## ■ Warnings

The ASA contains dangerous voltages when connected to line voltage. Only a competent electrician should carry out the electrical installation. Improper installation of the motor or the ASA may cause equipment failure, serious injury or death. Follow this manual and National Electrical Codes (NEC®) and local safety codes.

### Safety regulations

1. The soft starter must be disconnected from the mains if repair work is to be carried out.
2. The [STOP] on the control panel of the soft starter does not disconnect the equipment from the mains and thus is not to be used as a safety switch.

It is the responsibility of the user or the person installing the ASA to provide proper grounding and branch circuit protection according to the National Electric Code (NEC®) and local codes.

### Symbols used in this manual

The following symbols indicate items that require special attention:

Indicates a general warning.

Indicates a high voltage warning.

### Avoiding soft starter damage

Please read and follow all instructions in this manual. Additionally, take special note of the following:

1. Do not connect power factor correction capacitors to the soft starter output. Static power factor correction, if used, must be connected on the mains side of the soft starter.
2. Do not apply voltage to the ASA control inputs. The inputs are active 24 VDC and must be controlled with potential free circuits.
3. When installed in non-ventilated enclosures, soft starters should be used with a bypass contactor to prevent excessive enclosure temperatures.
4. When bypassing a soft starter take care to ensure phase connections are correct. i.e. L1B-T1, L2B-T2, L3B-T3.
5. When using the DC Brake function ensure the DC Braking contactor is connected across output terminals T2-T3 only and that it operates only when the braking function is operating. Incorrect connection or operation will cause soft starter damage.

Electrostatic Precaution: Electrostatic discharge (ESD). Many electronic components are sensitive to static electricity. Voltages so low that they cannot be felt, seen or heard, can reduce the life, affect performance, or completely destroy sensitive electronic components. When performing service, proper ESD equipment should be used to prevent possible damage from occurring.

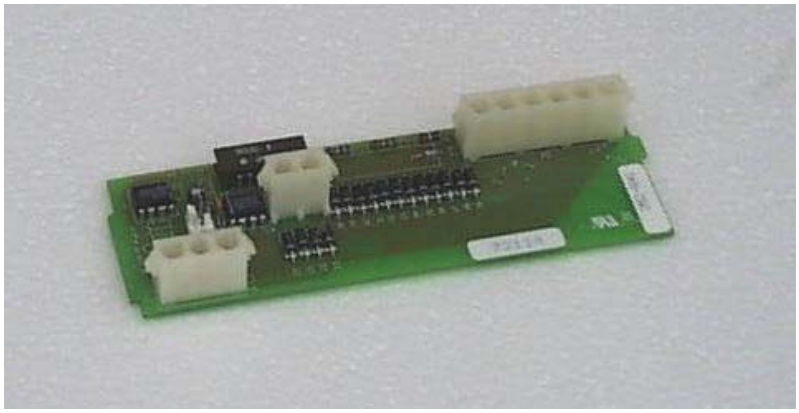
## ■ Spare Parts

| Main Control Module<br>Kit Part Number (Item ID) | ASA-0018 | ASA-0047 | ASA-0067 | ASA-0088 | ASA-0125 | ASA-0141 | ASA-0238 | ASA-0253 | ASA-0405 | ASA-0513 | ASA-0585 | ASA-0628 | ASA-0775 | ASA-0897 | ASA-1153 | ASA-1403 | ASA-1574 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (number per unit) | | | | | | | | | | | | | | | | |
| 995-00776-00 (991-00160-00) | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | |
| 995-00777-00 (991-00161-00) | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

995-00776-00 (991-00160-00)
995-00777-00 (991-00161-00)

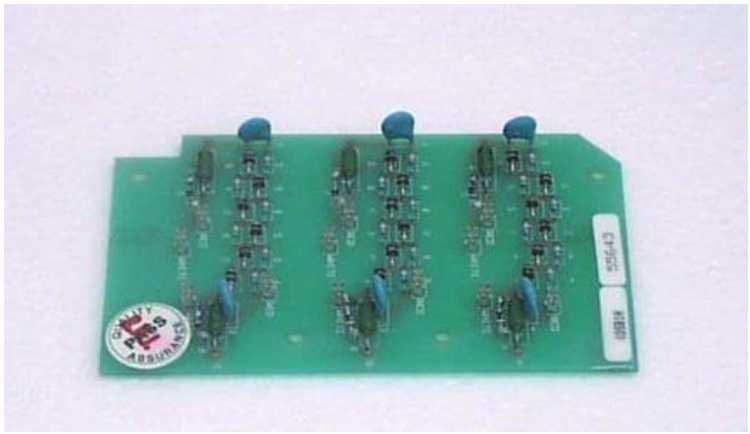
| Personality Module / Kit Part Number (Item ID) | ASA-0018 | ASA-0047 | ASA-0067 | ASA-0088 | ASA-0125 | ASA-0141 | ASA-0238 | ASA-0253 | ASA-0405 | ASA-0513 | ASA-0585 | ASA-0628 | ASA-0775 | ASA-0897 | ASA-1153 | ASA-1403 | ASA-1574 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (number per unit) | | | | | | | | | | | | | | | | |
| 995-00841-00 (990-00166-00) | 1 | | | | | | | | | | | | | | | | |
| 995-00844-00 (990-00169-00) | | 1 | | | | | | | | | | | | | | | |
| 995-00845-00 (990-00170-00) | | | 1 | | | | | | | | | | | | | | |
| 995-00846-00 (990-00171-00) | | | | 1 | | | | | | | | | | | | | |
| 995-00848-00 (990-00173-00) | | | | | 1 | | | | | | | | | | | | |
| 995-00849-00 (990-00174-00) | | | | | | 1 | | | | | | | | | | | |
| 995-00851-00 (990-00176-00) | | | | | | | 1 | | | | | | | | | | |
| 995-00852-00 (990-00177-00) | | | | | | | | 1 | | | | | | | | | |
| 995-00854-00 (990-00179-00) | | | | | | | | | 1 | | | | | | | | |
| 995-00855-00 (990-00180-00) | | | | | | | | | | 1 | | | | | | | |
| 995-00856-00 (990-00181-00) | | | | | | | | | | | 1 | | | | | | |
| 995-00857-00 (990-00182-00) | | | | | | | | | | | | 1 | | | | | |
| 995-00858-00 (990-00183-00) | | | | | | | | | | | | | 1 | | | | |
| 995-00859-00 (990-00184-00) | | | | | | | | | | | | | | 1 | | | |
| 995-00860-00 (990-00185-00) | | | | | | | | | | | | | | | 1 | | |
| 995-00861-00 (990-00186-00) | | | | | | | | | | | | | | | | 1 | |
| 995-00862-00 (990-00187-00) | | | | | | | | | | | | | | | | | 1 |

