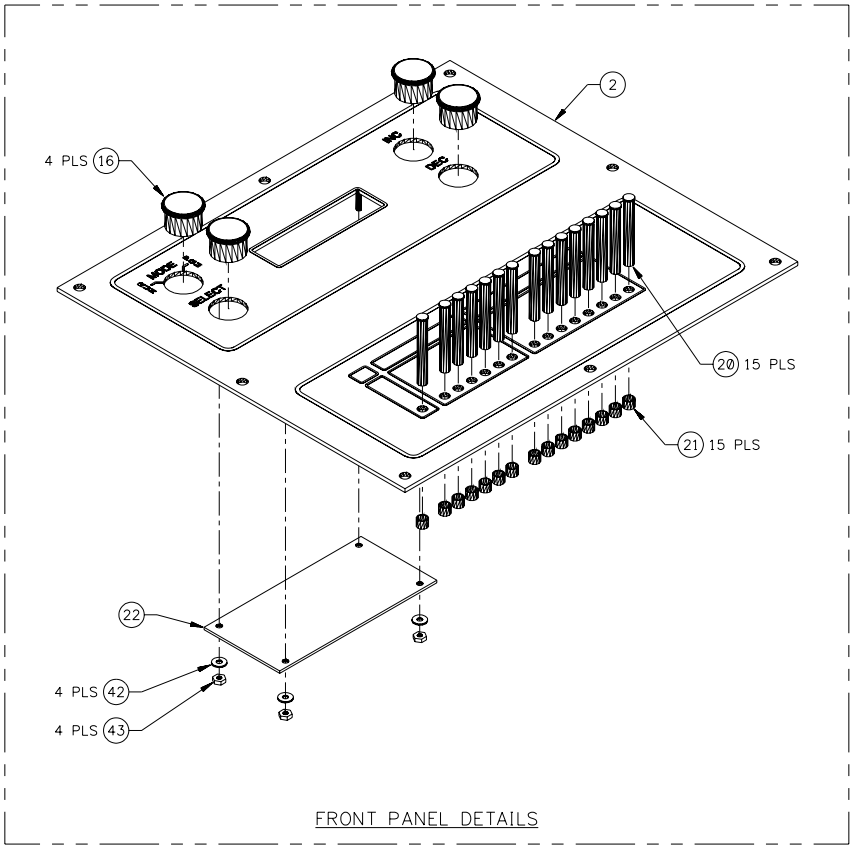
P/N:
WSC II PWM CONTROL ENCLOSURE SCHEMATIC
DWG
REV:
SHEET 1 OF 1

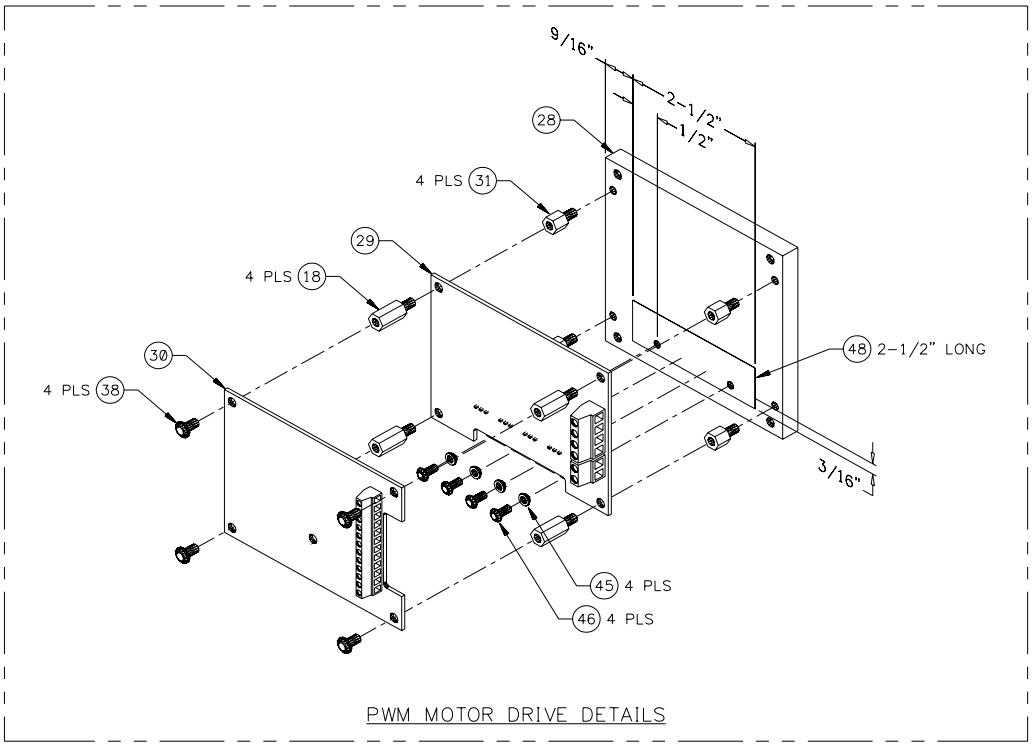
8.6 110VAC Enclosure for Remote Display with 12CM Control (P/N: S3A5090)



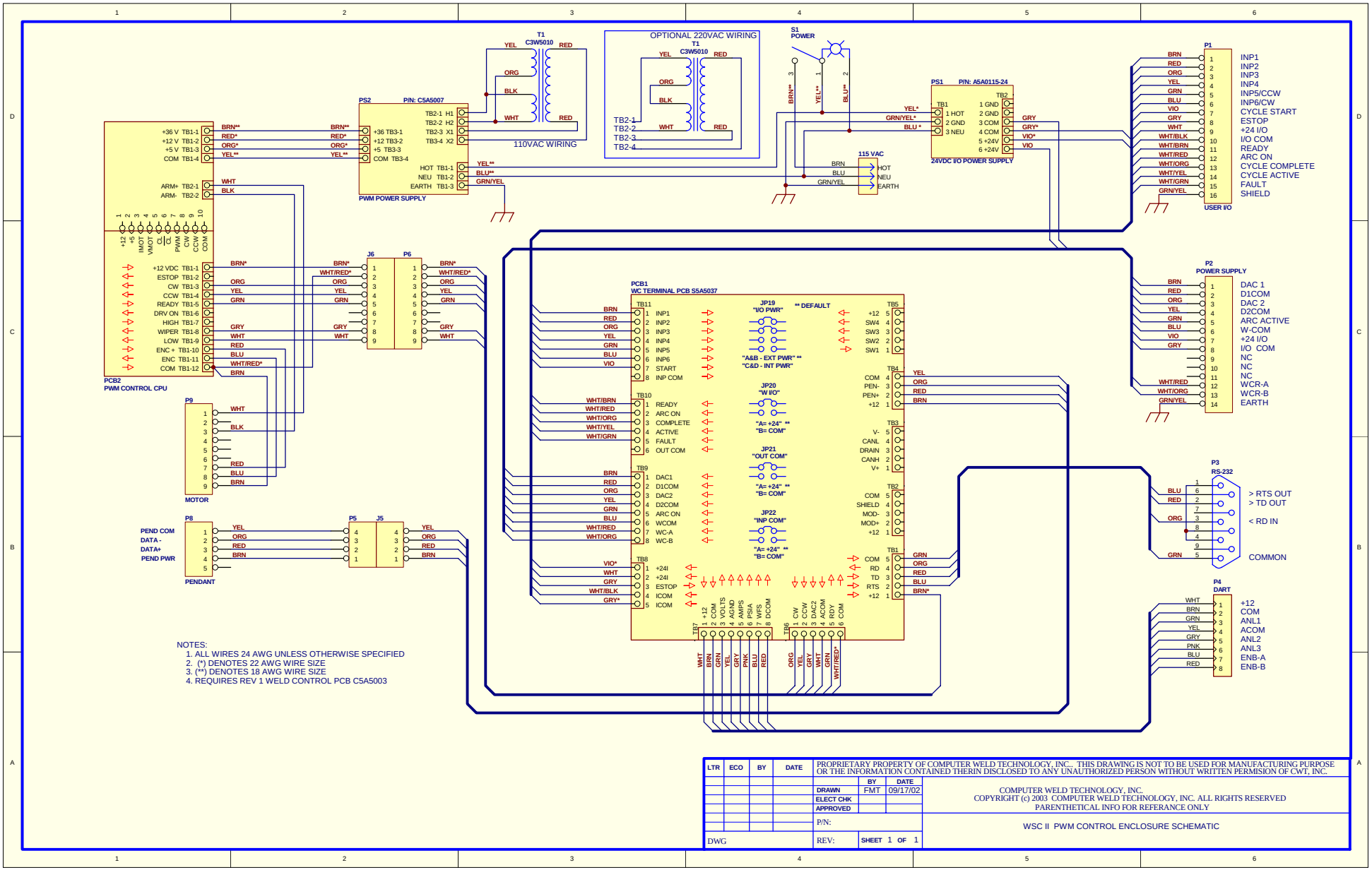

TB1
TB2
TB3
GRN
BLU
YEL
YEL
ORG
RED
BRN
RED
RED
WHT
BLK
4 PLS
2 PLS
3 PLS
GROUND STUD
COPPER TERMINAL LOCATED ON TOP
BROWN WIRES
YELLOW WIRE
CRIMP ALL BLUE WIRES TOGETHER
COPPER TERMINAL
SILVER TERMINAL
BRASS TERMINAL
GREEN WIRES



FRONT PANEL DETAILS



PWM MOTOR DRIVE DETAILS


T1
C3W5010
YEL
RED
ORG
BLK
WHT
110VAC WIRING
OPTIONAL 220VAC WIRING
S1
POWER
PS1 P/N: A5A0115-24
24VDC I/O POWER SUPPLY
115 VAC
PS2 P/N: C5A5007
PWM POWER SUPPLY
P1
USER I/O
INP1
INP2
INP3
INP4
INP5/CCW
INP6/CW
CYCLE START
ESTOP
+24 I/O
I/O COM
READY
ARC ON
CYCLE COMPLETE
CYCLE ACTIVE
FAULT
SHIELD
P2
POWER SUPPLY
DAC 1
D1COM
DAC 2
D2COM
ARC ACTIVE
W-COM
+24 I/O
I/O COM
NC
NC
NC
WCR-A
WCR-B
EARTH
PCB1
WC TERMINAL PCB S5A5037
** DEFAULT
"I/O PWR"
"A&B - EXT PWR" **
"C&D - INT PWR"
"W I/O"
"A= +24" **
"B= COM"
"OUT COM"
"INP COM"
PCB2
PWM CONTROL CPU
MOTOR
PENDANT
P3
RS-232
> RTS OUT
> TD OUT
< RD IN
COMMON
P4
DART
+12
COM
ANL1
ACOM
ANL2
ANL3
ENB-A
ENB-B
NOTES:
1. ALL WIRES 24 AWG UNLESS OTHERWISE SPECIFIED
2. (*) DENOTES 22 AWG WIRE SIZE
3. (**) DENOTES 18 AWG WIRE SIZE
4. REQUIRES REV 1 WELD CONTROL PCB C5A5003
LTR ECO BY DATE
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DRAWN FMT 09/17/02
ELECT CHK
APPROVED
P/N:
DWG
REV:
SHEET 1 OF 1
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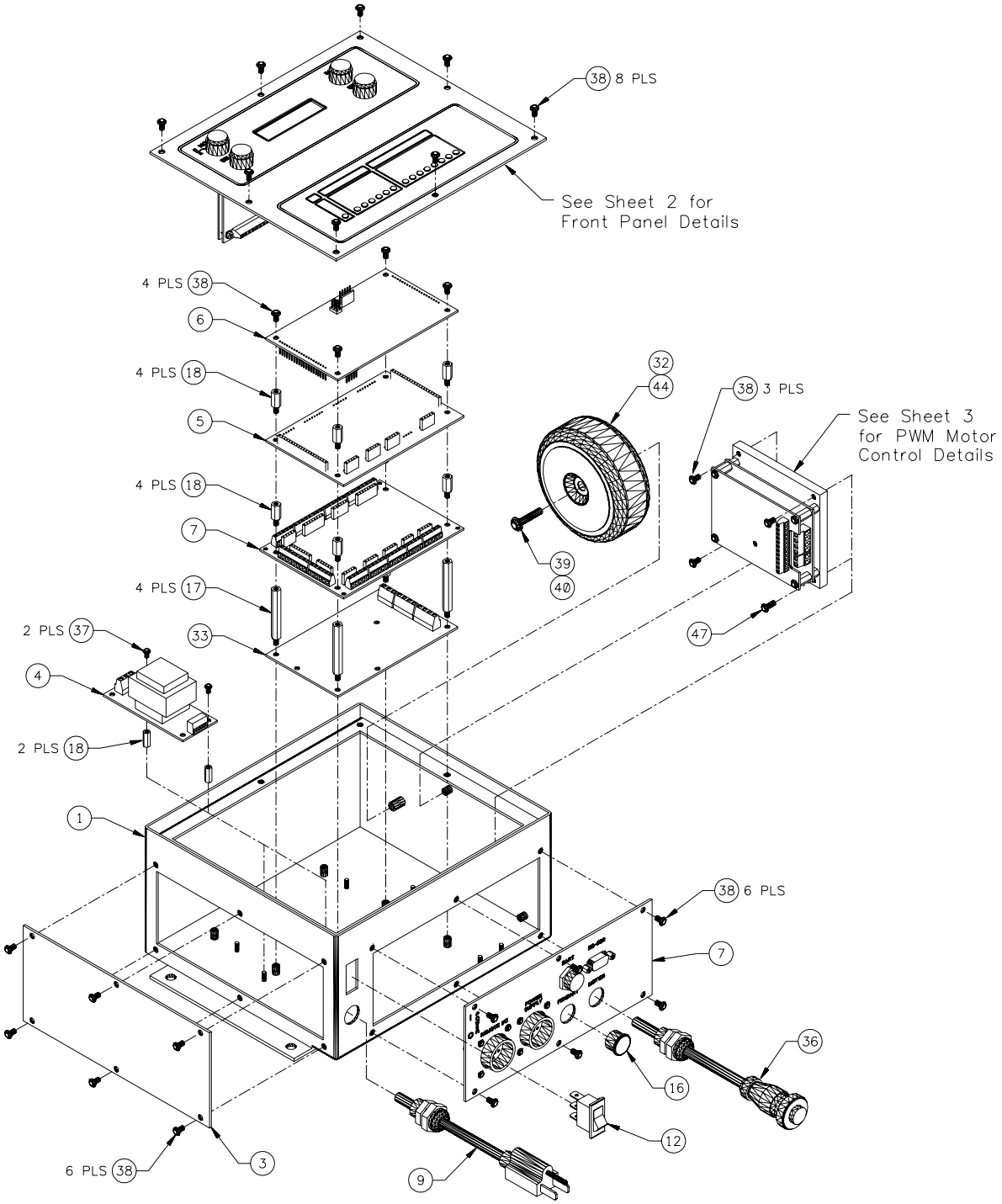
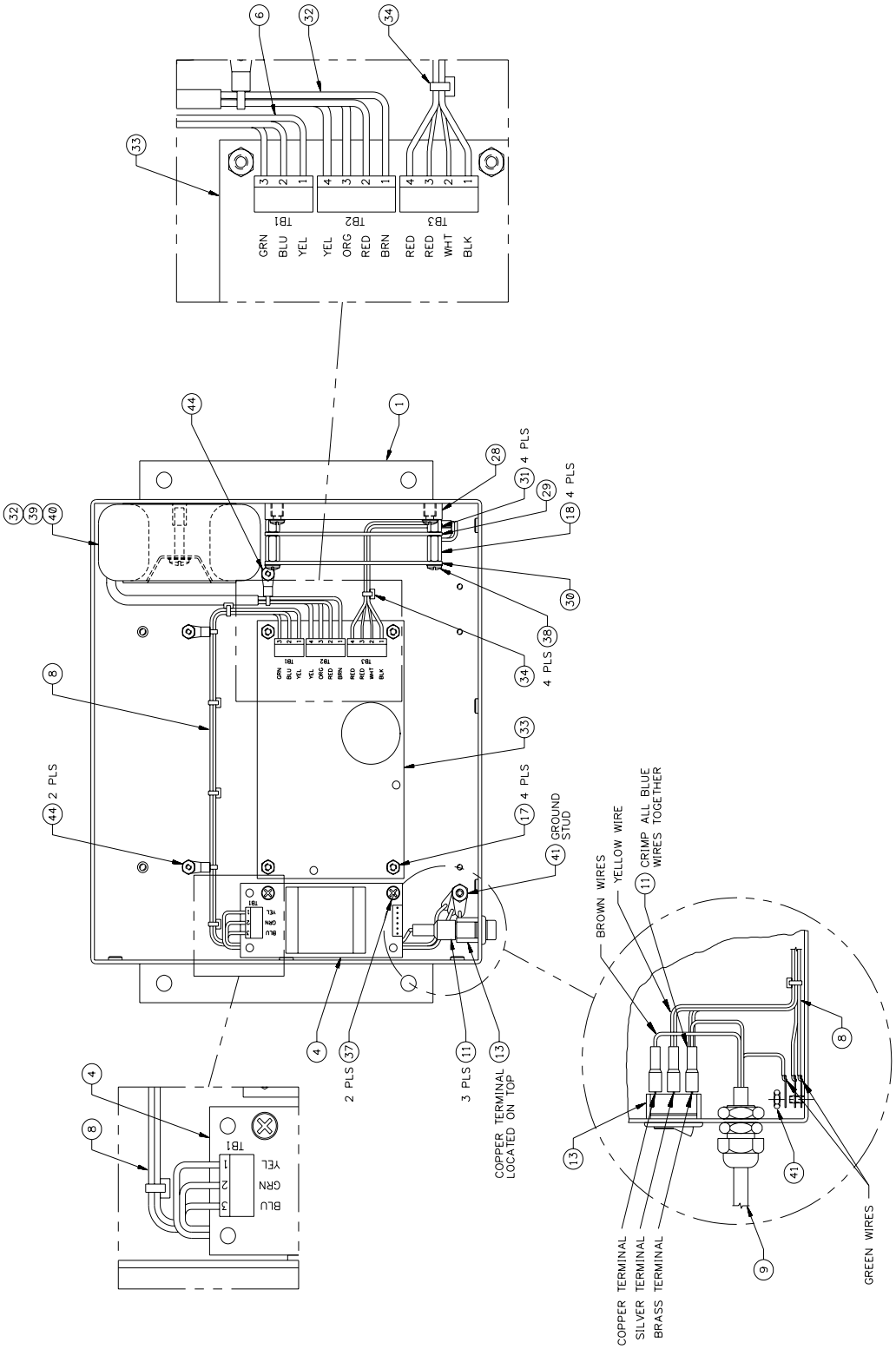
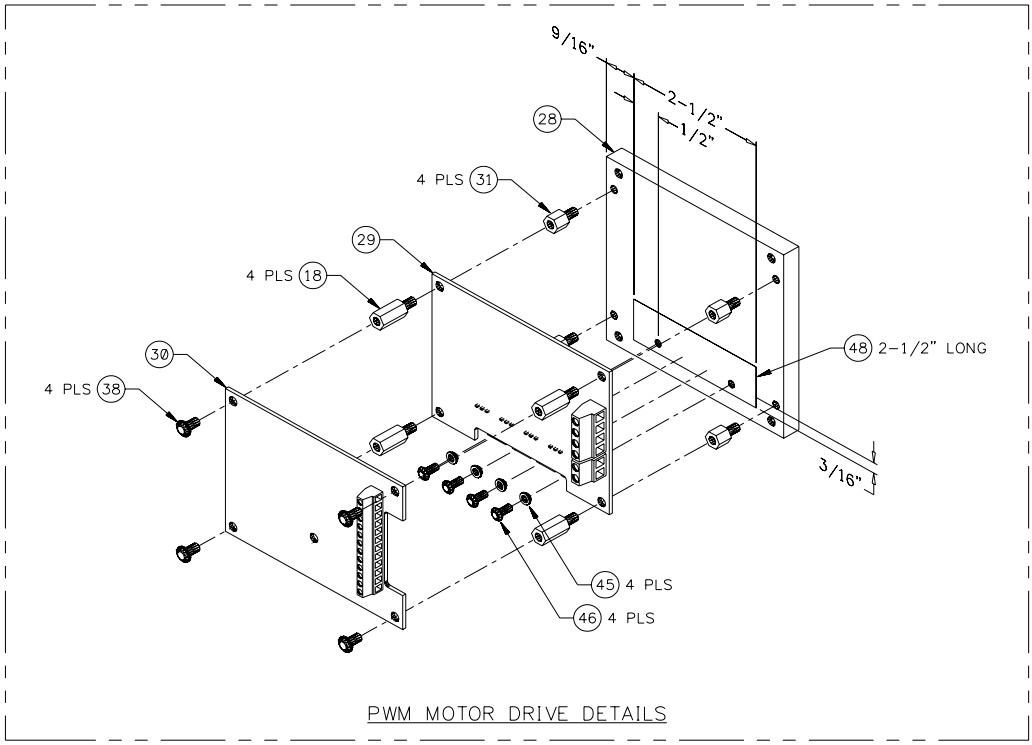
WSC II PWM CONTROL ENCLOSURE SCHEMATIC