All Types

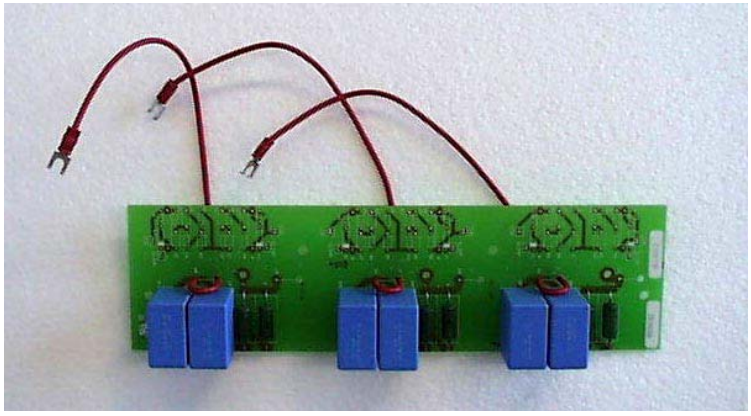


| **Snubber/Overvoltage Protection Module**<br><br>**Kit Part Number (Item ID)** | | ASA-0018 | ASA-0047 | ASA-0067 | ASA-0088 | ASA-0125 | ASA-0141 | ASA-0238 | ASA-0253 | ASA-0405 | ASA-0513 | ASA-0585 | ASA-0628 | ASA-0775 | ASA-0897 | ASA-1153 | ASA-1403 | ASA-1574 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **/5 (200~525V)** | **/6 (200~690V)** | (number per unit) | | | | | | | | | | | | | | | | |
| (Not required) | 995-00783-00 (0DSB1H / 990-00451-00) | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | |
| 995-00779-00 (990-00162-00) | 995-00784-00 (990-00164-00) | | | | | | 1 | 1 | 1 | | | | | | | | | |
| 995-00781-00 (0DSB4 / 990-00739-00) | 995-00786-00 (0DSB4H / 990-00740-00) | | | | | | | | | 2 | 2 | 2 | 2 | 2 | 2 | | | |
| 995-00782-00 (0DSB5 / 990-00895-00) | 995-00787-00 (0DSB5H / 990-00896-00) | | | | | | | | | | | | | | | 6 | 6 | 6 |

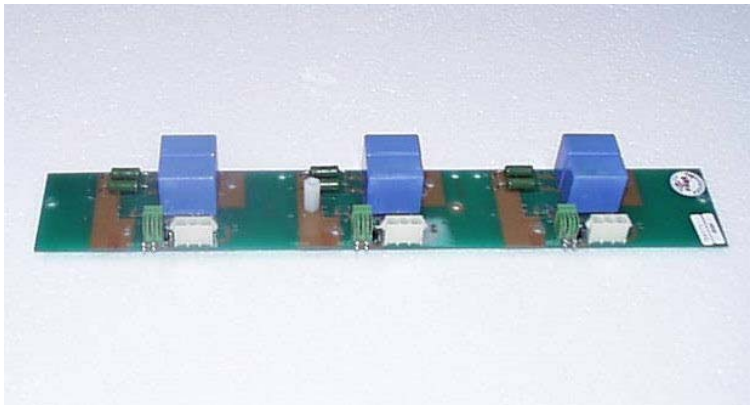
995-00783-00 (0DSB1H / 990-00451-00)



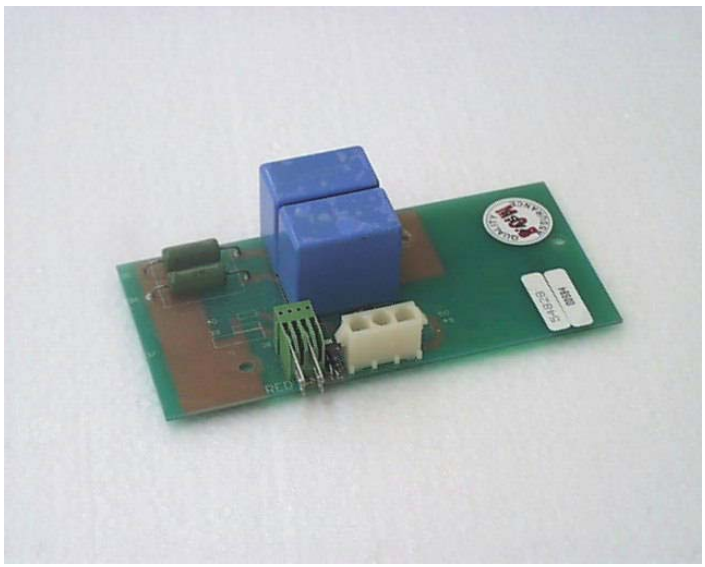
995-00779-00 (990-00162-00)
995-00784-00 (990-00164-00)



995-00781-00 (0DSB4 / 990-00739-00)
995-00786-00 (0DSB4H / 990-00740-00)

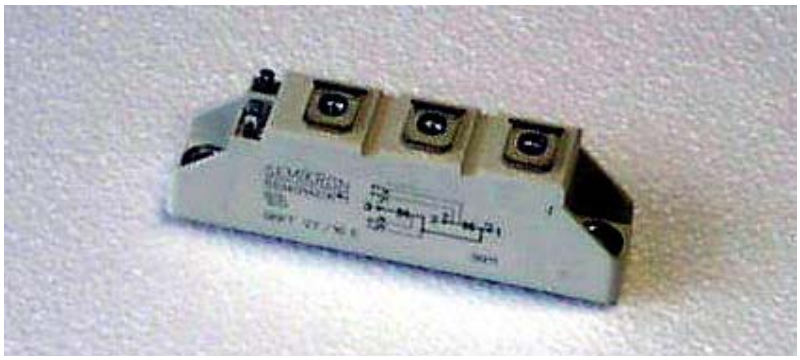


995-00782-00 (0DSB5 / 990-00895-00)
995-00787-00 (0DSB5H / 990-00896-00)

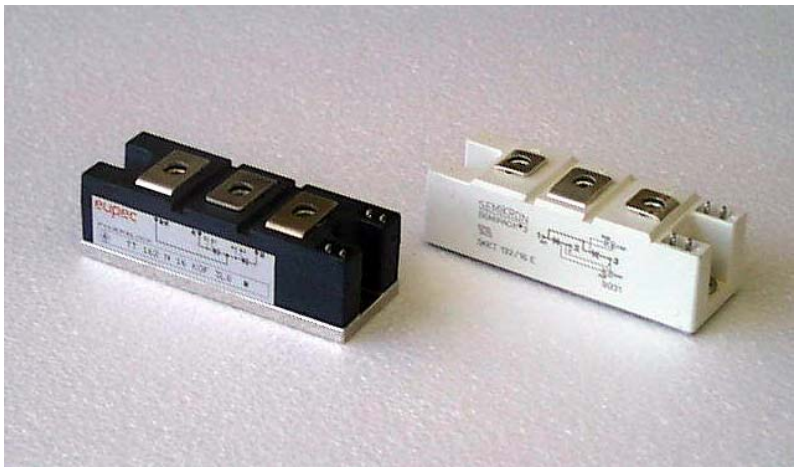


| SCRs / Power Assemblies<br>Kit Part Number (Item ID) | ASA-0018 | ASA-0047 | ASA-0067 | ASA-0088 | ASA-0125 | ASA-0141 | ASA-0238 | ASA-0253 | ASA-0405 | ASA-0513 | ASA-0585 | ASA-0628 | ASA-0775 | ASA-0897 | ASA-1153 | ASA-1403 | ASA-1574 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (number per unit) | | | | | | | | | | | | | | | | |
| 995-00788-00 (SKKT27/16) | 3 | | | | | | | | | | | | | | | | |
| 995-00790-00 (SKKT92/16) | | | 3 | | | | | | | | | | | | | | |
| 995-00791-00 (SKKT106/16) | | 3 | | | | | | | | | | | | | | | |
| 995-00792-00 (SKKT122/16) | | | | 3 | | | | | | | | | | | | | |
| 995-00794-00 (TT162N16) | | | | | 3 | 3 | | | | | | | | | | | |
| 995-00796-00 (TT330N16) | | | | | | | 3 | 3 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| 995-00798-00 (0405 / 994-00199-00) | | | | | | | | | 2 | | | | | | | | |
| 995-00799-00 (0513 / 994-00201-00) | | | | | | | | | | 2 | | | | | | | |
| 995-00800-00 (0585 / 994-00203-00) | | | | | | | | | | | 2 | | | | | | |
| 995-00801-00 (0628 / 994-00721-00) | | | | | | | | | | | | 2 | | | | | |
| 995-00802-00 (0775 / 994-00723-00) | | | | | | | | | | | | | 2 | | | | |
| 995-00803-00 (0897 / 994-00725-00) | | | | | | | | | | | | | | 2 | | | |
| 995-00804-00 (1153 / 994-00207-00) | | | | | | | | | | | | | | | 2 | | |
| 995-00805-00 (1403 / 994-00986-00) | | | | | | | | | | | | | | | | 2 | |
| 995-00806-00 (1574 / 994-00988-00) | | | | | | | | | | | | | | | | | 2 |

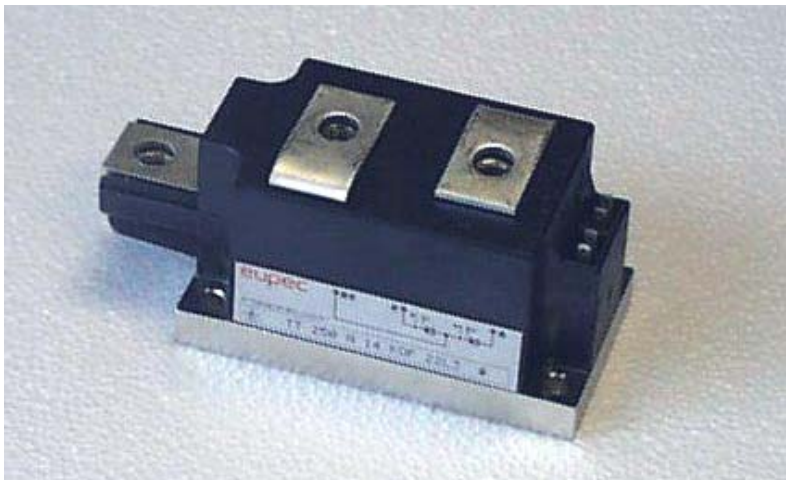
995-00788-00 (SKKT27/16)
995-00790-00 (SKKT92/16)
995-00791-00 (SKKT106/16)



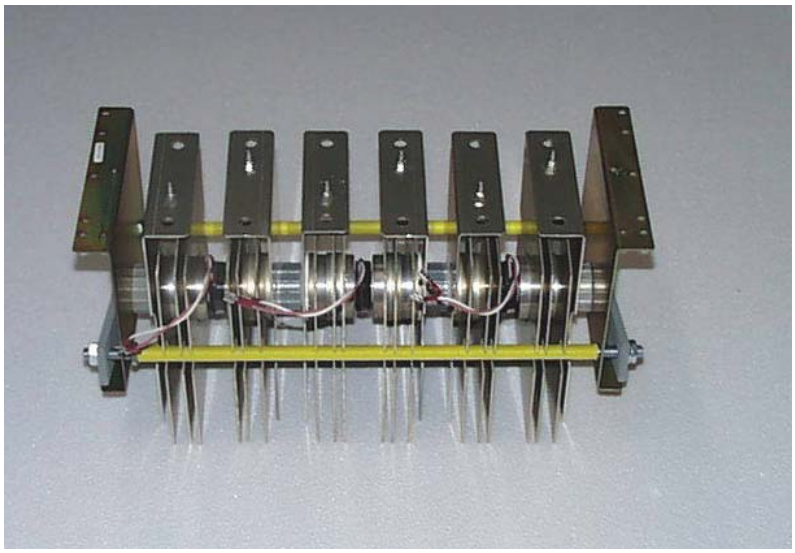
995-00792-00 (SKKT122/16)
995-00794-00 (TT162N16)




995-00796-00 (TT330N16)



995-00797-00 (0405 / 994-00197-00)
995-00798-00 (0405 / 994-00199-00)
995-00799-00 (0513 / 994-00201-00)
995-00800-00 (0585 / 994-00203-00)
995-00801-00 (0628 / 994-00721-00)
995-00802-00 (0775 / 994-00723-00)
995-00803-00 (0897 / 994-00725-00)

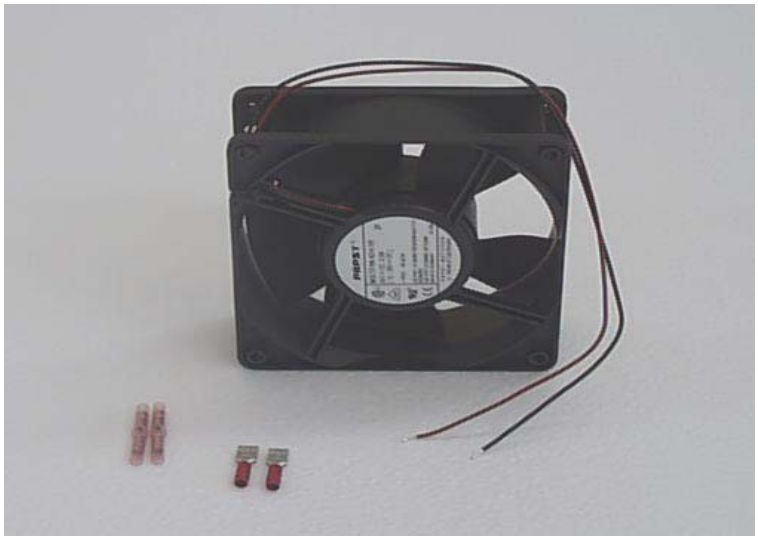


995-00804-00 (1153 / 994-00207-00)
995-00805-00 (1403 / 994-00986-00)
995-00806-00 (1574 / 994-00988-00)