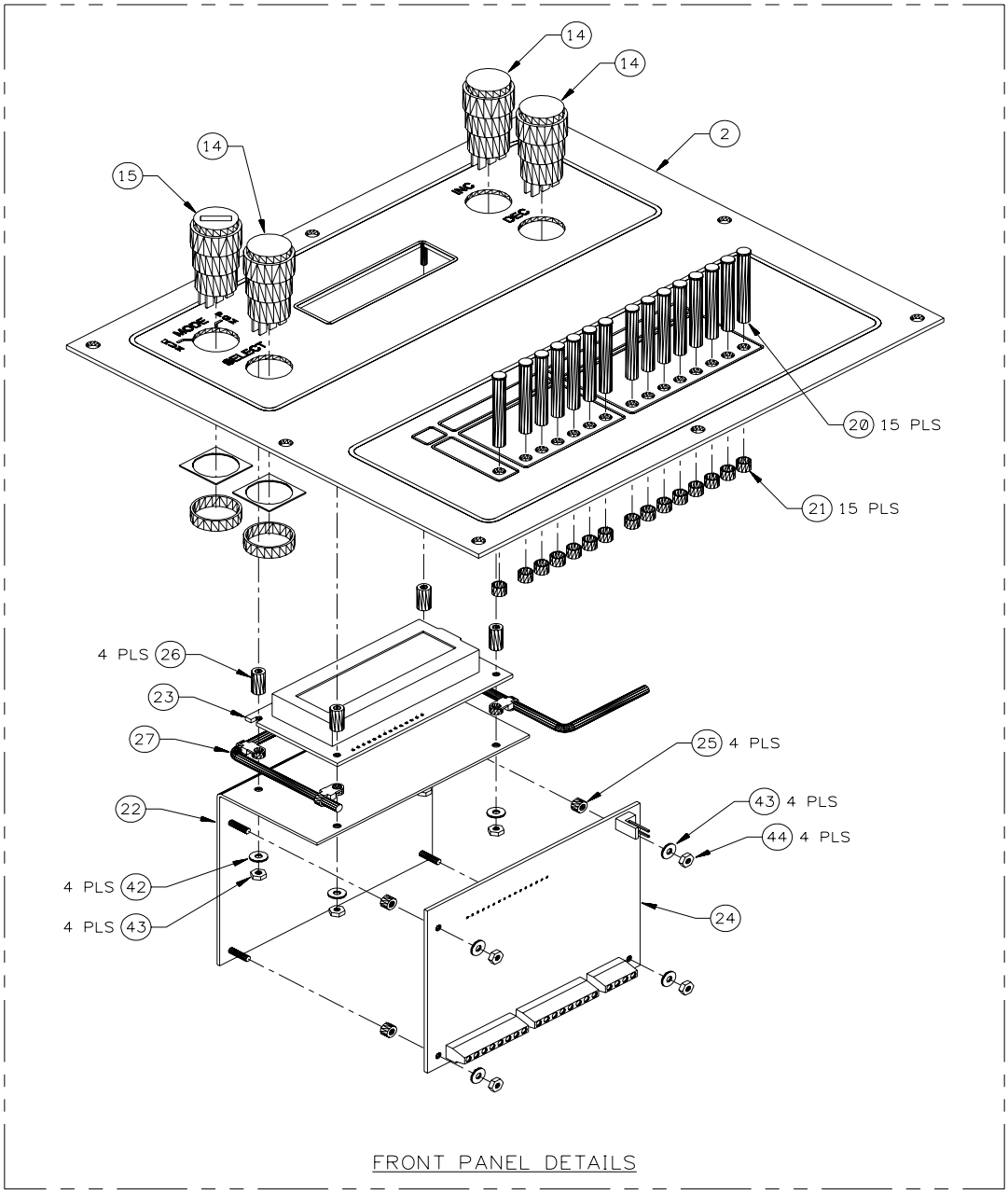
8.7 110VAC Enclosure with Local Display and 12CM Control (P/N: S3A5091)



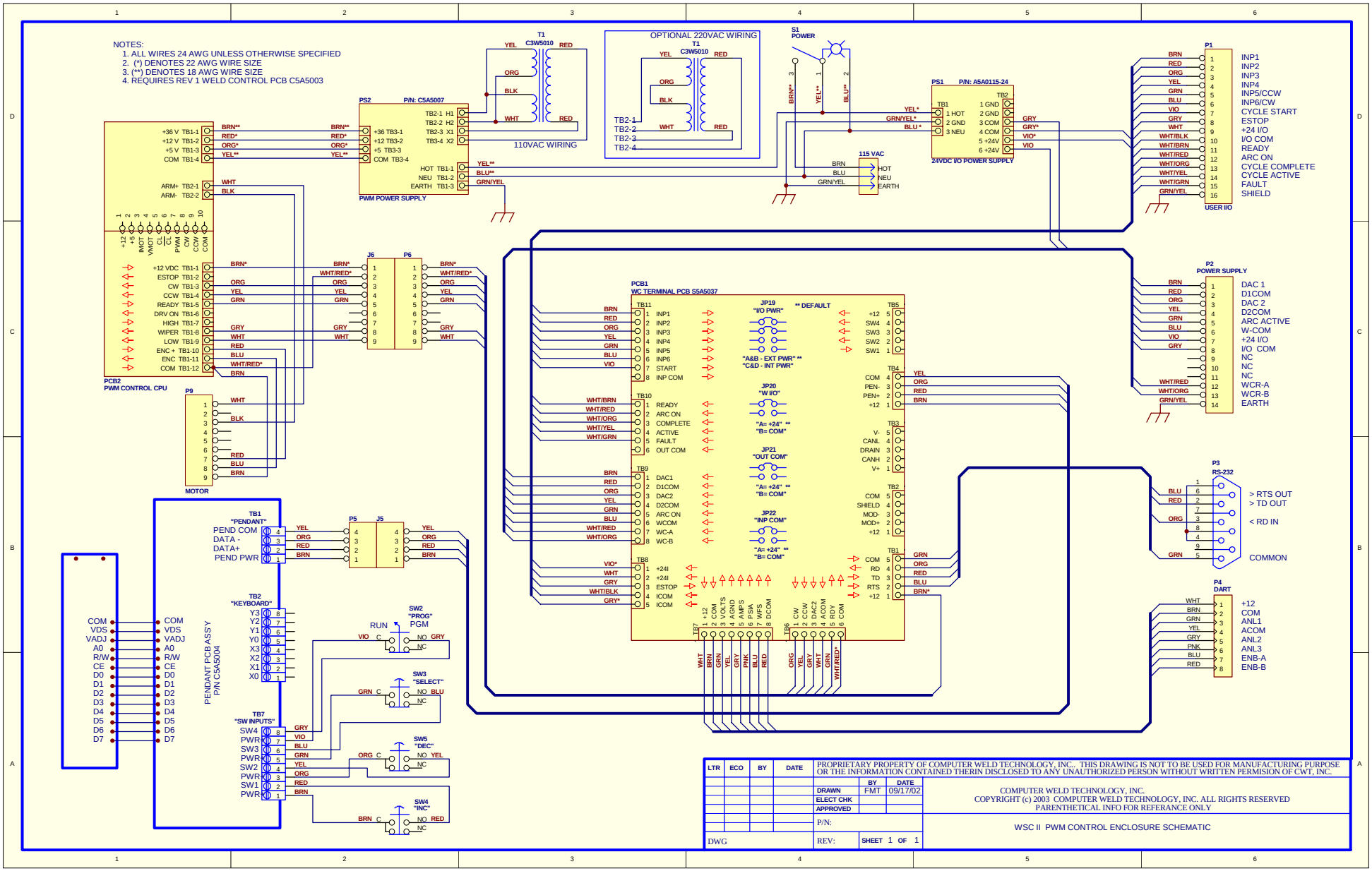

TB1
TB2
TB3
GRN
BLU
YEL
YEL
ORG
RED
BRN
RED
RED
WHT
BLK
4 PLS
2 PLS
3 PLS
GROUND STUD
COPPER TERMINAL LOCATED ON TOP
BROWN WIRES
YELLOW WIRE
CRIMP ALL BLUE WIRES TOGETHER
COPPER TERMINAL
SILVER TERMINAL
BRASS TERMINAL
GREEN WIRES



PWM MOTOR DRIVE DETAILS



FRONT PANEL DETAILS


NOTES:
1. ALL WIRES 24 AWG UNLESS OTHERWISE SPECIFIED
2. (*) DENOTES 22 AWG WIRE SIZE
3. (**) DENOTES 18 AWG WIRE SIZE
4. REQUIRES REV 1 WELD CONTROL PCB C5A5003
T1 C3W5010
110VAC WIRING
OPTIONAL 220VAC WIRING
S1 POWER
PS1 P/N: A5A0115-24
24VDC I/O POWER SUPPLY
115 VAC
PS2 P/N: C5A5007
PWM POWER SUPPLY
PCB2 PWM CONTROL CPU
MOTOR
PCB1 WC TERMINAL PCB SSA5037
** DEFAULT
"A&B - EXT PWR" **
"C&D - INT PWR"
"A= +24" **
"B= COM"
"INP COM"
P1 USER I/O
P2 POWER SUPPLY
P3 RS-232
P4 DART
TB1 "PENDANT"
TB2 "KEYBOARD"
TB7 "SW INPUTS"
PENDANT PCB ASSY P/N C5A5004
SW2 "PROG" PGM
SW3 "SELECT"
SW5 "DEC"
SW4 "INC"
INP1
INP2
INP3
INP4
INP5/CCW
INP6/CW
CYCLE START
ESTOP
+24 I/O
I/O COM
READY
ARC ON
CYCLE COMPLETE
CYCLE ACTIVE
FAULT
SHIELD
DAC 1
D1COM
DAC 2
D2COM
ARC ACTIVE
W-COM
+24 I/O
I/O COM
NC
NC
NC
WCR-A
WCR-B
EARTH
> RTS OUT
> TD OUT
< RD IN
COMMON
+12
COM
ANL1
ACOM
ANL2
ANL3
ENB-A
ENB-B
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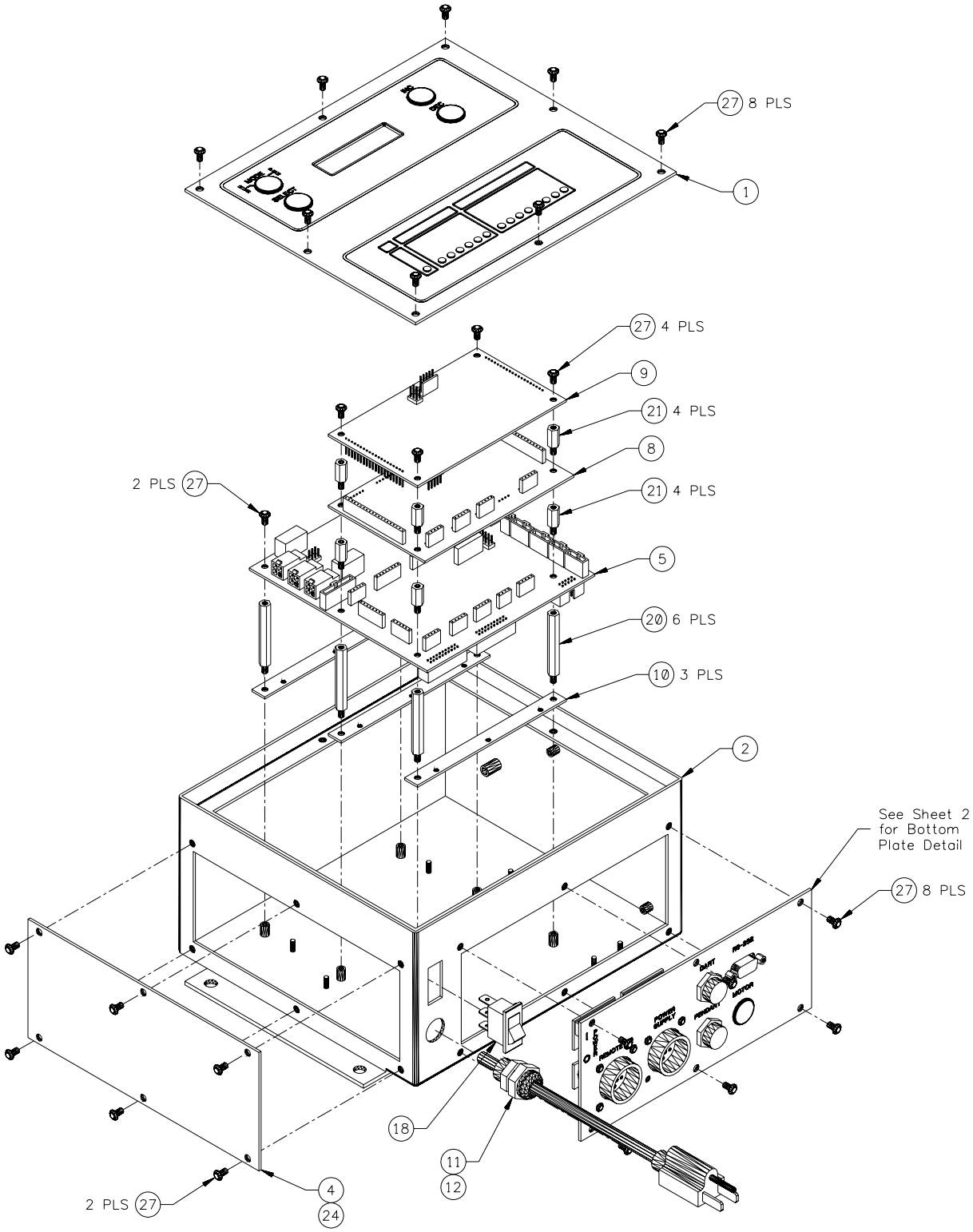
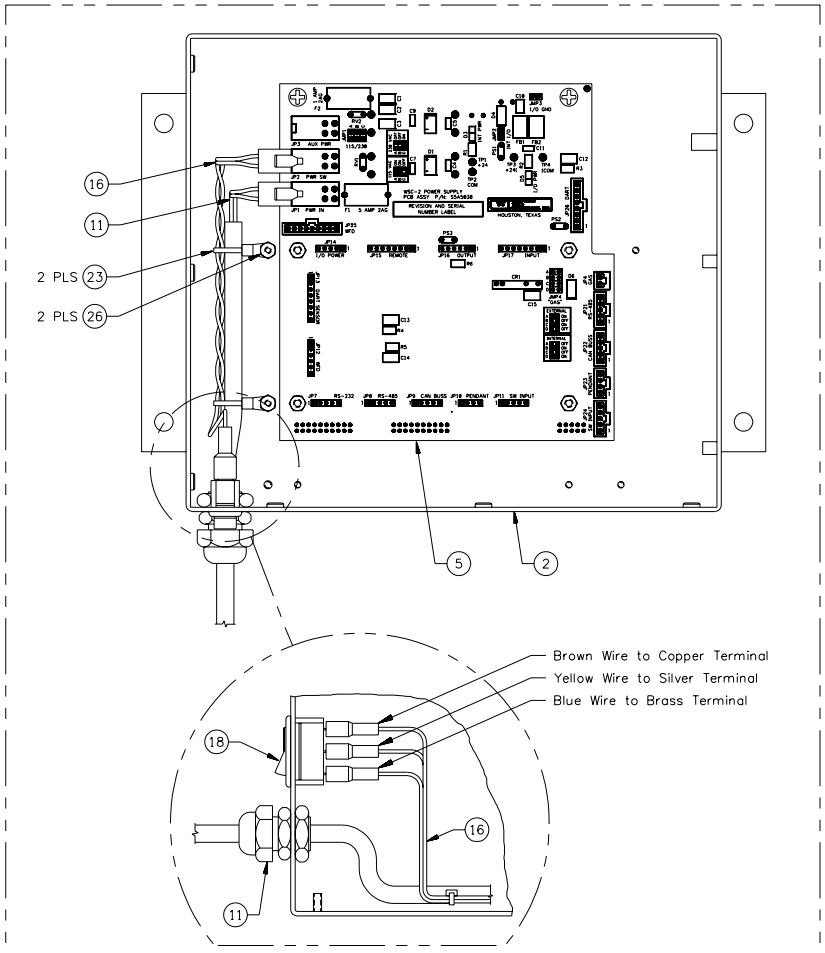
WSC II PWM CONTROL ENCLOSURE SCHEMATIC
DRAWN FMT 09/17/02
SHEET 1 OF 1

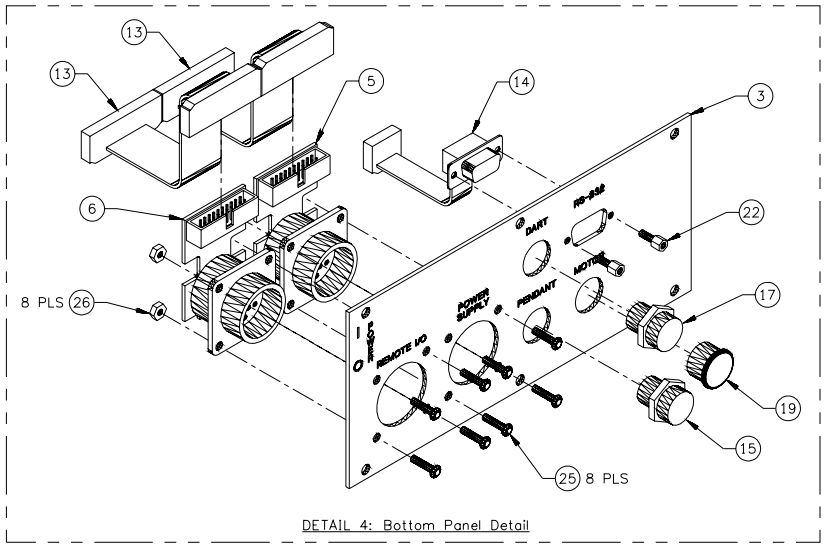
8.8 110VAC Enclosure for Remote Display (P/N: S3A5096)



DETAIL 1: Main View

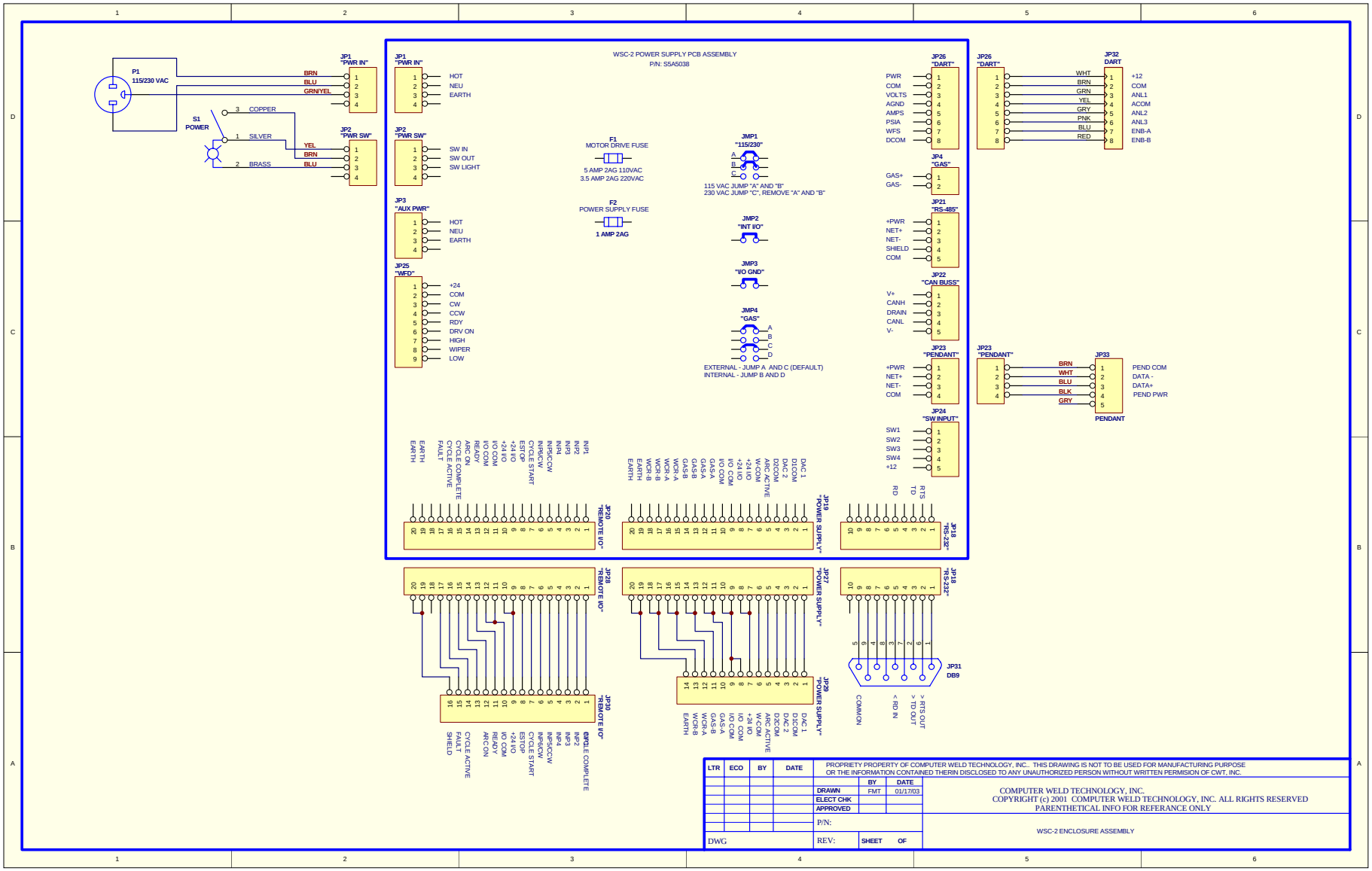


DETAIL 5: AC Power Wiring Details



DETAIL 4: Bottom Panel Detail

COMPUTER WELD TECHNOLOGY – PARTS LIST			
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	S3A5109	Cover Assy, WSC–2 Front without Display
2	1	S3E5078	Enclosure, 9" X 8" X 4–1/2"
3	1	S3E5080	Cover, WSC–2 Bottom
4	1	S3E5081	Cover, WSC–2 Large Blank
5	1	S5A5038	PCB Assembly, WSC–2 Power Supply
6	1	S5A5039	PCB Assembly, WSC–2 Remote I/O Connector
7	1	S5A5040	PCB Assembly, WSC–2 Power Source Connector
8	1	S5A5036	PCB Assembly, Weld Control I/O Module
9	1	S5A5033–WSC2	PCB Assembly, MC6808GP32 WSC–2 FW: S5Z5008
10	3	S5F5034	PCB, WSC–2 Spacer
11	1	S3W5109	Cable, WSC–2 125VAC North American Power
12	1	X3P5706	Connector, Housing 4 Circuit Amp #172167–1
13	1	S3W5111	Cable, WSC–2 Remote I/O and Power Source
14	1	S3W5112	Cable, WSC–2 RS–232
15	1	S3W5114	Harness, WSC–2 Remote Pendant Wire
16	1	S3W5115	Harness, WSC–2 Power Switch Wire
17	1	S3W5118	Harness, WSC–2 DART Wire
18	1	X3S5078	Switch, Rocker Power Cutler–Hammer #1600R11E
19	1	X6Z5042	Plug, Dome Hole Black 5/8" Heyco #2663
20	6	X6S5062	Spacer, #6–32 X 1–3/4" Long M–F RAF #4554–632–SS–0
21	8	X6S5023	Spacer, #6–32 X 1/2" Long M–F RAF #4534–632–SS–0
22	1	X3Z5027	Kit, Female Screwlock AMP #205817–3
23	2	X3Z5090	Tie, Cable Screw Down Panduit #PLC1M–S4–C0
24	41"		Tape, Foam Black 1/8" thick 1/2" wide
25	8		#4–40 X 1/4" Long Pan Head Screw
26	10		#4–40 Hex Lock Nut
27	26		#6–32 X 1/4" Long Pan Head Screw w/ Int Lock Washer
28	1		Label, Serial Number