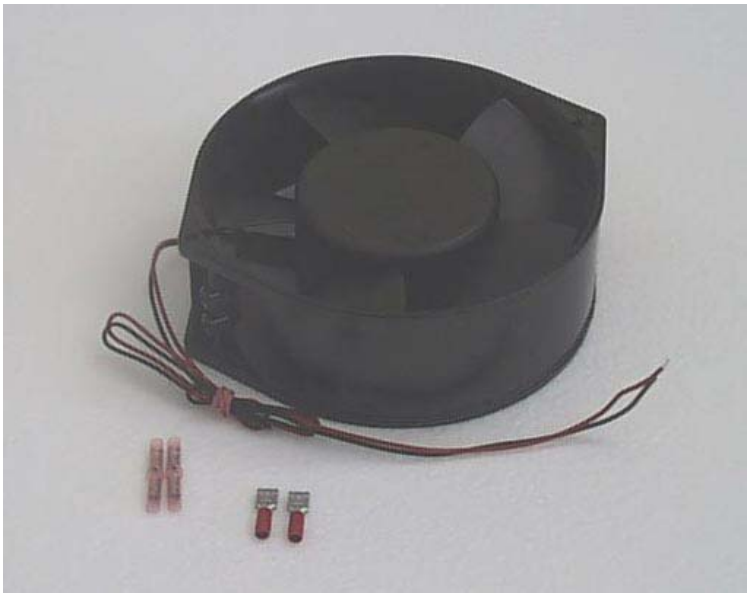
**Cooling Fans**

| **Kit Part Number (Item ID)** | ASA-0018 | ASA-0047 | ASA-0067 | ASA-0088 | ASA-0125 | ASA-0141 | ASA-0238 | ASA-0253 | ASA-0405 | ASA-0513 | ASA-0585 | ASA-0628 | ASA-0775 | ASA-0897 | ASA-1153 | ASA-1403 | ASA-1574 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (number per unit) | | | | | | | | | | | | | | | | |
| 995-00807-00 (4214HR) | | | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | | | | | | |
| 995-00808-00 (7214NR) | | | | | | | | | | | | 2 | 2 | 2 | 3 | 3 | 3 |

995-00807-00 (4214HR)



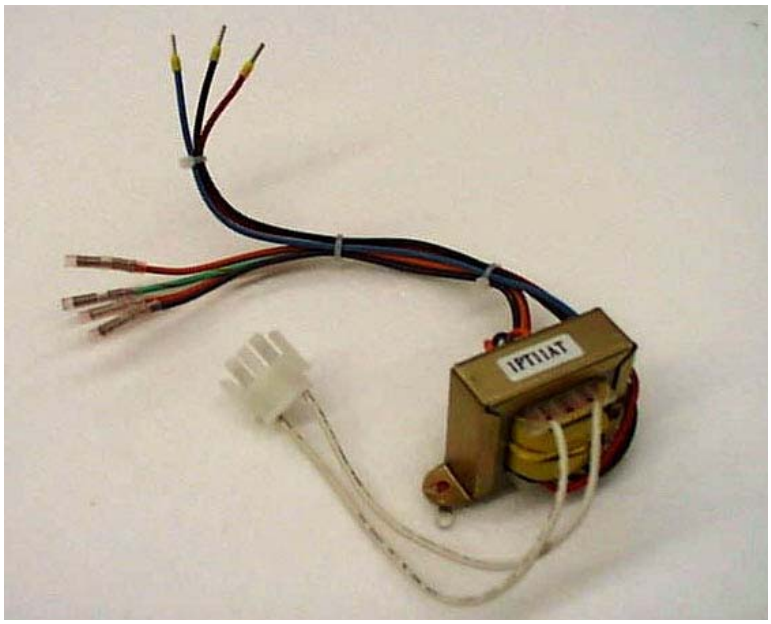
995-00808-00 (7214NR)



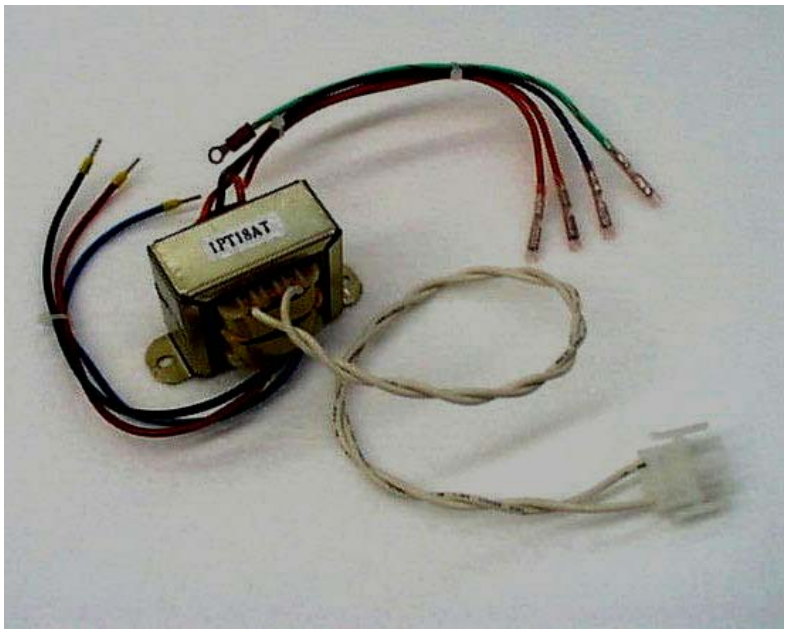
**Power Transformers**

| **Kit Part Number (Item ID)** | ASA-0018 | ASA-0047 | ASA-0067 | ASA-0088 | ASA-0125 | ASA-0141 | ASA-0238 | ASA-0253 | ASA-0405 | ASA-0405 | ASA-0513 | ASA-0585 | ASA-0628 | ASA-0775 | ASA-0897 | ASA-1153 | ASA-1403 | ASA-1574 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **/24 (230V/400V)** | (number per unit) | | | | | | | | | | | | | | | | | |
| 995-00809-00 (1PT11AT) | 1 | 1 | | | | | | | | | | | | | | | | |
| 995-00810-00 (1PT18AT) | | | 1 | 1 | 1 | | | | | | | | | | | | | |
| 995-00811-00 (1PT24AT) | | | | | | 1 | 1 | | | | | | | | | | | |
| 995-00812-00 (1PT31AT) | | | | | | | | 1 | | | | | | | | | | |
| 995-00813-00 (1PT41AT) | | | | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| 995-00814-00 (1PT56AT) | | | | | | | | | | | | | | | | 1 | 1 | 1 |

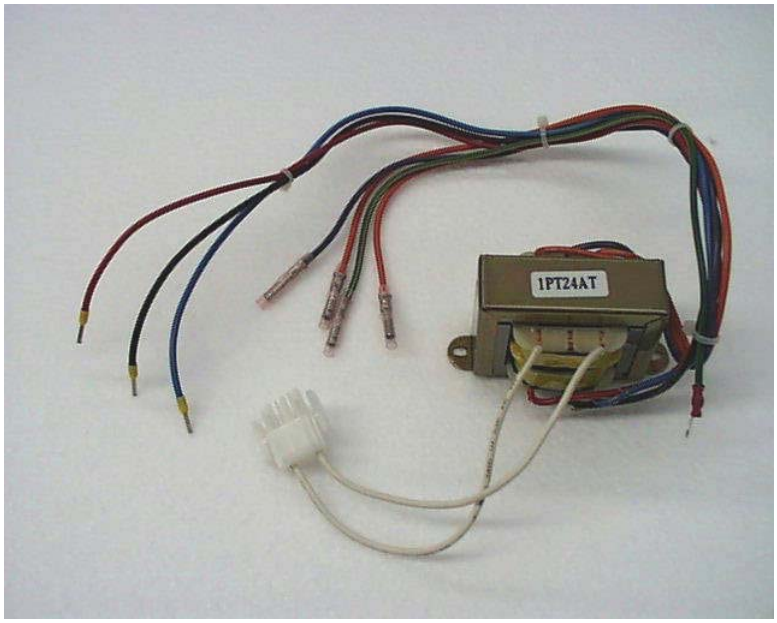
995-00809-00 (1PT11AT)



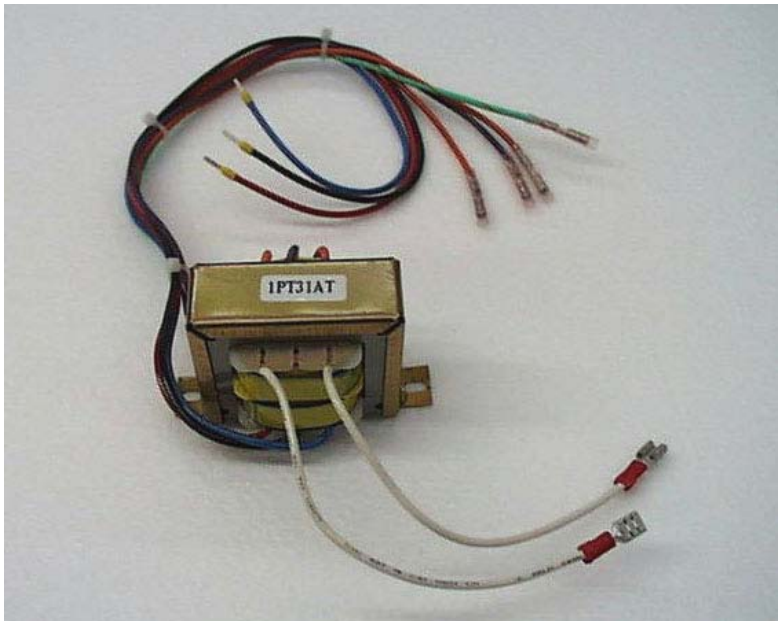
995-00810-00 (1PT18AT)



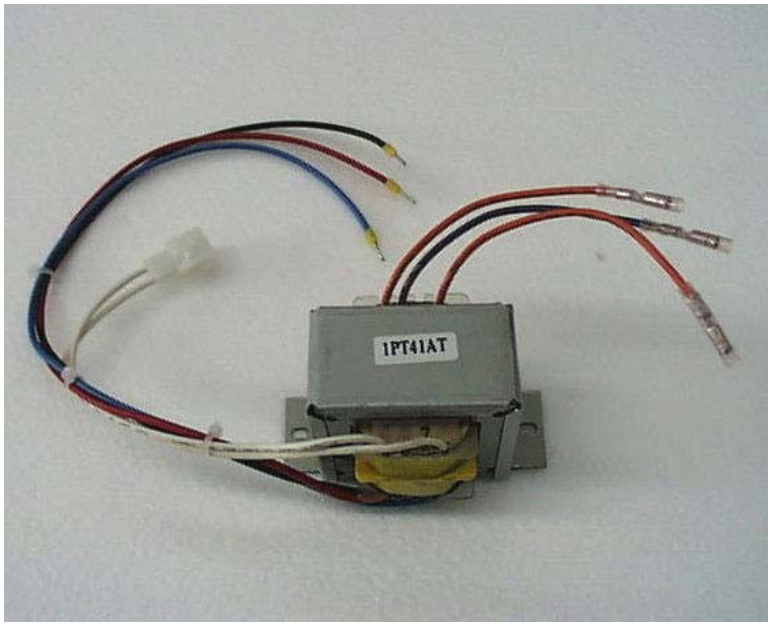

995-00811-00 (1PT24AT)



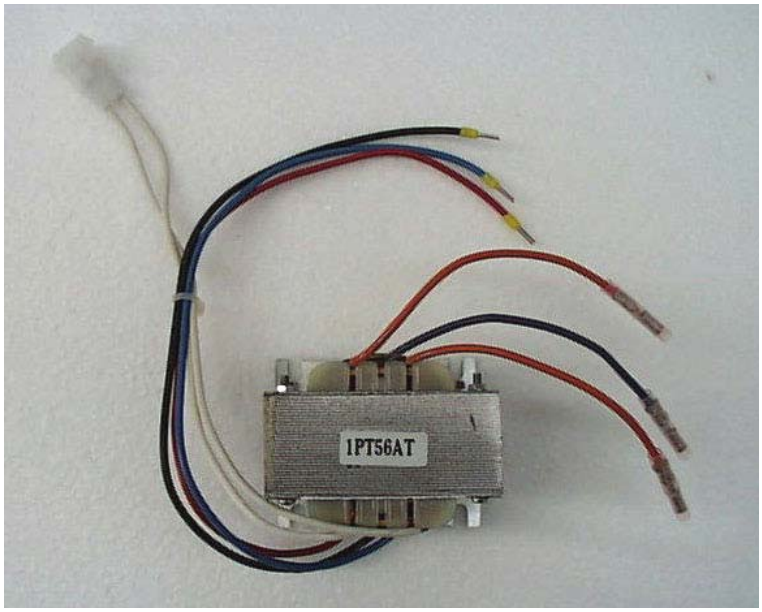
995-00812-00 (1PT31AT)




995-00813-00 (1PT41AT)



995-00814-00 (1PT56AT)



## ■ Tests

The following tests and measurements can be used to verify starter operation.

### Start Performance Test

This procedure tests for correct operation of the ASA during start.

- Calculate the expected start current by multiplying Function 1 *Motor FLC* by the Function 2 *Current Limit* or, if the secondary parameter set is being tested Function 80 *Motor FLC* by the Function 81 *Current Limit*.
- Initiate a start and measure the actual start current.
- If the measured start current is equal to the calculated current the starter is performing correctly.

### Run Performance Test

This procedure tests for correct operation of the ASA during run.

- Measure the voltage across each phase (L1-T1, L2-T2, L3-T3) of the soft starter.
  A voltage drop of approximately 2 VAC or less indicates the starter is performing correctly.

### Power Circuit Test

This procedure tests the ASA power circuit including the SCR, firing loom and printed circuit board.