WSC-2 POWER SUPPLY PCB ASSEMBLY
P/N: SSA5038
P1
115/230 VAC
S1
POWER
COPPER
SILVER
BRASS
JP1 "PWR IN"
JP2 "PWR SW"
JP3 "AUX PWR"
JP25 "WFD"
HOT
NEU
EARTH
SW IN
SW OUT
SW LIGHT
+24
COM
CW
CCW
RDY
DRV ON
HIGH
WIPER
LOW
F1
MOTOR DRIVE FUSE
5 AMP 2AG 110VAC
3.5 AMP 2AG 220VAC
F2
POWER SUPPLY FUSE
1 AMP 2AG
JMP1 "115/230"
115 VAC JUMP "A" AND "B"
230 VAC JUMP "C", REMOVE "A" AND "B"
JMP2 "INT I/O"
JMP3 "I/O GND"
JMP4 "GAS"
EXTERNAL - JUMP A AND C (DEFAULT)
INTERNAL - JUMP B AND D
JP26 "DART"
PWR
COM
VOLTS
AGND
AMPS
PSIA
WFS
DCOM
JP4 "GAS"
GAS+
GAS-
JP21 "RS-485"
+PWR
NET+
NET-
SHIELD
COM
JP22 "CAN BUSS"
V+
CANH
DRAIN
CANL
V-
JP23 "PENDANT"
+PWR
NET+
NET-
COM
JP24 "SW INPUT"
SW1
SW2
SW3
SW4
+12
JP20 "REMOTE I/O"
JP19 "POWER SUPPLY"
JP18 "RS-232"
JP28 "REMOTE I/O"
JP27 "POWER SUPPLY"
JP18 "RS-232"
JP30 "REMOTE I/O"
JP29 "POWER SUPPLY"
JP31 DB9
COMMON
< RD IN
> TD OUT
> RTS OUT
JP26 "DART"
JP32 DART
WHT
BRN
GRN
YEL
GRY
PNK
BLU
RED
+12
COM
ANL1
ACOM
ANL2
ANL3
ENB-A
ENB-B
JP23 "PENDANT"
JP33
BRN
WHT
BLU
BLK
GRY
PEND COM
DATA -
DATA+
PEND PWR
PENDANT
LTR
ECO
BY
DATE
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DRAWN
FMT
01/17/03
ELECT CHK
APPROVED
P/N:
REV:
SHEET
OF
DWG
COMPUTER WELD TECHNOLOGY, INC.
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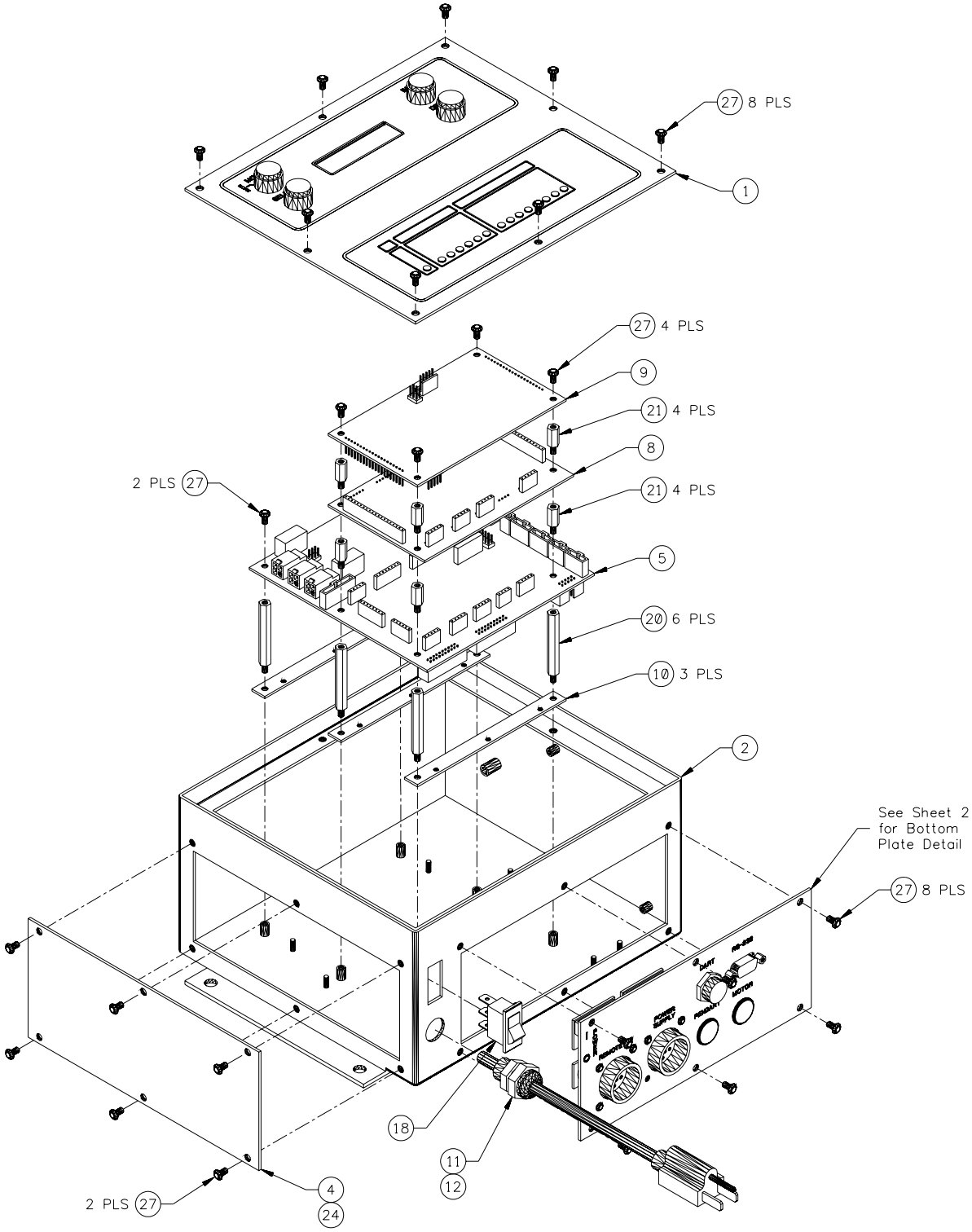
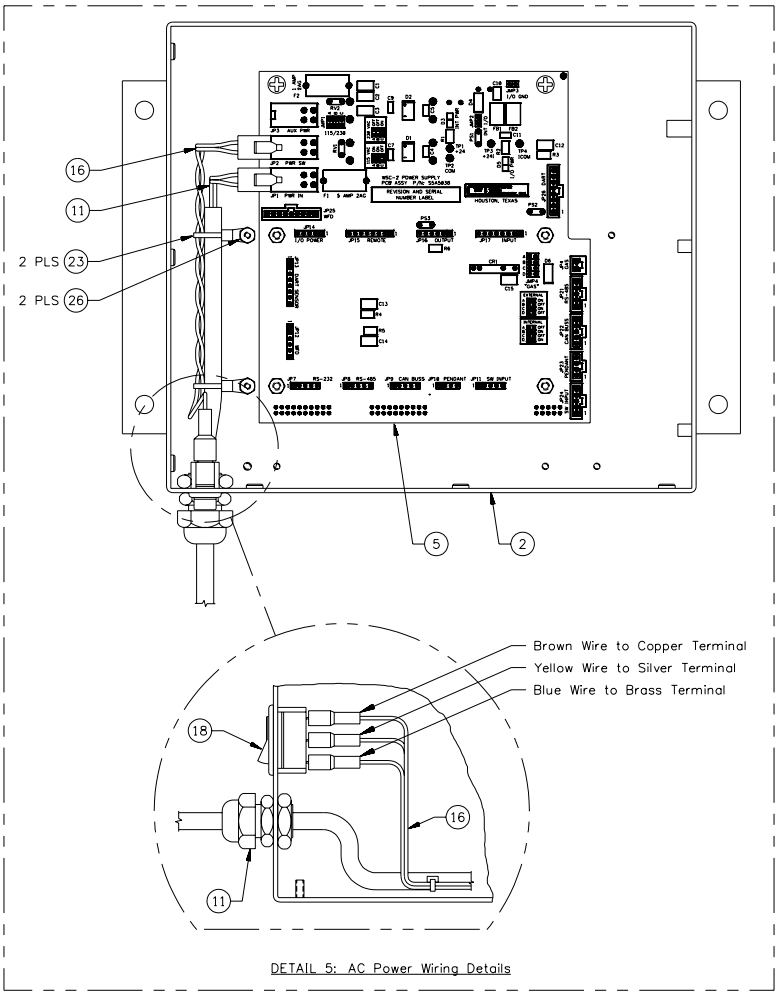
WSC-2 ENCLOSURE ASSEMBLY

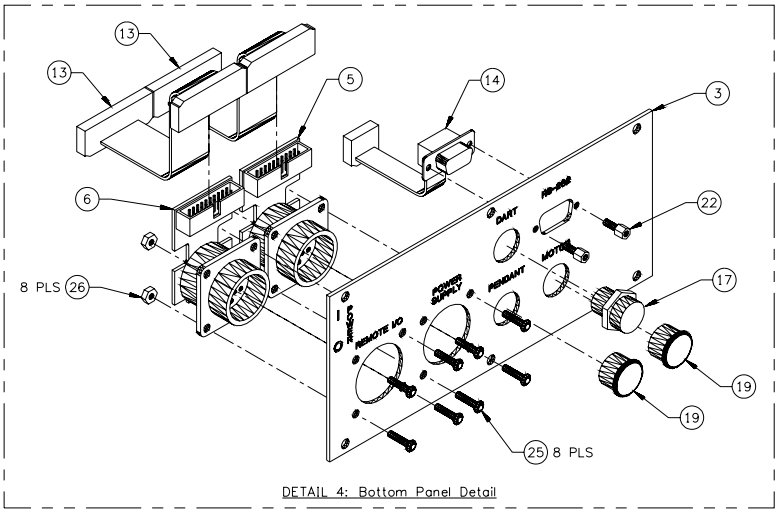
8.9 110VAC Enclosure with Local Display (P/N: S3A5097)



DETAIL 1: Main View

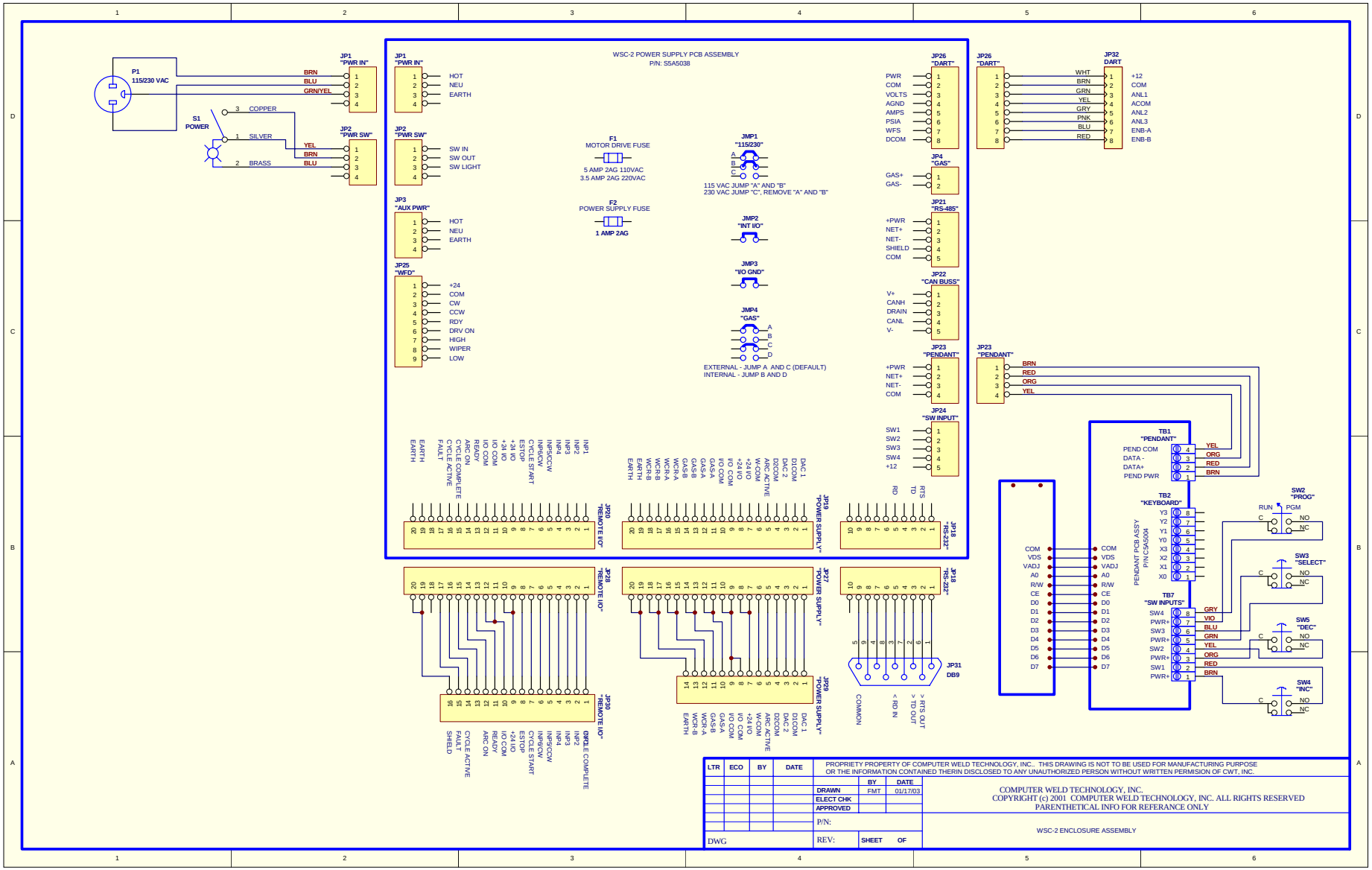


DETAIL 5: AC Power Wiring Details



DETAIL 4: Bottom Panel Detail

COMPUTER WELD TECHNOLOGY – PARTS LIST			
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	S3A5110	Cover Assy, WSC–2 Front with Display
2	1	S3E5078	Enclosure, 9" X 8" X 4–1/2"
3	1	S3E5080	Cover, WSC–2 Bottom
4	1	S3E5081	Cover, WSC–2 Large Blank
5	1	S5A5038	PCB Assembly, WSC–2 Power Supply
6	1	S5A5039	PCB Assembly, WSC–2 Remote I/O Connector
7	1	S5A5040	PCB Assembly, WSC–2 Power Source Connector
8	1	S5A5036	PCB Assembly, Weld Control I/O Module
9	1	S5A5033–WSC2	PCB Assembly, MC6808GP32 WSC–2 FW: S5Z5008
10	3	S5F5034	PCB, WSC–2 Spacer
11	1	S3W5109	Cable, WSC–2 125VAC North American Power
12	1	X3P5706	Connector, Housing 4 Circuit Amp #172167–1
13	1	S3W5111	Cable, WSC–2 Remote I/O and Power Source
14	1	S3W5112	Cable, WSC–2 RS–232
15			
16	1	S3W5115	Harness, WSC–2 Power Switch Wire
17	1	S3W5118	Harness, WSC–2 DART Wire
18	1	X3S5078	Switch, Rocker Power Cutler–Hammer #1600R11E
19	2	X6Z5042	Plug, Dome Hole Black 5/8" Heyco #2663
20	6	X6S5062	Spacer, #6–32 X 1–3/4" Long M–F RAF #4554–632–SS–0
21	8	X6S5023	Spacer, #6–32 X 1/2" Long M–F RAF #4534–632–SS–0
22	1	X3Z5027	Kit, Female Screwlock AMP #205817–3
23	2	X3Z5090	Tie, Cable Screw Down Panduit #PLC1M–S4–C0
24	41"		Tape, Foam Black 1/8" thick 1/2" wide
25	8		#4–40 X 1/4" Long Pan Head Screw
26	10		#4–40 Hex Lock Nut
27	26		#6–32 X 1/4" Long Pan Head Screw w/ Int Lock Washer
28	1		Label, Serial Number