- Disconnect the incoming supply (L1, L2, L3 and control voltage) from the starter.
- Disconnect the motor cables (T1, T2, T3) from the starter.
- Ensure the firing looms remain plugged in during the tests.
- Using a 500 VDC insulation tester (low voltage ohm meters or multi-meters are not adequate), measure the resistance between the input and output on each phase (L1-T1, L2-T2, L3-T3). The resistance should be close to 33kΩ and equal on all three phases.
- If the resistance measured across the SCR measures below about 10kΩ the SCR should be replaced.
- If the resistance measured across the SCR is greater than about 60kΩ there could be a control PCB or firing loom fault.

### Control Input Test

This procedure verifies the integrity of circuits connected to any of the remote control inputs, Start, Stop, Reset and Input A.

- Using a voltmeter measure across each input.
  If 24VDC is measured when the circuit is closed, the switch/control is connected incorrectly or is faulty.

### Power Transformer Test

This procedure verifies operation of the ASA Power Transformer.

Remove the Main Control Module from the starter and measure the power transformer output voltage to the Main Control Module.

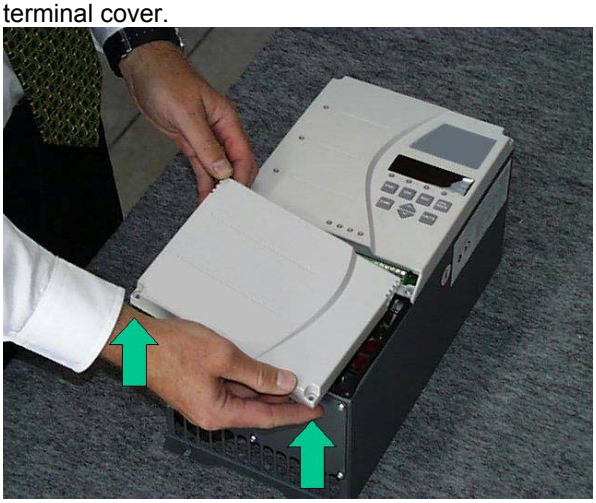
The following values should be measured:

- Green/Yellow - Earth
- Purple - 0 VAC
- Orange - 13 ~ 16 VAC
- Orange - 13 ~ 16 VAC

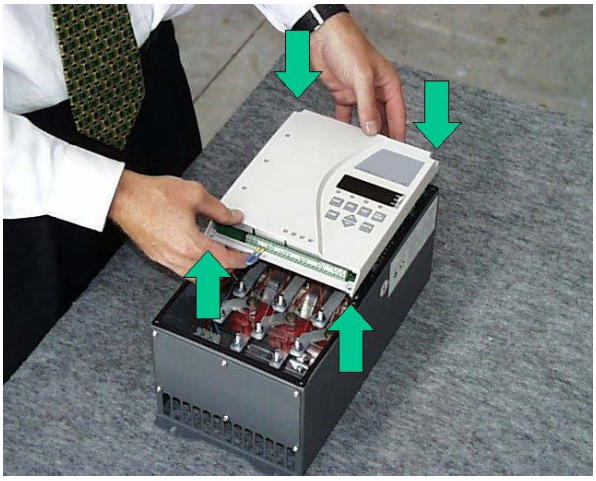
## ■ Component Replacement Procedures

### Control Module: ASA-0018 ~ ASA-0253

**Step 1.** Undo fixing screws (2) and remove lower terminal cover.



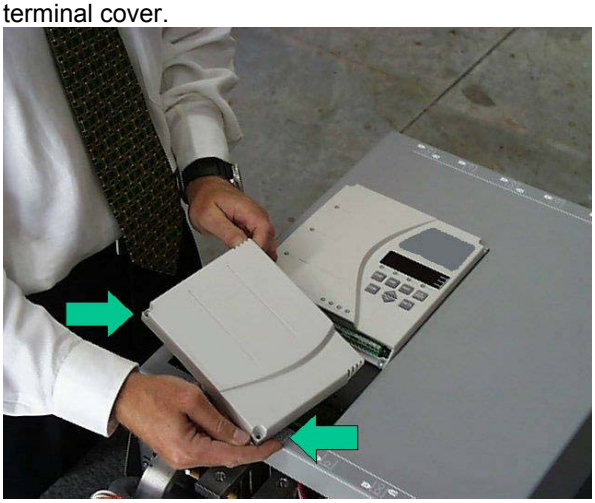
**Step 2:** Undo fixing screws (4) and lift off the Control Module.



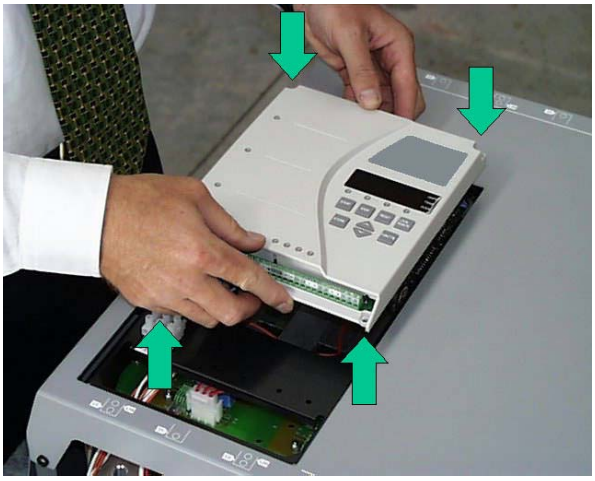
**Step 3:** Fit new Control Module in reverse order.

### Control Module: ASA-0405 ~ ASA-1574

**Step 1.** Undo fixing screws (2) and remove lower terminal cover.



**Step 2:** Undo fixing screws (4) and lift off the Control Module.



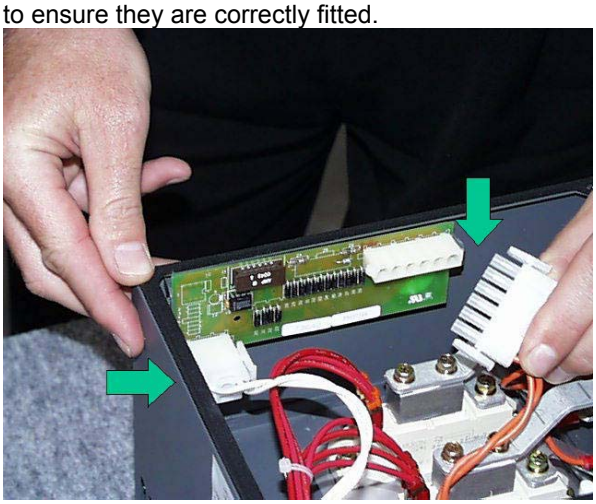
**Step 3:** Fit new Control Module in reverse order.

## Personality Module: ASA-0018 ~ ASA-0253

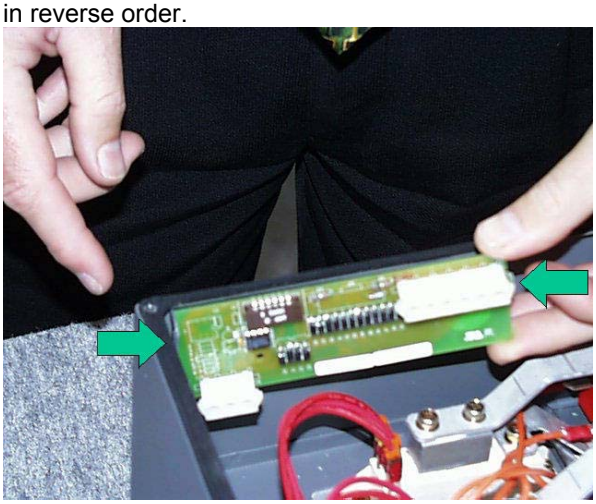
**Step 1.** Remove the Control Module using the method described on page 17.

**Step 2.** Unplug all connectors attached to the Personality Module.
(ASA-0018~ASA-0047 = 2 connectors)
(ASA-0067~ASA-0238 = 4 connectors)
(ASA-0253 = 3 connectors)

All plugs are different and have locating mechanisms to ensure they are correctly fitted.



**Step 3.** Detach the Personality Module by unclipping from its holding bracket. Fit new Personality Module in reverse order.

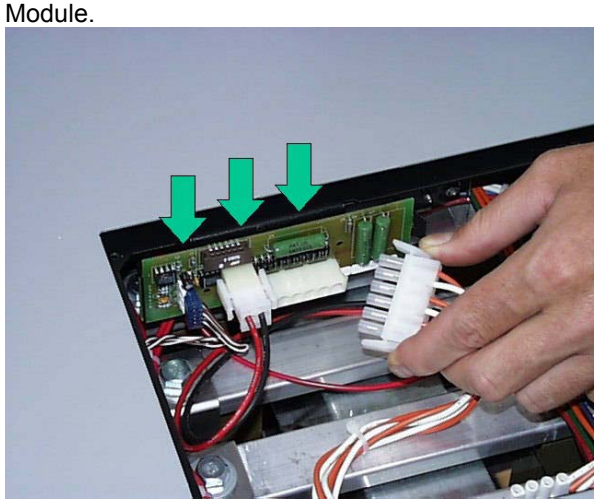


## Personality Module: ASA-0405 ~ ASA-1574

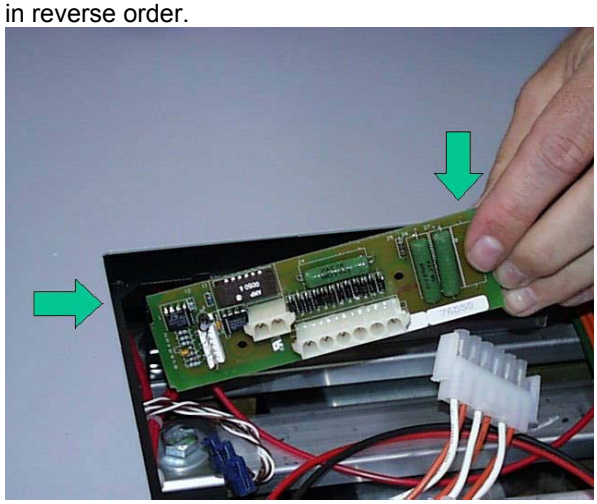
**Step 1.** Remove the Control Module using the method described on page 17.

**Step 2.** Unplug all connectors attached to the Personality Module.

All plugs have locating mechanisms to ensure they are correctly fitted. The 3 temperature detector plugs are interchangeable and can be reconnected to any temperature detector pins located on the Personality Module.



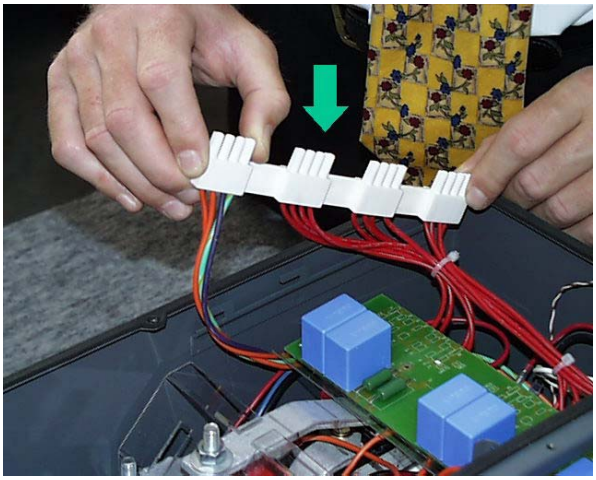
**Step 3.** Detach the Personality Module by unclipping from its holding bracket. Fit new Personality Module in reverse order.



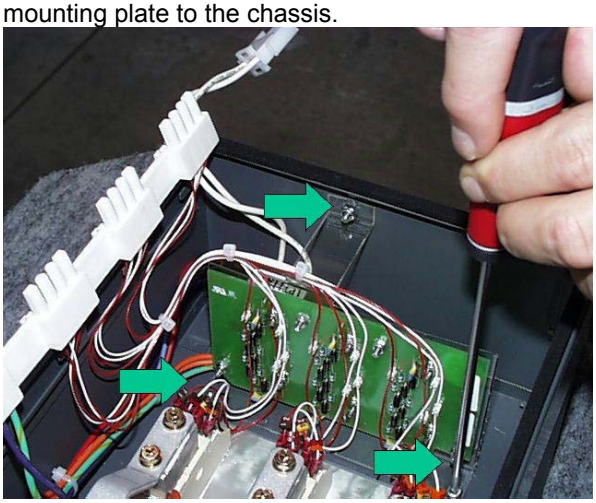
## Snubber/Overvoltage Protection Module: ASA-0018 ~ ASA-0047 (/6 Models only)

**Step 1.** Remove the Personality Module using the method described on page 18.

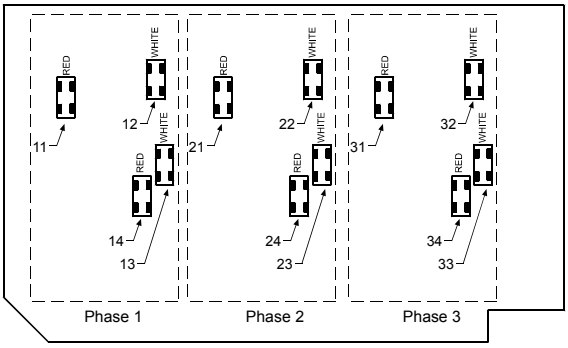
**Step 2.** Unclip the plastic firing loom connector block and lift clear.