WSC-2 POWER SUPPLY PCB ASSEMBLY
P/N: S5A5038
P1
115/230 VAC
BRN
BLU
GRN/YEL
S1
POWER
COPPER
SILVER
BRASS
JP1 "PWR IN"
JP2 "PWR SW"
JP3 "AUX PWR"
JP25 "WFD"
HOT
NEU
EARTH
SW IN
SW OUT
SW LIGHT
+24
COM
CW
CCW
RDY
DRV ON
HIGH
WIPER
LOW
F1
MOTOR DRIVE FUSE
5 AMP 2AG 110VAC
3.5 AMP 2AG 220VAC
F2
POWER SUPPLY FUSE
1 AMP 2AG
JMP1 "115/230"
115 VAC JUMP "A" AND "B"
230 VAC JUMP "C", REMOVE "A" AND "B"
JMP2 "INT I/O"
JMP3 "I/O GND"
JMP4 "GAS"
EXTERNAL - JUMP A AND C (DEFAULT)
INTERNAL - JUMP B AND D
JP26 "DART"
PWR
COM
VOLTS
AGND
AMPS
PSIA
WFS
DCOM
JP4 "GAS"
GAS+
GAS-
JP21 "RS-485"
+PWR
NET+
NET-
SHIELD
COM
JP22 "CAN BUSS"
V+
CANH
DRAIN
CANL
V-
JP23 "PENDANT"
+PWR
NET+
NET-
COM
JP24 "SW INPUT"
SW1
SW2
SW3
SW4
+12
JP26 "DART"
JP32 DART
WHT
BRN
GRN
YEL
GRY
PNK
BLU
RED
+12
COM
ANL1
ACOM
ANL2
ANL3
ENB-A
ENB-B
JP23 "PENDANT"
BRN
RED
ORG
YEL
TB1 "PENDANT"
PEND COM
DATA -
DATA+
PEND PWR
TB2 "KEYBOARD"
PENDANT PCB ASSY
P/N C9A5004
Y3
Y2
Y1
Y0
X3
X2
X1
X0
TB7 "SW INPUTS"
SW4
PWR+
SW3
PWR+
SW2
PWR+
SW1
PWR+
GRY
VIO
BLU
GRN
YEL
ORG
RED
BRN
SW2 "PROG"
SW3 "SELECT"
SW5 "DEC"
SW4 "INC"
RUN
PGM
NO
NC
COM
VDS
VADJ
A0
R/W
CE
D0
D1
D2
D3
D4
D5
D6
D7
JP20 "REMOTE I/O"
JP27 "POWER SUPPLY"
JP18 "RS-232"
JP31 DB9
COMMON
< RD IN
> TD OUT
> RTS OUT
INP1
INP2
INP3
INP4
INP5/CCW
INP6/CW
CYCLE START
ESTOP
+24 I/O
I/O COM
ARC ON
READY
CYCLE ACTIVE
FAULT
CYCLE COMPLETE
SHIELD
EARTH
DAC 1
D1COM
D2COM
DAC 2
W-COM
+24 I/O
I/O COM
GAS-A
GAS-B
WCR-A
WCR-B
EARTH
RD
TD
RTS
LTR
ECO
BY
DATE
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REV:
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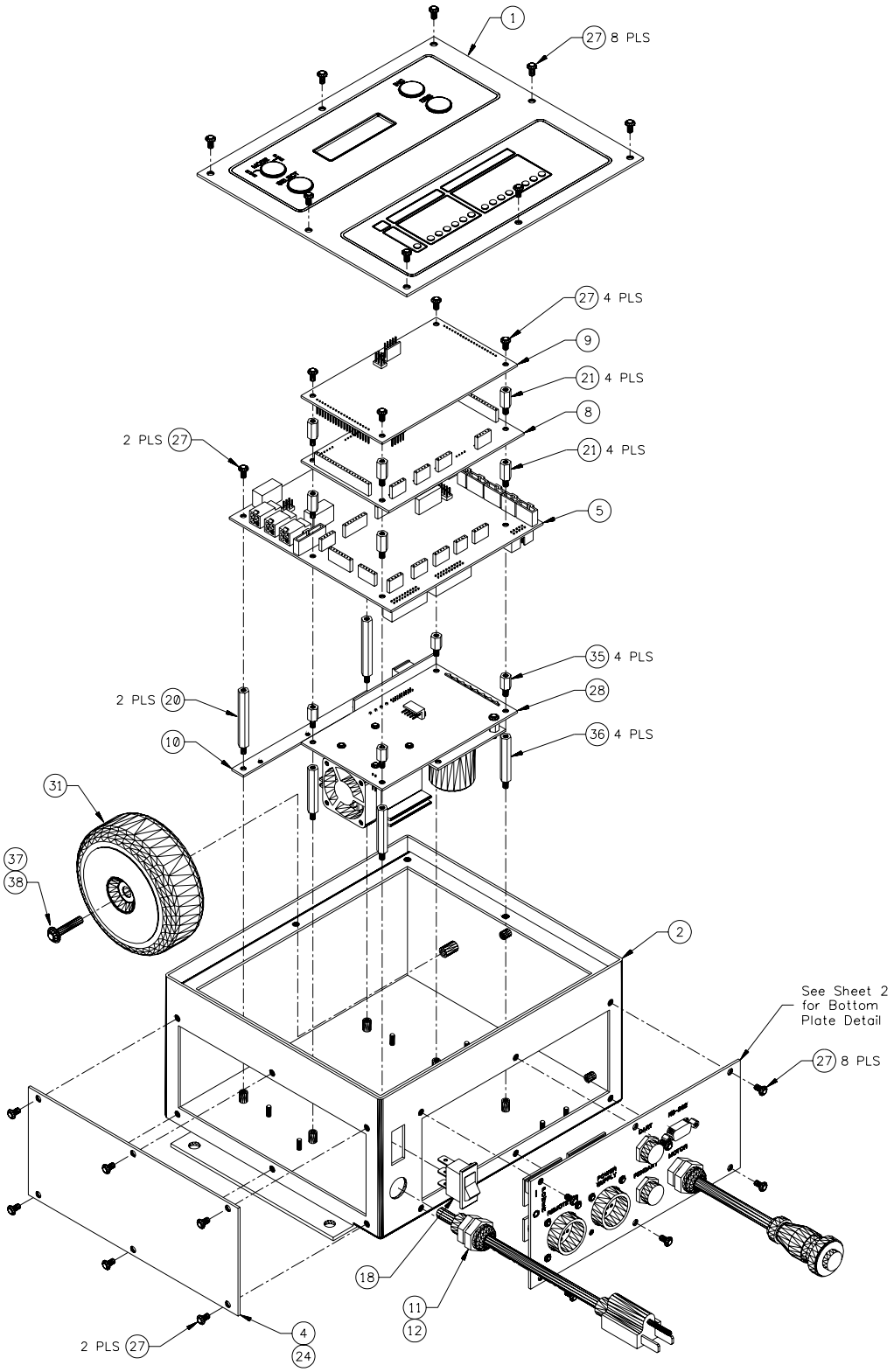
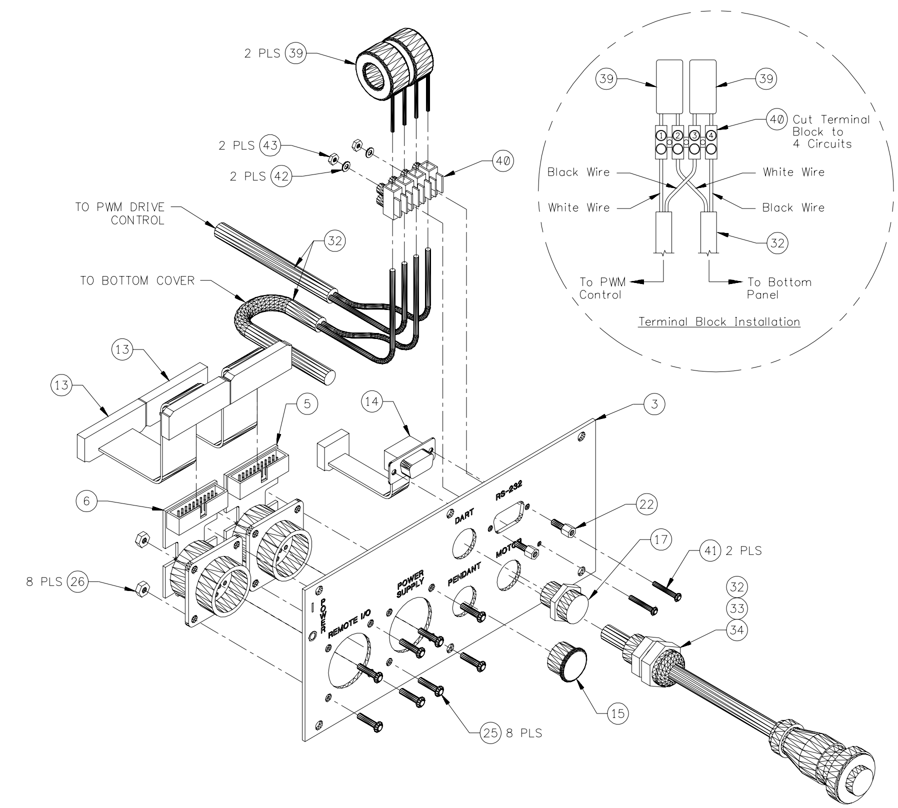
WSC-2 ENCLOSURE ASSEMBLY

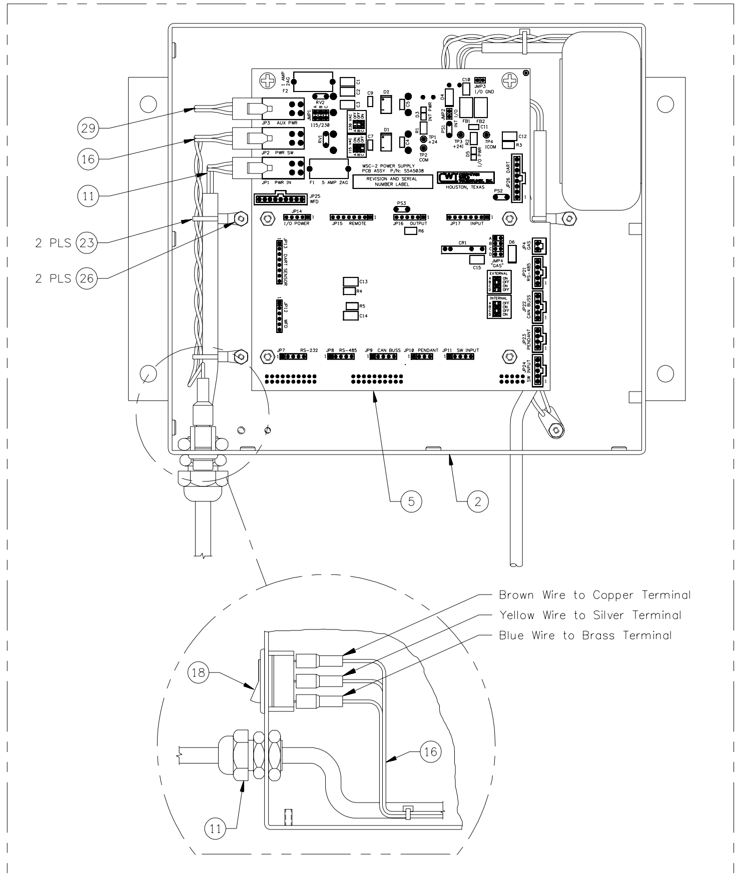
8.10 110VAC Enclosure for Remote Display with 9CM Control (P/N: S3A5098)



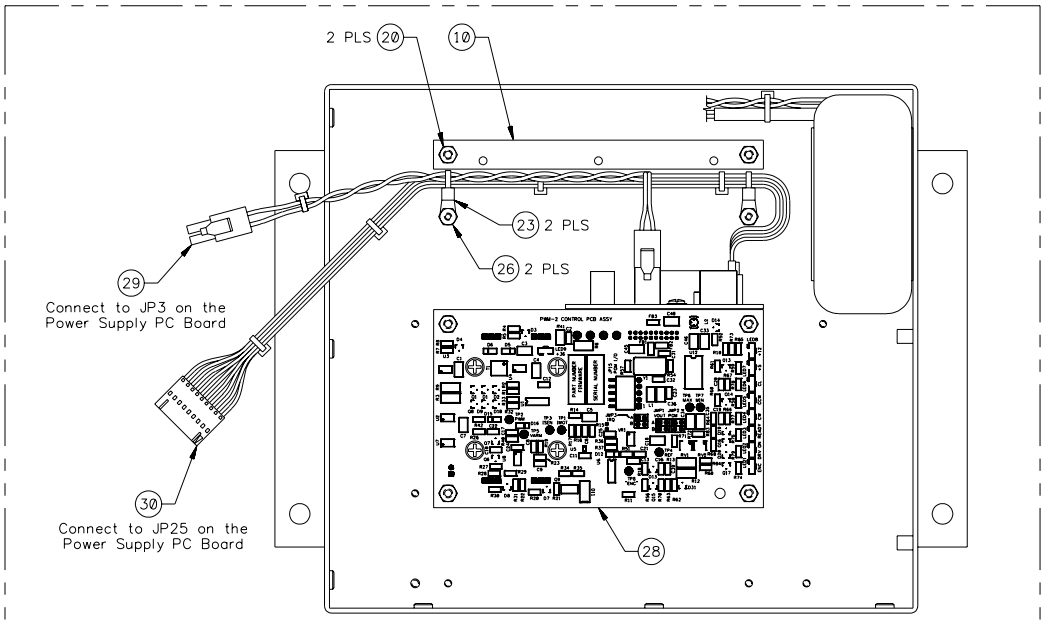
DETAIL 1: Main View



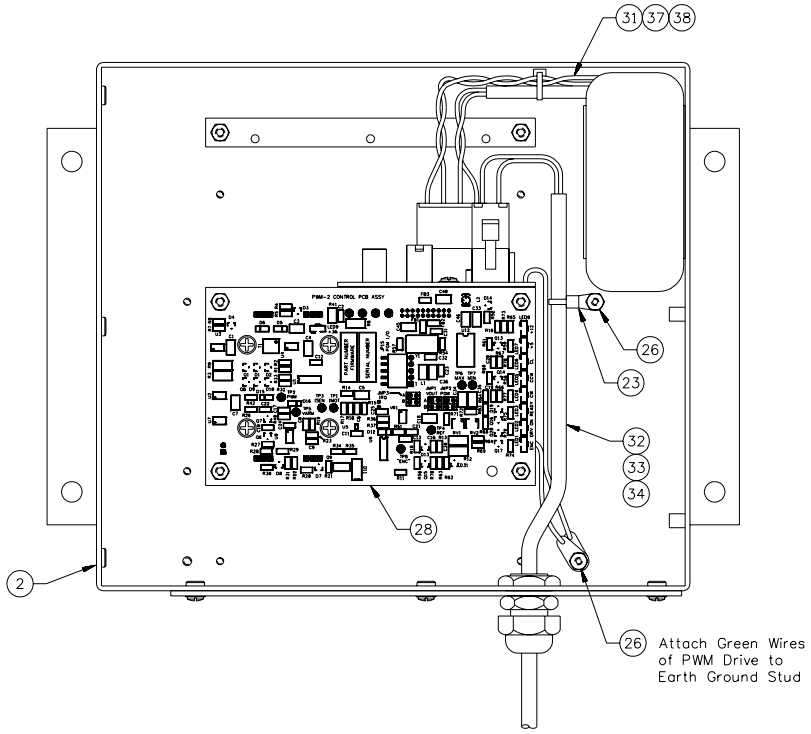
DETAIL 4: Bottom Panel Detail



DETAIL 5: AC Power Wiring Details

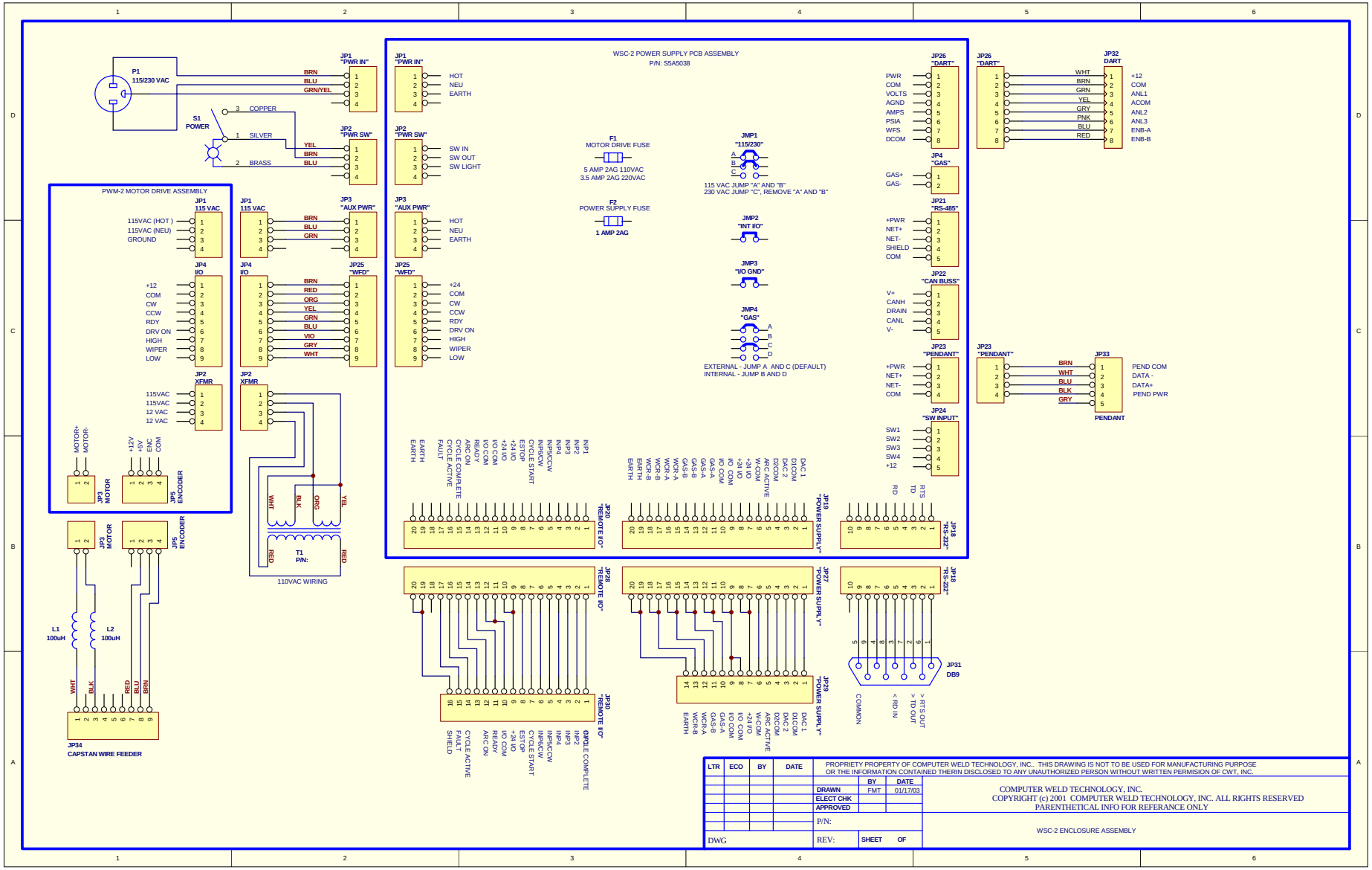


DETAIL 6: PWM AC and Communications Wiring Details



DETAIL 7: PWM Transformer and Motor Wiring Details

COMPUTER WELD TECHNOLOGY – PARTS LIST			
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	S3A5109	Cover Assy, WSC–2 Front without Display
2	1	S3E5078	Enclosure, 9" X 8" X 4–1/2"
3	1	S3E5080	Cover, WSC–2 Bottom
4	1	S3E5081	Cover, WSC–2 Large Blank
5	1	S5A5038	PCB Assembly, WSC–2 Power Supply
6	1	S5A5039	PCB Assembly, WSC–2 Remote I/O Connector
7	1	S5A5040	PCB Assembly, WSC–2 Power Source Connector
8	1	S5A5036	PCB Assembly, Weld Control I/O Module
9	1	S5A5033–WSC2	PCB Assembly, MC6808GP32 WSC–2 FW: S5Z5008
10	1	S5F5034	PCB, WSC–2 Spacer
11	1	S3W5109	Cable, WSC–2 125VAC North American Power
12	1	X3P5706	Connector, Housing 4 Circuit Amp #172167–1
13	1	S3W5111	Cable, WSC–2 Remote I/O and Power Source
14	1	S3W5112	Cable, WSC–2 RS–232
15	1	S3W5114	Harness, WSC–2 Remote Pendant Wire
16	1	S3W5115	Harness, WSC–2 Power Switch Wire
17	1	S3W5118	Harness, WSC–2 DART Wire
18	1	X3S5078	Switch, Rocker Power Cutler–Hammer #1600R11E
19			
20	2	X6S5062	Spacer, #6–32 X 1–3/4" Long M–F RAF #4554–632–SS–0
21	8	X6S5023	Spacer, #6–32 X 1/2" Long M–F RAF #4534–632–SS–0
22	1	X3Z5027	Kit, Female Screwlock AMP #205817–3
23	5	X3Z5090	Tie, Cable Screw Down Panduit #PLC1M–S4–C0
24	41"		Tape, Foam Black 1/8" thick 1/2" wide
25	8		#4–40 X 1/4" Long Pan Head Screw
26	14		#4–40 Hex Lock Nut
27	26		#6–32 X 1/4" Long Pan Head Screw w/ Int Lock Washer
28	1	S3A5094–9CM	Control Assy, PWM–2 Motor Drive
29	1	S3W5116	Harness, WSC–2 Auxilary Power Wire
30	1	S3W5117	Harness, WSC–2 WFD Control Wire
31	1	S3A5111	Transformer Assy, WSC–2 PWM 115VAC
32	1	S3W5119	Cable, WSC–2 WF–100 Motor/Encoder
33	1	X3P5576	Connector, Housing 2 Circuit Molex #19–09–1029
34	1	X3P5839	Connector, Housing 4 Circuit Molex #50–57–9404
35	4	X6S5064	Spacer, #6–32 X 3/8" Long M–F RAF #4532–632–SS–0
36	4	X6S5065	Spacer, #6–32 X 1–3/8" Long M–F RAF #4548–632–SS–0
37	1		#10–32 X 1" Long Pand Head Screw
38	1		#10 External Lock Washer
39	2	X5L5021	Inductor, Power 100 uH 2.6 amp Pulse #PE–92102
40	0.33	X3P5793	Strip, Terminal 12 Circuit Molex #C1512–151
41	2		#2–56 X 5/8" Long Pan Head Screw
42	2		#2 Internal Lock Washer
43	2		#2–56 Hex Nut
44	1		Label, Serial Number


WSC-2 POWER SUPPLY PCB ASSEMBLY
P/N: SSA5038
PWM-2 MOTOR DRIVE ASSEMBLY
P1
115/230 VAC
S1
POWER
COPPER
SILVER
BRASS
JP1 "PWR IN"
JP2 "PWR SW"
JP3 "AUX PWR"
JP25 "WFD"
JP1 115 VAC
JP4 I/O
JP2 XFMR
JP3 MOTOR
JP5 ENCODER
F1
MOTOR DRIVE FUSE
5 AMP 2AG 110VAC
3.5 AMP 2AG 220VAC
F2
POWER SUPPLY FUSE
1 AMP 2AG
JMP1 "115/230"
115 VAC JUMP "A" AND "B"
230 VAC JUMP "C", REMOVE "A" AND "B"
JMP2 "INT I/O"
JMP3 "I/O GND"
JMP4 "GAS"
EXTERNAL - JUMP A AND C (DEFAULT)
INTERNAL - JUMP B AND D
T1
P/N:
110VAC WIRING
JP26 "DART"
JP4 "GAS"
JP21 "RS-485"
JP22 "CAN BUSS"
JP23 "PENDANT"
JP24 "SW INPUT"
JP32 DART
JP33 PENDANT
JP20 "REMOTE I/O"
JP19 "POWER SUPPLY"
JP18 "RS-232"
JP31 DB9
JP34
CAPSTAN WIRE FEEDER
L1
100uH
L2
100uH
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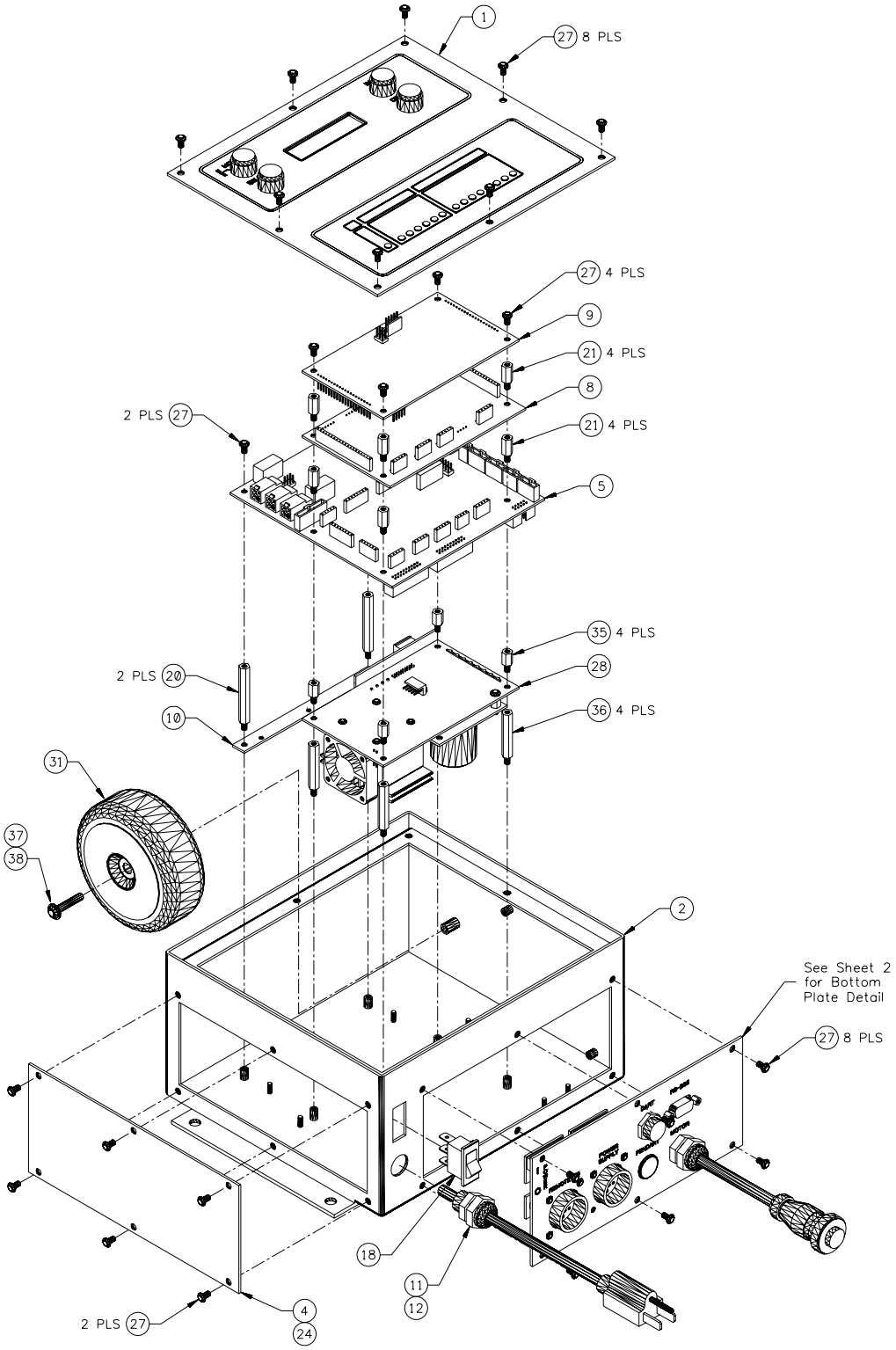
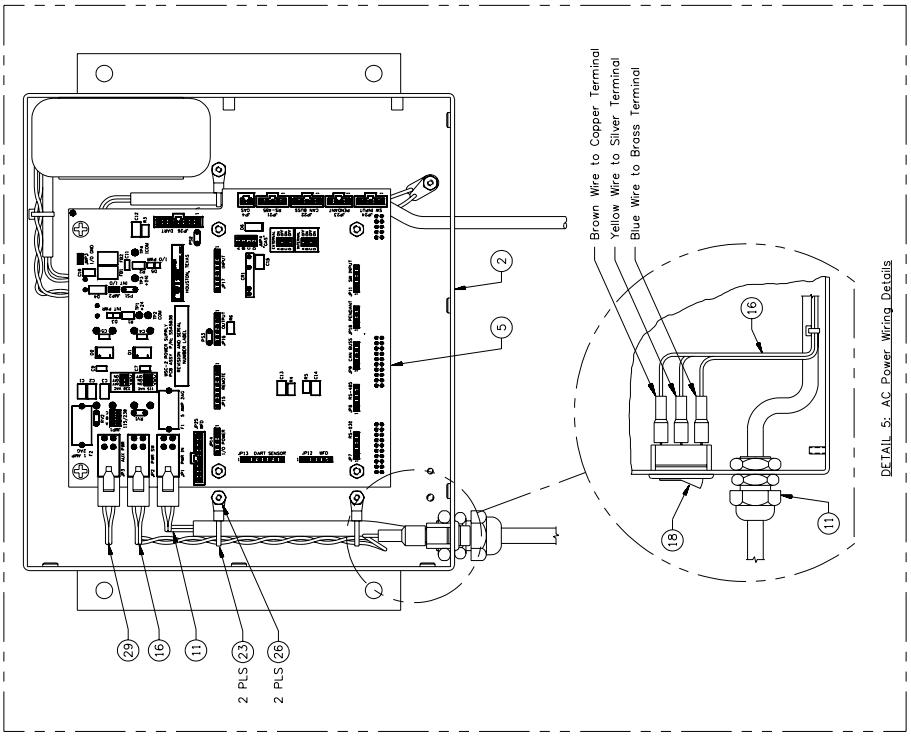
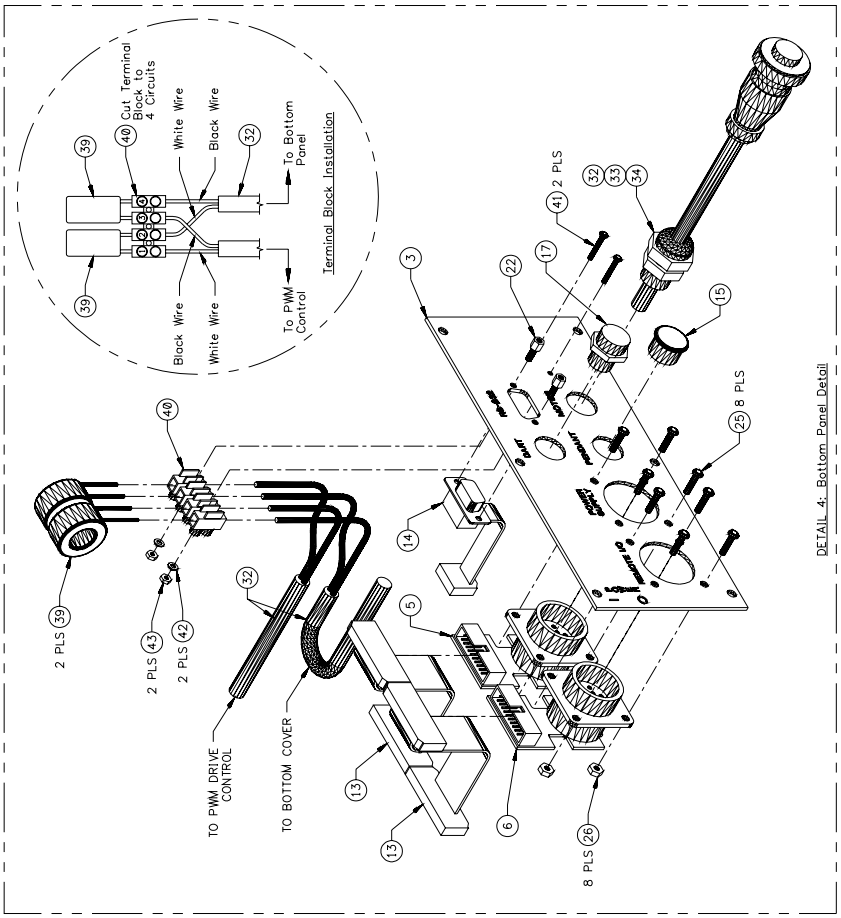
WSC-2 ENCLOSURE ASSEMBLY

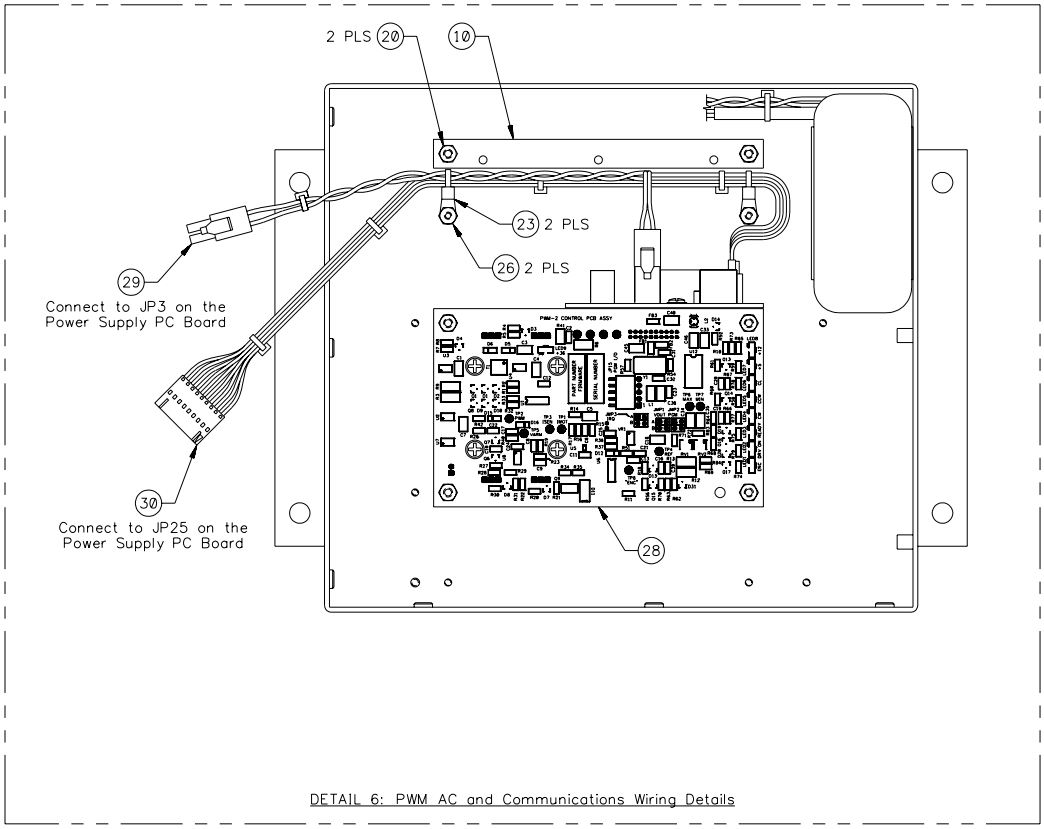
8.11 110VAC Enclosure with Local Display and 9CM Control (P/N: S3A5099)



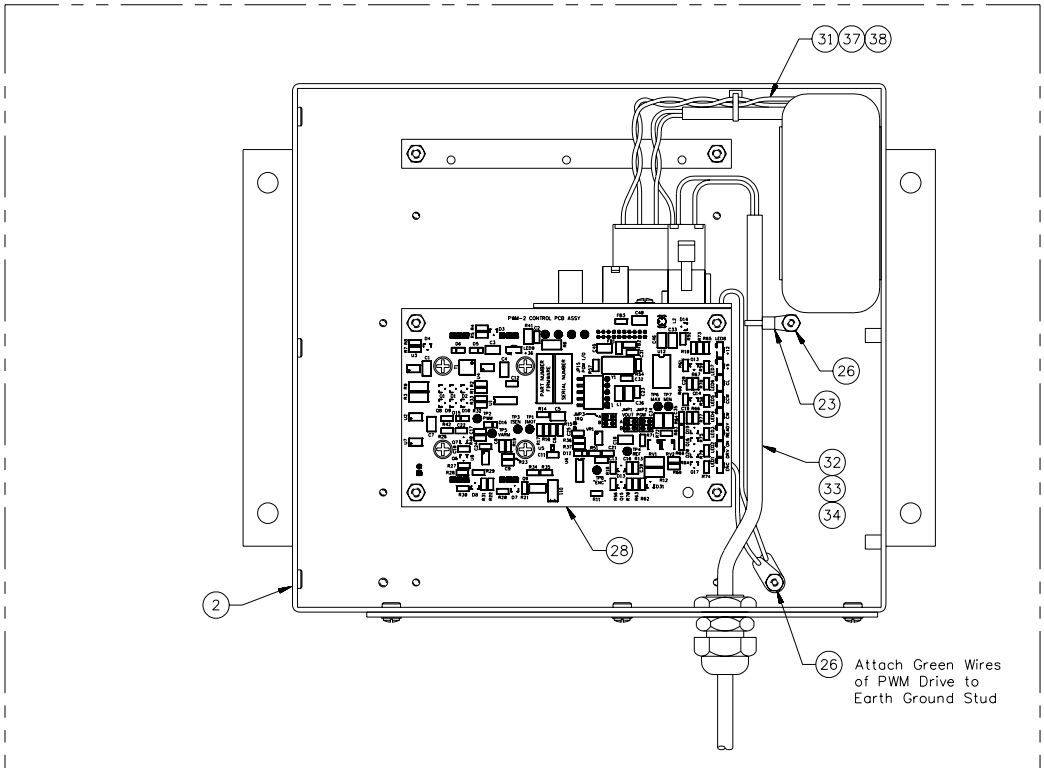
DETAIL 1: Main View


Brown Wire to Copper Terminal
Yellow Wire to Silver Terminal
Blue Wire to Brass Terminal
DETAIL 5: AC Power Wiring Details
2 PLS
2 PLS


Cut Terminal Block to 4 Circuits
White Wire
Black Wire
To Bottom Panel
Terminal Block Installation
Black Wire
White Wire
To PWM Control
2 PLS
8 PLS
TO PWM DRIVE CONTROL
TO BOTTOM COVER
8 PLS
DETAIL 4: Bottom Panel Detail

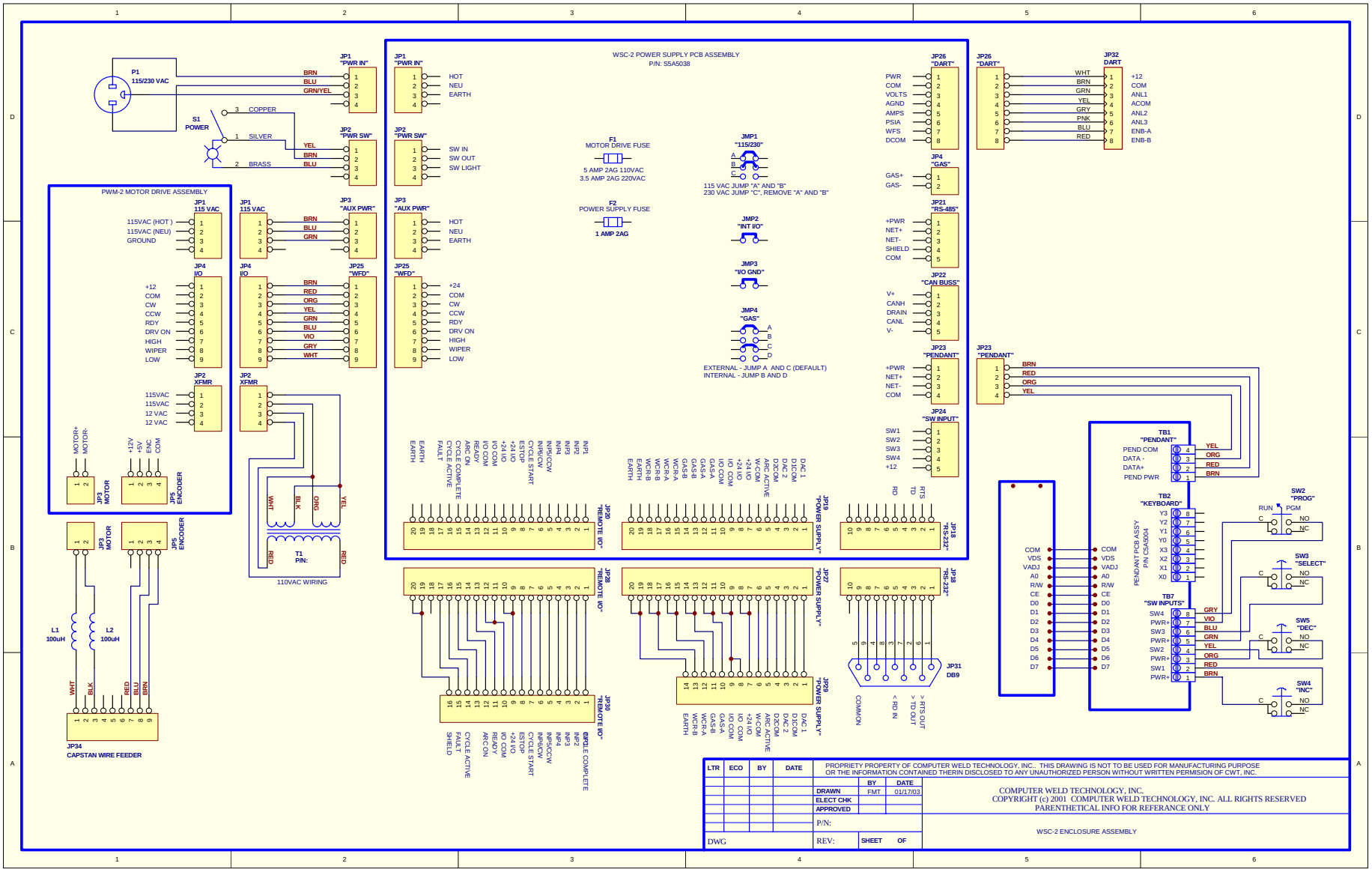


DETAIL 6: PWM AC and Communications Wiring Details



DETAIL 7: PWM Transformer and Motor Wiring Details

COMPUTER WELD TECHNOLOGY – PARTS LIST			
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	S3A5110	Cover Assy, WSC–2 Front with Display
2	1	S3E5078	Enclosure, 9" X 8" X 4–1/2"
3	1	S3E5080	Cover, WSC–2 Bottom
4	1	S3E5081	Cover, WSC–2 Large Blank
5	1	S5A5038	PCB Assembly, WSC–2 Power Supply
6	1	S5A5039	PCB Assembly, WSC–2 Remote I/O Connector
7	1	S5A5040	PCB Assembly, WSC–2 Power Source Connector
8	1	S5A5036	PCB Assembly, Weld Control I/O Module
9	1	S5A5033–WSC2	PCB Assembly, MC6808GP32 WSC–2 FW: S5Z5008
10	1	S5F5034	PCB, WSC–2 Spacer
11	1	S3W5109	Cable, WSC–2 125VAC North American Power
12	1	X3P5706	Connector, Housing 4 Circuit Amp #172167–1
13	1	S3W5111	Cable, WSC–2 Remote I/O and Power Source
14	1	S3W5112	Cable, WSC–2 RS–232
15			
16	1	S3W5115	Harness, WSC–2 Power Switch Wire
17	1	S3W5118	Harness, WSC–2 DART Wire
18	1	X3S5078	Switch, Rocker Power Cutler–Hammer #1600R11E
19	1	X6Z5042	Plug, Dome Hole Black 5/8" Heyco #2663
20	2	X6S5062	Spacer, #6–32 X 1–3/4" Long M–F RAF #4554–632–SS–0
21	8	X6S5023	Spacer, #6–32 X 1/2" Long M–F RAF #4534–632–SS–0
22	1	X3Z5027	Kit, Female Screwlock AMP #205817–3
23	5	X3Z5090	Tie, Cable Screw Down Panduit #PLC1M–S4–C0
24	41"		Tape, Foam Black 1/8" thick 1/2" wide
25	8		#4–40 X 1/4" Long Pan Head Screw
26	14		#4–40 Hex Lock Nut
27	26		#6–32 X 1/4" Long Pan Head Screw w/ Int Lock Washer
28	1	S3A5094–9CM	Control Assy, PWM–2 Motor Drive
29	1	S3W5116	Harness, WSC–2 Auxilary Power Wire
30	1	S3W5117	Harness, WSC–2 WFD Control Wire
31	1	S3A5111	Transformer Assy, WSC–2 PWM 115VAC
32	1	S3W5119	Cable, WSC–2 WF–100 Motor/Encoder
33	1	X3P5576	Connector, Housing 2 Circuit Molex #19–09–1029
34	1	X3P5839	Connector, Housing 4 Circuit Molex #50–57–9404
35	4	X6S5064	Spacer, #6–32 X 3/8" Long M–F RAF #4532–632–SS–0
36	4	X6S5065	Spacer, #6–32 X 1–3/8" Long M–F RAF #4548–632–SS–0
37	1		#10–32 X 1" Long Pand Head Screw
38	1		#10 External Lock Washer
39	2	X5L5021	Inductor, Power 100 uH 2.6 amp Pulse #PE–92102
40	0.33	X3P5793	Strip, Terminal 12 Circuit Molex #C1512–151
41	2		#2–56 X 5/8" Long Pan Head Screw
42	2		#2 Internal Lock Washer
43	2		#2–56 Hex Nut
44	1		Label, Serial Number


WSC-2 POWER SUPPLY PCB ASSEMBLY
P/N: S5A5038
PWM-2 MOTOR DRIVE ASSEMBLY
P1
115/230 VAC
S1
POWER
F1
MOTOR DRIVE FUSE
5 AMP 2AG 110VAC
3.5 AMP 2AG 220VAC
F2
POWER SUPPLY FUSE
1 AMP 2AG
JMP1
"115/230"
115 VAC JUMP "A" AND "B"
230 VAC JUMP "C", REMOVE "A" AND "B"
JMP2
"INT I/O"
JMP3
"I/O GND"
JMP4
"GAS"
EXTERNAL - JUMP A AND C (DEFAULT)
INTERNAL - JUMP B AND D
T1
P/N:
110VAC WIRING
JP34
CAPSTAN WIRE FEEDER
L1
100uH
L2
100uH
JP31
DB9
TB1
"PENDANT"
TB2
"KEYBOARD"
TB7
"SW INPUTS"
PENDANT PCB ASSY
P/N CSA5004
SW2
"PROG"
SW3
"SELECT"
SW4
"INC"
SW5
"DEC"
LTR
ECO
BY
DATE
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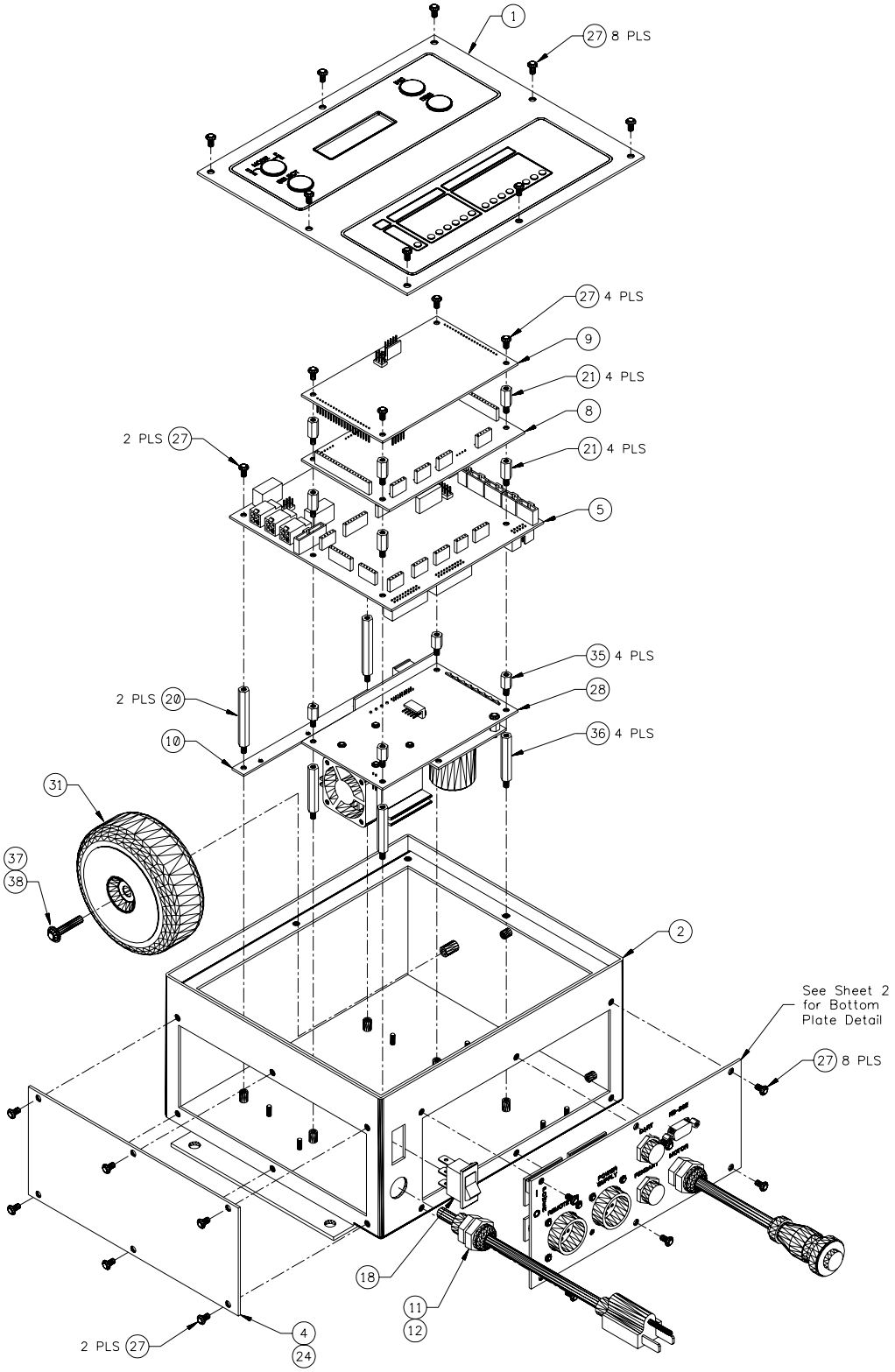
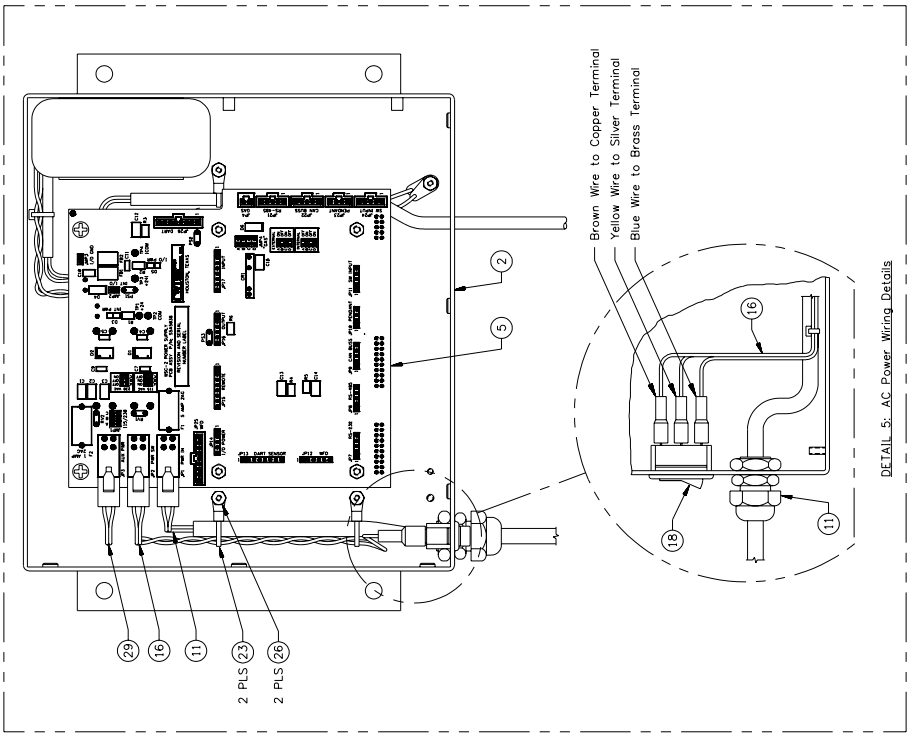
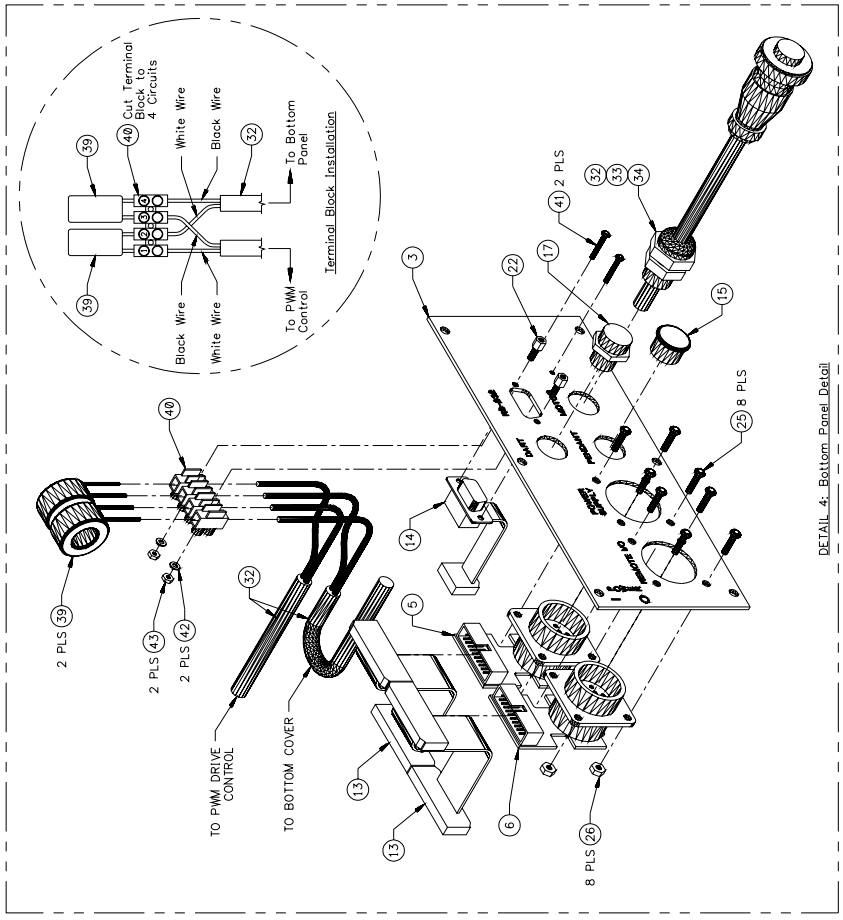
WSC-2 ENCLOSURE ASSEMBLY

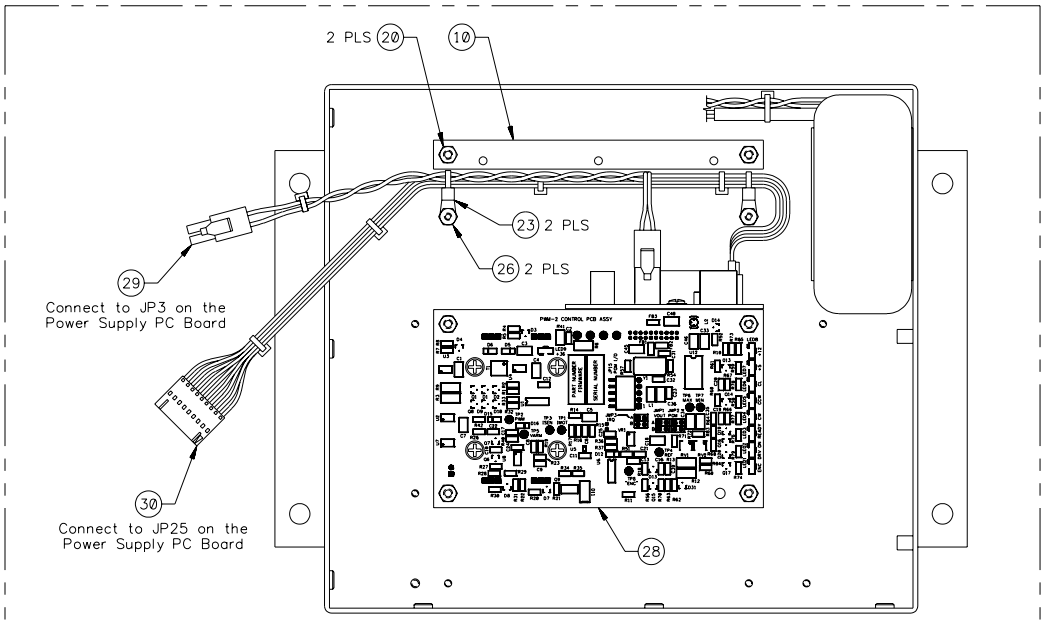
8.12 110VAC Enclosure for Remote Display with 12CM Control (P/N: S3A5100)



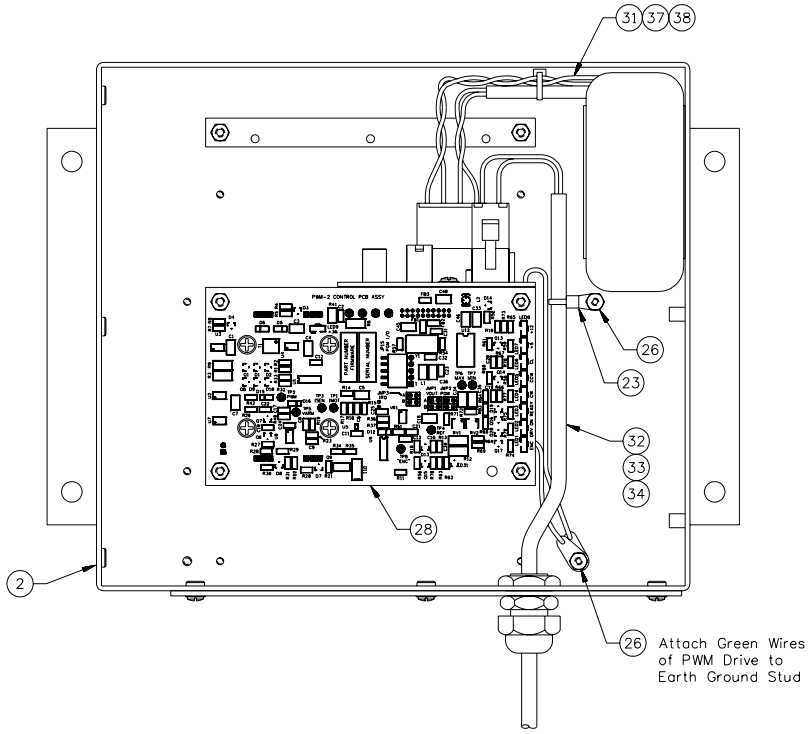
DETAIL 1: Main View


Brown Wire to Copper Terminal
Yellow Wire to Silver Terminal
Blue Wire to Brass Terminal
2
5
16
18
11
29
16
11
2 PLS 23
2 PLS 26
DETAIL 5: AC Power Wiring Details


Cut Terminal Block to 4 Circuits
White Wire
Black Wire
To Bottom Panel
To PWM Control
Terminal Block Installation
Black Wire
White Wire
39
40
32
41 2 PLS
33
34
22
17
15
3
25 8 PLS
14
2 PLS 39
2 PLS 43
2 PLS 42
TO PWM DRIVE CONTROL
TO BOTTOM COVER
13
6
8 PLS 26
DETAIL 4: Bottom Panel Detail

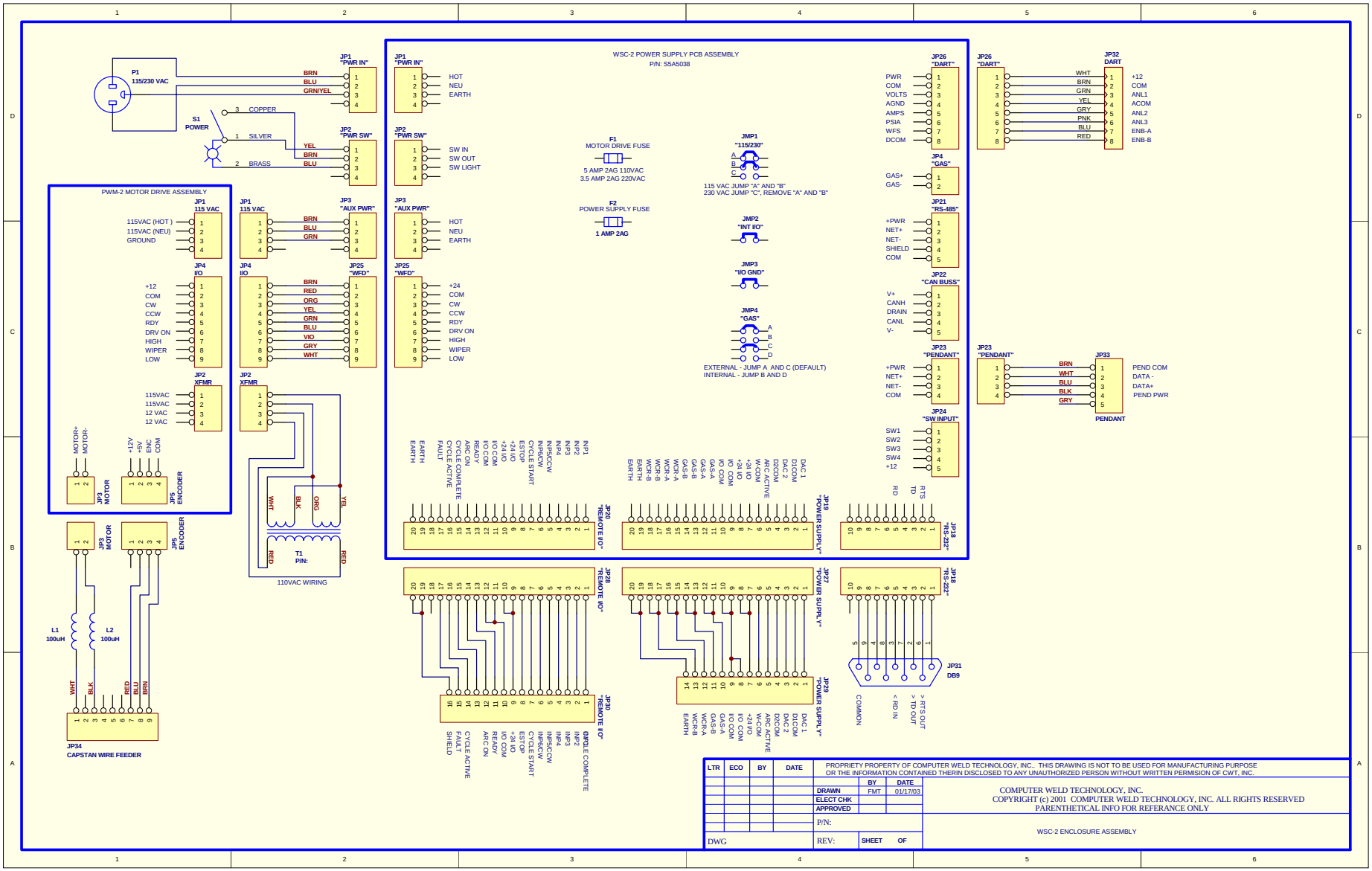


DETAIL 6: PWM AC and Communications Wiring Details



DETAIL 7: PWM Transformer and Motor Wiring Details

COMPUTER WELD TECHNOLOGY – PARTS LIST			
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	S3A5109	Cover Assy, WSC–2 Front without Display
2	1	S3E5078	Enclosure, 9" X 8" X 4–1/2"
3	1	S3E5080	Cover, WSC–2 Bottom
4	1	S3E5081	Cover, WSC–2 Large Blank
5	1	S5A5038	PCB Assembly, WSC–2 Power Supply
6	1	S5A5039	PCB Assembly, WSC–2 Remote I/O Connector
7	1	S5A5040	PCB Assembly, WSC–2 Power Source Connector
8	1	S5A5036	PCB Assembly, Weld Control I/O Module
9	1	S5A5033–WSC2	PCB Assembly, MC6808GP32 WSC–2 FW: S5Z5008
10	1	S5F5034	PCB, WSC–2 Spacer
11	1	S3W5109	Cable, WSC–2 125VAC North American Power
12	1	X3P5706	Connector, Housing 4 Circuit Amp #172167–1
13	1	S3W5111	Cable, WSC–2 Remote I/O and Power Source
14	1	S3W5112	Cable, WSC–2 RS–232
15	1	S3W5114	Harness, WSC–2 Remote Pendant Wire
16	1	S3W5115	Harness, WSC–2 Power Switch Wire
17	1	S3W5118	Harness, WSC–2 DART Wire
18	1	X3S5078	Switch, Rocker Power Cutler–Hammer #1600R11E
19			
20	2	X6S5062	Spacer, #6–32 X 1–3/4" Long M–F RAF #4554–632–SS–0
21	8	X6S5023	Spacer, #6–32 X 1/2" Long M–F RAF #4534–632–SS–0
22	1	X3Z5027	Kit, Female Screwlock AMP #205817–3
23	5	X3Z5090	Tie, Cable Screw Down Panduit #PLC1M–S4–C0
24	41"		Tape, Foam Black 1/8" thick 1/2" wide
25	8		#4–40 X 1/4" Long Pan Head Screw
26	14		#4–40 Hex Lock Nut
27	26		#6–32 X 1/4" Long Pan Head Screw w/ Int Lock Washer
28	1	S3A5094–12CM	Control Assy, PWM–2 Motor Drive
29	1	S3W5116	Harness, WSC–2 Auxilary Power Wire
30	1	S3W5117	Harness, WSC–2 WFD Control Wire
31	1	S3A5111	Transformer Assy, WSC–2 PWM 115VAC
32	1	S3W5119	Cable, WSC–2 WF–100 Motor/Encoder
33	1	X3P5576	Connector, Housing 2 Circuit Molex #19–09–1029
34	1	X3P5839	Connector, Housing 4 Circuit Molex #50–57–9404
35	4	X6S5064	Spacer, #6–32 X 3/8" Long M–F RAF #4532–632–SS–0
36	4	X6S5065	Spacer, #6–32 X 1–3/8" Long M–F RAF #4548–632–SS–0
37	1		#10–32 X 1" Long Pand Head Screw
38	1		#10 External Lock Washer
39	2	X5L5021	Inductor, Power 100 uH 2.6 amp Pulse #PE–92102
40	0.33	X3P5793	Strip, Terminal 12 Circuit Molex #C1512–151
41	2		#2–56 X 5/8" Long Pan Head Screw
42	2		#2 Internal Lock Washer
43	2		#2–56 Hex Nut
44	1		Label, Serial Number


WSC-2 POWER SUPPLY PCB ASSEMBLY
P/N: S5A5038
PWM-2 MOTOR DRIVE ASSEMBLY
P1
115/230 VAC
S1
POWER
JP1 "PWR IN"
JP2 "PWR SW"
JP3 "AUX PWR"
JP25 "WFD"
F1
MOTOR DRIVE FUSE
5 AMP 2AG 110VAC
3.5 AMP 2AG 220VAC
F2
POWER SUPPLY FUSE
1 AMP 2AG
JMP1 "115/230"
115 VAC JUMP "A" AND "B"
230 VAC JUMP "C", REMOVE "A" AND "B"
JMP2 "INT I/O"
JMP3 "I/O GND"
JMP4 "GAS"
EXTERNAL - JUMP A AND C (DEFAULT)
INTERNAL - JUMP B AND D
JP26 "DART"
JP4 "GAS"
JP21 "RS-485"
JP22 "CAN BUSS"
JP23 "PENDANT"
JP24 "SW INPUT"
JP32 DART
JP33 PENDANT
JP1 115 VAC
JP4 I/O
JP2 XFMR
JP3 MOTOR
JP5 ENCODER
T1
P/N:
110VAC WIRING
JP20 "REMOTE I/O"
JP19 "POWER SUPPLY"
JP18 "RS-232"
JP31 DB9
JP34
CAPSTAN WIRE FEEDER
L1
100uH
L2
100uH
LTR
ECO
BY
DATE
DRAWN
ELECT CHK
APPROVED
FMT
01/17/03
P/N:
REV:
SHEET
OF
DWG
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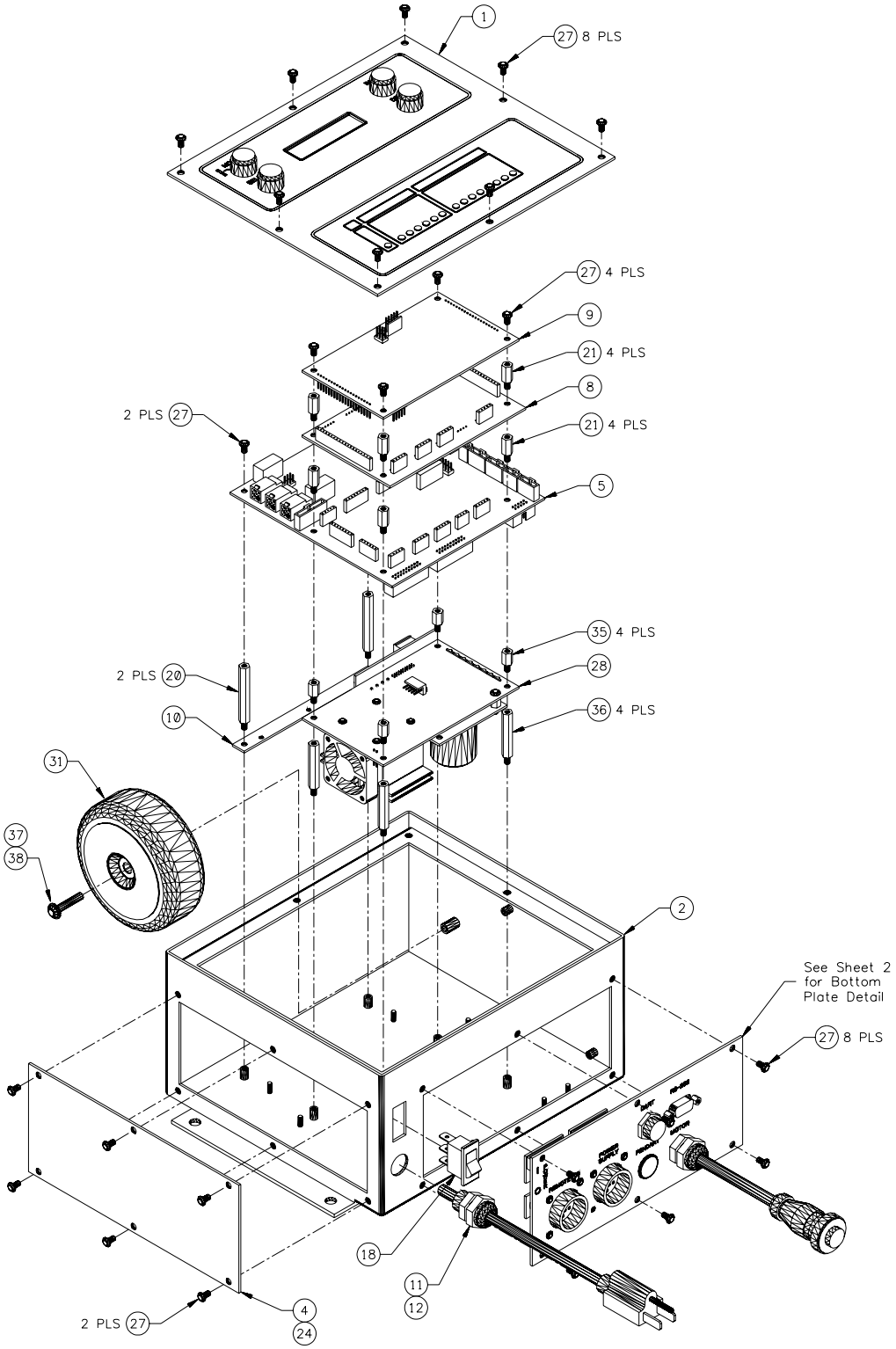
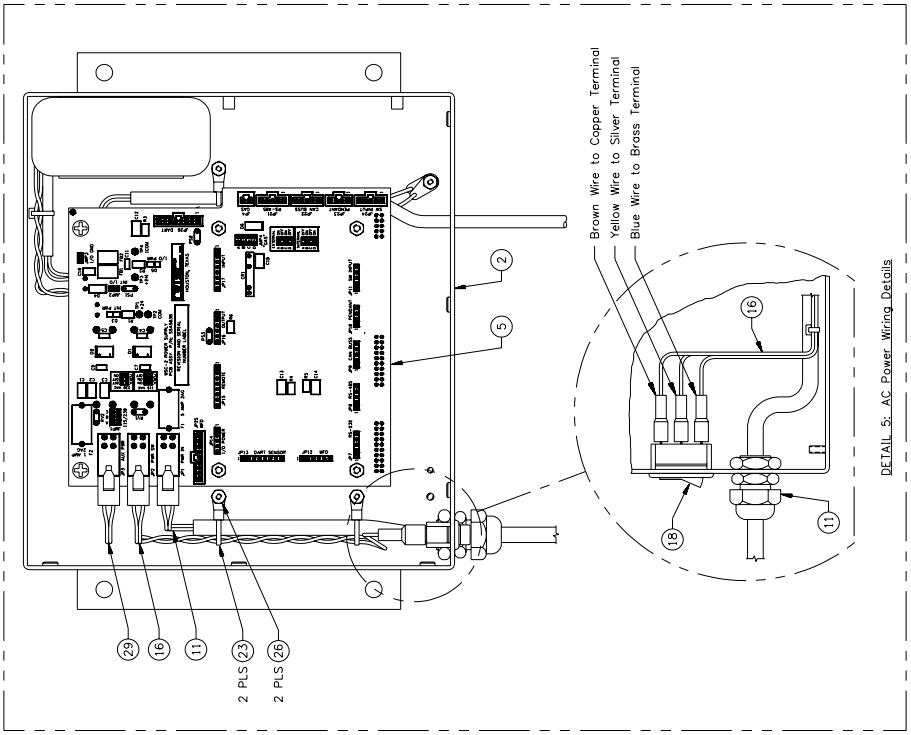
WSC-2 ENCLOSURE ASSEMBLY

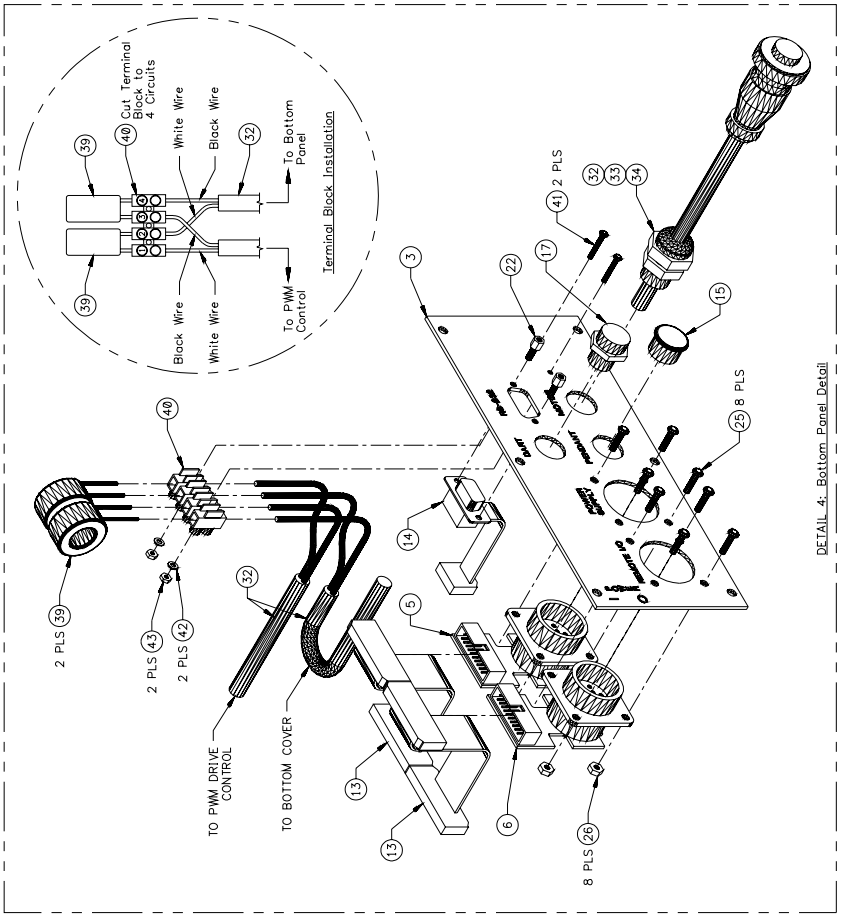
8.13 110VAC Enclosure with Local Display and 12CM Control (P/N: S3A5101)



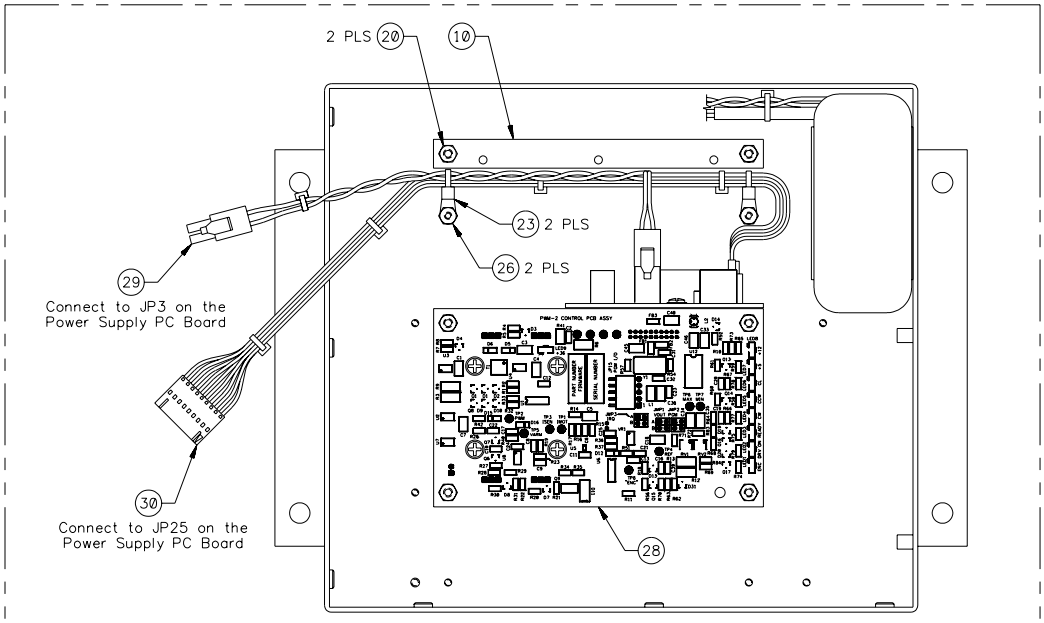
DETAIL 1: Main View



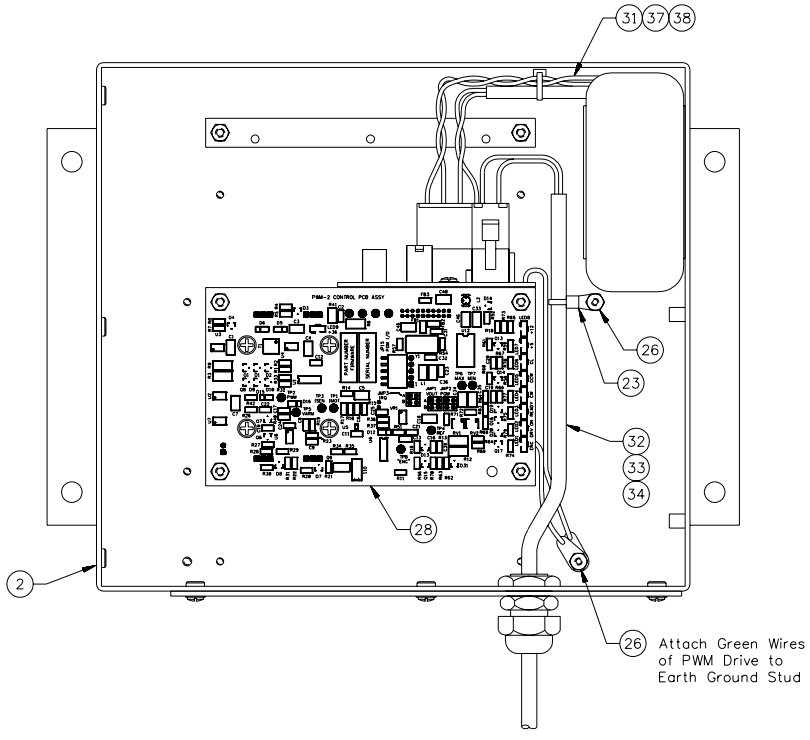
DETAIL 5: AC Power Wiring Details



DETAIL 4: Bottom Panel Detail

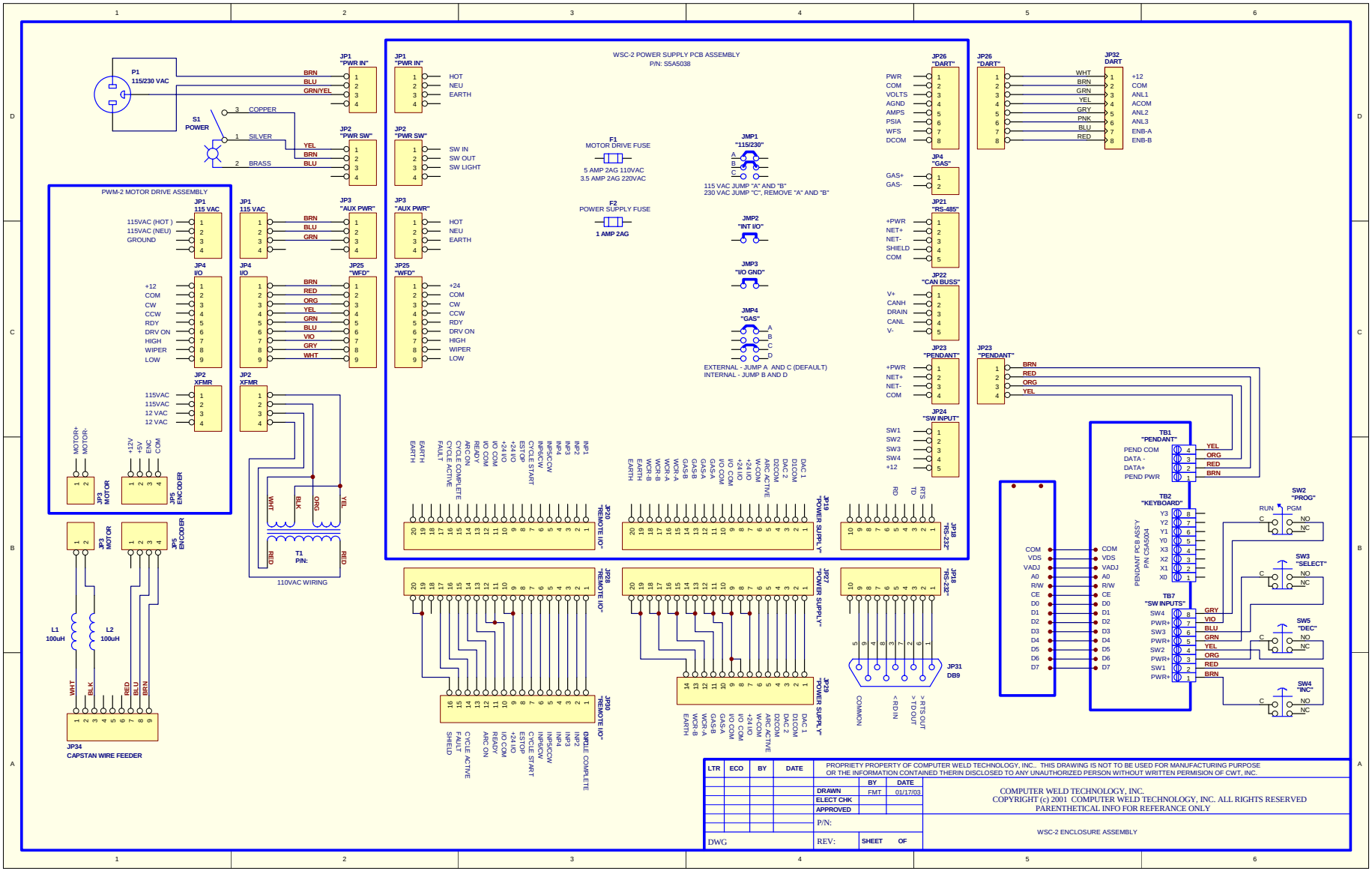


DETAIL 6: PWM AC and Communications Wiring Details



DETAIL 7: PWM Transformer and Motor Wiring Details

COMPUTER WELD TECHNOLOGY – PARTS LIST			
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	S3A5110	Cover Assy, WSC–2 Front with Display
2	1	S3E5078	Enclosure, 9" X 8" X 4–1/2"
3	1	S3E5080	Cover, WSC–2 Bottom
4	1	S3E5081	Cover, WSC–2 Large Blank
5	1	S5A5038	PCB Assembly, WSC–2 Power Supply
6	1	S5A5039	PCB Assembly, WSC–2 Remote I/O Connector
7	1	S5A5040	PCB Assembly, WSC–2 Power Source Connector
8	1	S5A5036	PCB Assembly, Weld Control I/O Module
9	1	S5A5033–WSC2	PCB Assembly, MC6808GP32 WSC–2 FW: S5Z5008
10	1	S5F5034	PCB, WSC–2 Spacer
11	1	S3W5109	Cable, WSC–2 125VAC North American Power
12	1	X3P5706	Connector, Housing 4 Circuit Amp #172167–1
13	1	S3W5111	Cable, WSC–2 Remote I/O and Power Source
14	1	S3W5112	Cable, WSC–2 RS–232
15			
16	1	S3W5115	Harness, WSC–2 Power Switch Wire
17	1	S3W5118	Harness, WSC–2 DART Wire
18	1	X3S5078	Switch, Rocker Power Cutler–Hammer #1600R11E
19	1	X6Z5042	Plug, Dome Hole Black 5/8" Heyco #2663
20	2	X6S5062	Spacer, #6–32 X 1–3/4" Long M–F RAF #4554–632–SS–0
21	8	X6S5023	Spacer, #6–32 X 1/2" Long M–F RAF #4534–632–SS–0
22	1	X3Z5027	Kit, Female Screwlock AMP #205817–3
23	5	X3Z5090	Tie, Cable Screw Down Panduit #PLC1M–S4–C0
24	41"		Tape, Foam Black 1/8" thick 1/2" wide
25	8		#4–40 X 1/4" Long Pan Head Screw
26	14		#4–40 Hex Lock Nut
27	26		#6–32 X 1/4" Long Pan Head Screw w/ Int Lock Washer
28	1	S3A5094–12CM	Control Assy, PWM–2 Motor Drive
29	1	S3W5116	Harness, WSC–2 Auxilary Power Wire
30	1	S3W5117	Harness, WSC–2 WFD Control Wire
31	1	S3A5111	Transformer Assy, WSC–2 PWM 115VAC
32	1	S3W5119	Cable, WSC–2 WF–100 Motor/Encoder
33	1	X3P5576	Connector, Housing 2 Circuit Molex #19–09–1029
34	1	X3P5839	Connector, Housing 4 Circuit Molex #50–57–9404
35	4	X6S5064	Spacer, #6–32 X 3/8" Long M–F RAF #4532–632–SS–0
36	4	X6S5065	Spacer, #6–32 X 1–3/8" Long M–F RAF #4548–632–SS–0
37	1		#10–32 X 1" Long Pand Head Screw
38	1		#10 External Lock Washer
39	2	X5L5021	Inductor, Power 100 uH 2.6 amp Pulse #PE–92102
40	0.33	X3P5793	Strip, Terminal 12 Circuit Molex #C1512–151
41	2		#2–56 X 5/8" Long Pan Head Screw
42	2		#2 Internal Lock Washer
43	2		#2–56 Hex Nut
44	1		Label, Serial Number


WSC-2 POWER SUPPLY PCB ASSEMBLY
P/N: S5A5038
PWM-2 MOTOR DRIVE ASSEMBLY
P1
115/230 VAC
S1
POWER
JP1 "PWR IN"
JP2 "PWR SW"
JP3 "AUX PWR"
JP25 "WFD"
F1
MOTOR DRIVE FUSE
5 AMP 2AG 110VAC
3.5 AMP 2AG 220VAC
F2
POWER SUPPLY FUSE
1 AMP 2AG
JMP1 "115/230"
115 VAC JUMP "A" AND "B"
230 VAC JUMP "C", REMOVE "A" AND "B"
JMP2 "INT I/O"
JMP3 "I/O GND"
JMP4 "GAS"
EXTERNAL - JUMP A AND C (DEFAULT)
INTERNAL - JUMP B AND D
JP26 "DART"
JP4 "GAS"
JP21 "RS-485"
JP22 "CAN BUSS"
JP23 "PENDANT"
JP24 "SW INPUT"
JP32 DART
JP4 I/O
JP2 XFMR
JP3 MOTOR
JP5 ENCODER
110VAC WIRING
T1
P/N:
L1
100uH
L2
100uH
JP34
CAPSTAN WIRE FEEDER
JP28 "REMOTE I/O"
JP27 "POWER SUPPLY"
JP29 "RS-232"
JP31
DB9
TB1 "PENDANT"
TB2 "KEYBOARD"
TB7 "SW INPUTS"
PENDANT PCB ASSY
P/N CSA5004
SW2 "PROG"
SW3 "SELECT"
SW5 "DEC"
SW4 "INC"
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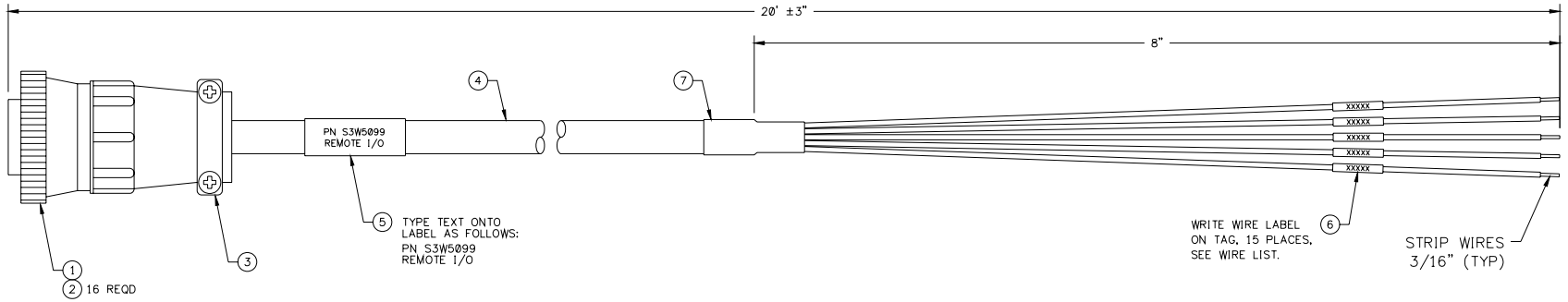
WSC-2 ENCLOSURE ASSEMBLY

8.14 Remote I/O Cable (P/N: S3W5099)

COMPUTER WELD TECHNOLOGY – PARTS LIST			
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	X3P5098	CONN., PLUG 16 CIRCUIT "AMP" #206037-1
2	16	X3P0303	SOCKET, 20-24 GAUGE "AMP" #66105-2
3	1	X3Z5054	CLAMP, CABLE "AMP" #206070-1
4	20'	X3W5054	CABLE, 15 CONDUCTOR SHIELDED "BELDEN" #9947
5	1		SLEEVE, WIRE "BRADY" #PTS.95-500-321
6	15		WIRE MARKING SLEEVE "BRADY" #WMS-617-321
7	1		TUBING, HEAT SHRINK BLACK ø3/8" X 1" LONG



WIRE LIST				
WIRE COLOR	GAUGE	FROM	LABEL	DESCRIPTION
BLK	22	ITEM 1 PIN 1	SCHED0	REMOTE WELD SCHEDULE SELECT BIT0
RED	22	ITEM 1 PIN 2	SCHED1	REMOTE WELD SCHEDULE SELECT BIT1
ORG	22	ITEM 1 PIN 3	SCHED2	REMOTE WELD SCHEDULE SELECT BIT2
GRN	22	ITEM 1 PIN 4	SCHED3	REMOTE WELD SCHEDULE SELECT BIT3
BLU	22	ITEM 1 PIN 5	CCW	JOG WIRE CCW DIRECTION OR WELD SCHEDULE SELECT BIT4
WHT	22	ITEM 1 PIN 6	CW	JOG WIRE CW DIRECTION OR WELD SCHEDULE SELECT BIT5
BLU/WHT	22	ITEM 1 PIN 7	START	CYCLE START INPUT
GRN/WHT	22	ITEM 1 PIN 8	ESTOP	ESTOP INPUT SIGNAL
RED/WHT	22	ITEM 1 PIN 9	+24 I/O	+24 VDC @ 500 MA I/O OUTPUT
BLK/WHT	22	ITEM 1 PIN 10	COM	RETURN COMMON FOR I/O
RED/BLK	22	ITEM 1 PIN 11	READY	+24 VDC OUTPUT INDICATING WSC READY
ORG/BLK	22	ITEM 1 PIN 12	ARCON	+24 VDC OUTPUT INDICATING ARC ACTIVE INPUT
GRN/BLK	22	ITEM 1 PIN 13	DONE	+24 VDC OUTPUT INDICATING CYCLE COMPLETE
BLU/BLK	22	ITEM 1 PIN 14	ACTIVE	+24 VDC OUTPUT INDICATING WELD CYCLE ACTIVE
WHT/BLK	22	ITEM 1 PIN 15	FAULT	+24 VDC OUTPUT INDICATING WELD FAULT
SHIELD	22	ITEM 1 PIN 16		TIE TO CHASSIS GROUND

REVISIONS				NEXT ASSY	USED ON		BY	DATE
LTR	ECO #	BY	DATE		WSC-2	DRAWN	JDG	9/24/2003
						MECH CHK		
						ELECT CHK		
						APPROVED	FMT	9/24/2003

MATERIAL: SEE PARTS LIST

FINISH:

TOLERANCES: UNLESS OTHERWISE STATED
ANGULAR ±1/2
DECIMAL X.XX ±0.01
X.XXX ±0.005
FRACTIONAL ±1/64
MACHINED ±1/32
STRUCTURAL ±1/32

COMPUTER WELD TECHNOLOGY, INC.

PARENTHETICAL INFO FOR REFERENCE ONLY

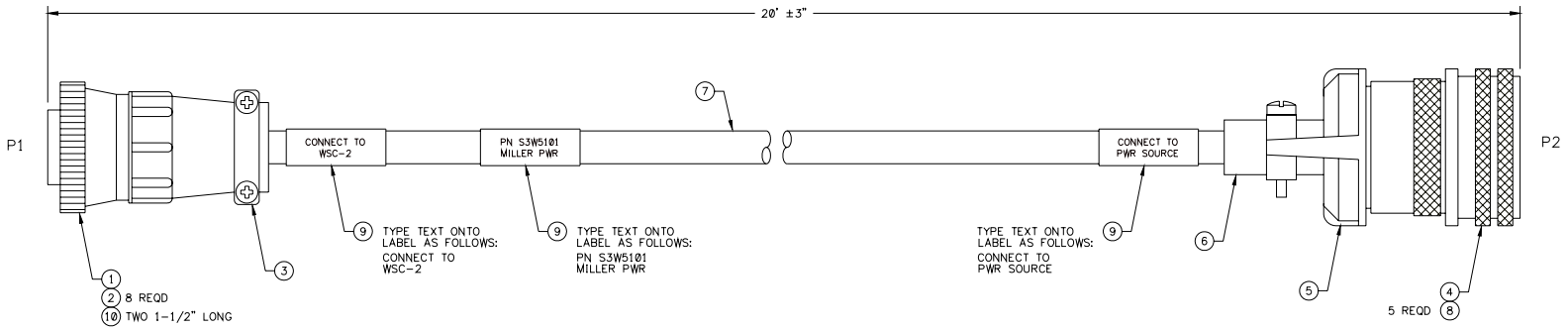
WSC-2 Remote I/O Cable

P/N: S3W5099 **REV: 0**

SCALE: 1/1 | DO NOT SCALE PRINTS | SHEET 1 OF 1

8.15 Miller Power Source Cable (P/N: S3W5101)

COMPUTER WELD TECHNOLOGY – PARTS LIST			
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	X3P5652	CONN., PLUG 14 CIRCUIT "AMP" #206044-1
2	8	X3P0301	PIN, 20-24 GAUGE "AMP" #66103-2
3	1	X3Z5054	CLAMP, CABLE "AMP" #206070-1
4	1	X3P5666	"AMPHENOL" CONN., PLUG 14 CIRCUIT #MS3106A-20-27P
5	1	X3P5590	"AMPHENOL" CLAMP, CABLE #97-3057-1012
6	1	X3P5492	"AMPHENOL" BOOT, CABLE CLAMP #9779-513-12
7	20'	X3W5072	"BELDEN" CABLE, 10 CONDUCTOR SHIELDED #9946
8	5		TUBING, HEAT SHRINK Ø1/8" X 1/2" LONG
9	3		SLEEVE, WIRE "BRADY" #PTS.95-500-321
10	3"		WIRE, 22AWG BLUE



WIRE LIST					
WIRE COLOR	GAUGE	FROM	TO	LABEL	DESCRIPTION
BROWN	22	P1-1	P2-E	DAC1	0-10 VDC ANALOG OUTPUT DAC 1 USED FOR VOLT/AMP CONTROL - WIPER
RED	22	P1-2	P2-D	D1COM	DAC 1 COMMON - REFERENCE LOW
		NOT CONNECTED	NOT CONNECTED	DAC2	0-10 VDC ANALOG OUTPUT DAC 2 USED FOR WIRE SPEED - WIPER
		NOT CONNECTED	NOT CONNECTED	D2COM	DAC 2 COMMON - REFERENCE LOW
BLUE	22	P1-5	P1-7	ARCON	POWER SOURCE ARC ON INPUT 5-24 VDC INPUT
BLUE	22	P1-6	P1-8	WCOM	ARC ON COMMON
		NOT CONNECTED	NOT CONNECTED	+24 I/O	+24 VDC @ 0.25A I/O POWER OUTPUT
		NOT CONNECTED	NOT CONNECTED	COM	I/O POWER OUTPUT COMMON
WHITE	22	P1-12	P2-A	WC-A	WELD CONTACTOR - A
BLACK	22	P1-13	P2-B	WC-B	WELD CONTACTOR - B
SHIELD	22	P1-14	NOT CONNECTED		

NOTES:
1 - INSTALL HEAT SHRINK TUBING (ITEM 8) ON ALL WIRES SOLDERED TO TERMINALS OF CONNECTOR (ITEM 4).

REVISIONS				NEXT ASSY	USED ON
LTR	ECO #	BY	DATE		WSC-2

	BY	DATE
DRAWN	JDG	6/25/2004
MECH CHK		
ELECT CHK		
APPROVED	EMT	6/25/2004

MATERIAL: SEE PARTS LIST

FINISH:

TOLERANCES: UNLESS OTHERWISE STATED
ANGULAR ±1/2
DECIMAL X.XX ±0.01
X.XXX ±0.005
FRACTIONAL
MACHINED ±1/64
STRUCTURAL ±1/32

COMPUTER WELD TECHNOLOGY, INC.

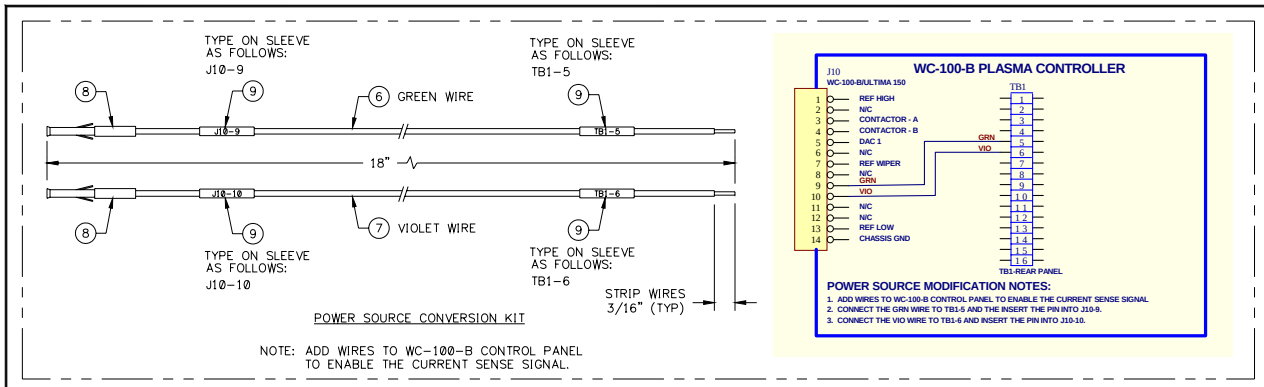
PARENTHETICAL INFO FOR REFERENCE ONLY

WSC-2 Power Source Miller Cable

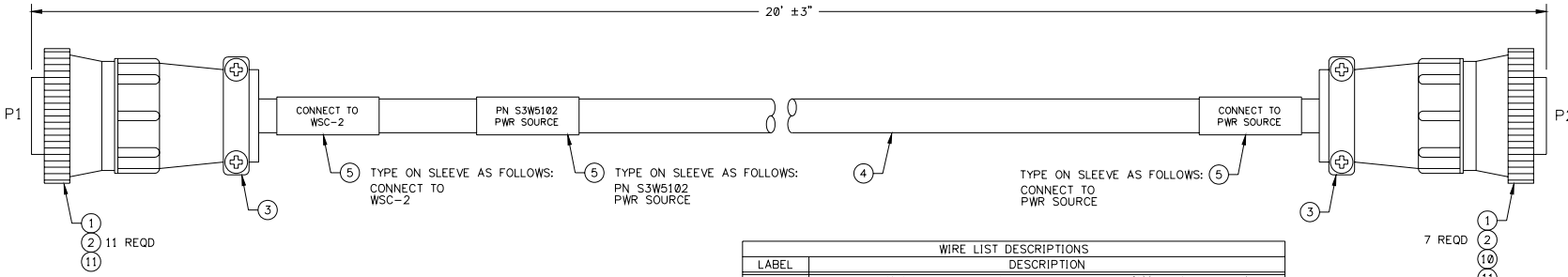
P/N: S3W5101 **REV: 0**

SCALE: 1/1 | DO NOT SCALE PRINTS | SHEET 1 OF 1

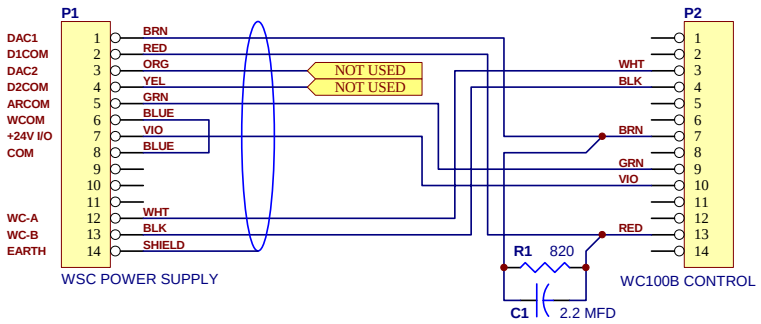
8.16 Ultima 150 Power Source Cable (P/N: S3W5102)



COMPUTER WELD TECHNOLOGY – PARTS LIST			
ITEM	QTY.	PART NO.	DESCRIPTION
1	2	X3P5652	CONN., PLUG 14 CIRCUIT "AMP" #206044-1
2	17	X3P0301	PIN, 20-24 GAUGE "AMP" #66103-2
3	2	X3Z5054	CLAMP, CABLE "AMP" #206070-1
4	20'	X3W5072	CABLE, 10 CONDUCTOR SHIELDED "BELDEN" #9946
5	3		SLEEVE, WIRE "BRADY" #PTS.95-500-321
6	18"		WIRE, 22 AWG GREEN HOOKUP
7	18"		WIRE, 22 AWG VIOLET HOOKUP
8	2	X3P0303	TERMINAL, SOCKET CRIMP AMP #66105-2
9	4		SLEEVE, WIRE "BRADY" #WMS-617-321
10	1	X5R5285	RSTR, 820 OHM 5% 1/8W #RC05GF821J
11	1	X5C5185	CAP, 10 MFD 10V MURATA #GRM32ER61A106KC01L
11	2"		WIRE, 22 AWG BLUE HOOKUP



WIRE LIST DESCRIPTIONS	
LABEL	DESCRIPTION
DAC1	0-10 VDC ANALOG OUTPUT DAC 1 USED FOR VOLT/AMP CONTROL – WIPER
D1COM	DAC 1 COMMON – REFERENCE LOW
DAC2	0-10 VDC ANALOG OUTPUT DAC 2 USED FOR WIRE SPEED – WIPER
D2COM	DAC 2 COMMON – REFERENCE LOW
ARCON	POWER SOURCE ARC ON INPUT 5-24 VDC INPUT
WCOM	ARC ON COMMON
+24 I/O	+24 VDC @ 0.25A I/O POWER OUTPUT
COM	I/O POWER OUTPUT COMMON
WC-A	WELD CONTACTOR – A
WC-B	WELD CONTACTOR – B



REVISIONS			
LTR	ECO #	BY	DATE
A	1814	JDG	10/12/04
B	1828	JDG	6/1/2005
C		JDG	9/27/05

NEXT ASSY	USED ON		BY	DATE
	WSC-2	DRAWN	JDG	9/24/2003
		MECH CHK		
		ELECT CHK		
		APPROVED	FMT	9/24/2003

MATERIAL: SEE PARTS LIST

FINISH:

TOLERANCES: UNLESS OTHERWISE STATED
ANGULAR ±1/2
DECIMAL X.XX ±0.01
X.XXX ±0.005
FRACTIONAL
MACHINED ±1/64
STRUCTURAL ±1/32

CWT COMPUTER WELD TECHNOLOGY, INC.

PARENTHETICAL INFO FOR REFERENCE ONLY

WSC-2 Power Source Ultima 150 Cable

P/N: S3W5102 **REV: C**

SCALE: 1/1 | DO NOT SCALE PRINTS | SHEET 1 OF 1