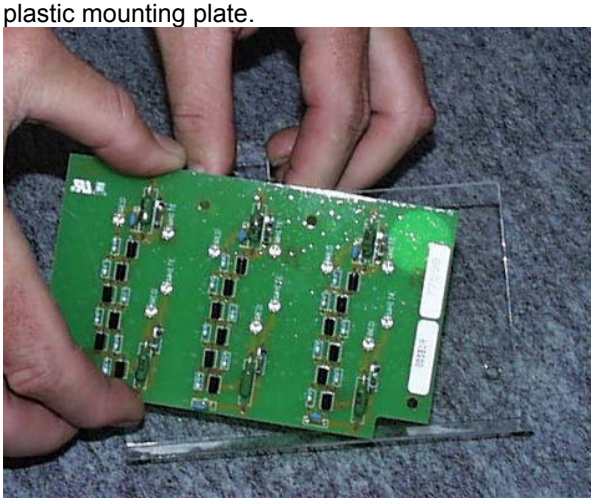
**Step 3.** The Snubber/Overvoltage Protection Module is fixed to a plastic mounting plate. Remove the fixing screws (2) and the fixing nut (1) attaching this mounting plate to the chassis.



**Step 4.** Lift the Snubber/Overvoltage Protection Module clear and unplug the firing loom connections (12).




**Step 5.** Undo the fixing nuts (4) to remove the Snubber/Overvoltage Protection Module from the plastic mounting plate.

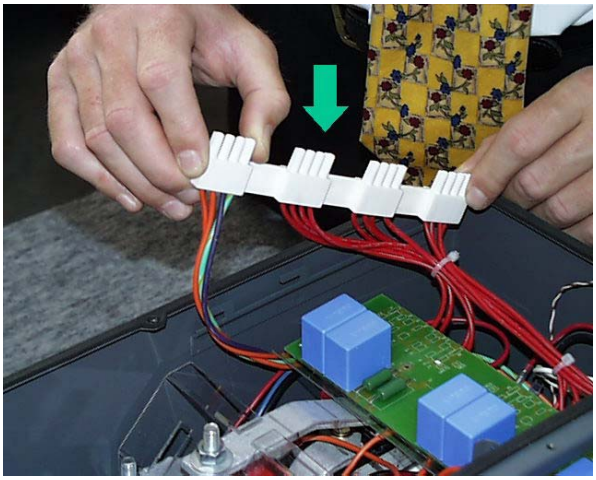


**Step 6.** Fit new Snubber/Overvoltage Protection Module in reverse order.

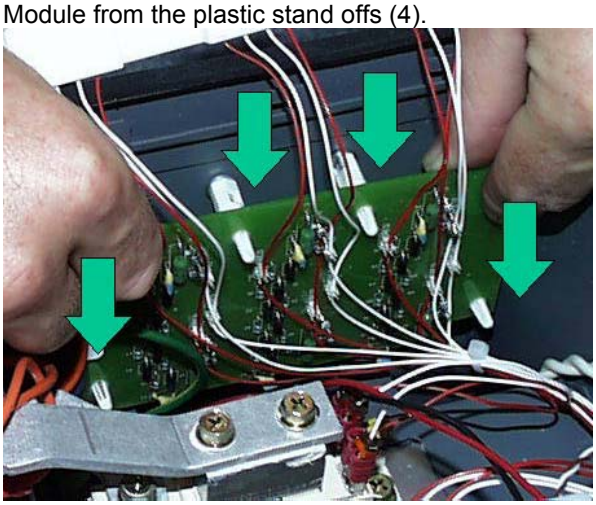
## Snubber/Overvoltage Protection Module: ASA-0067 ~ ASA-0125 (/6 Models only)

**Step 1.** Remove the Control Module using the method described on page 17.

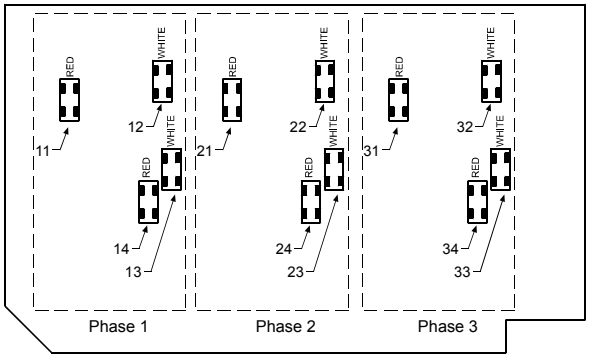
**Step 2.** Unclip the plastic firing loom connector block and lift clear.



**Step 3.** Unclip the Snubber/Overvoltage Protection Module from the plastic stand offs (4).



**Step 4.** Lift the Snubber/Overvoltage Protection Module clear and unplug the firing loom connections (12).

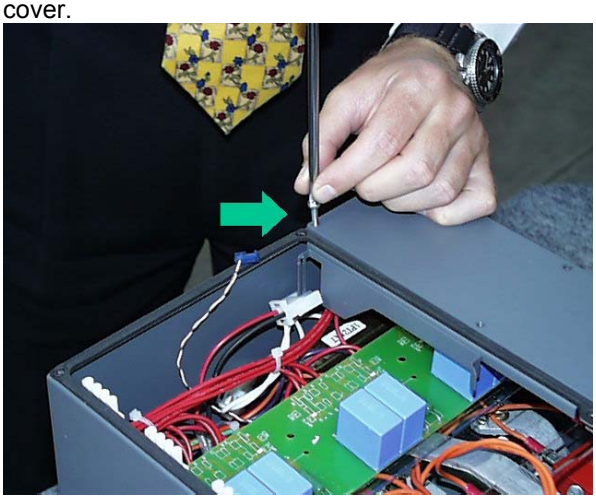



**Step 5.** Remove the Snubber/Overvoltage Protection Module. Replace in reverse order.

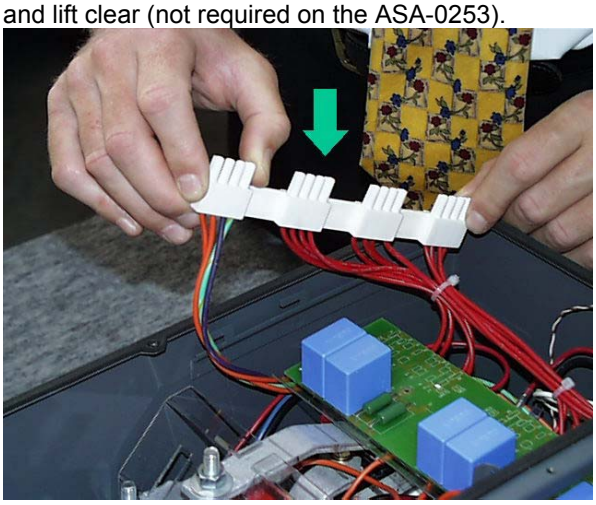
## Snubber/Overvoltage Protection Module: ASA-0141 ~ ASA-0253

**Step 1.** Remove the Personality Module using the method described on page 18.

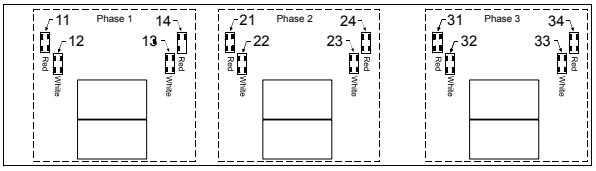
**Step 2.** Undo the screws (8) and remove the front cover.



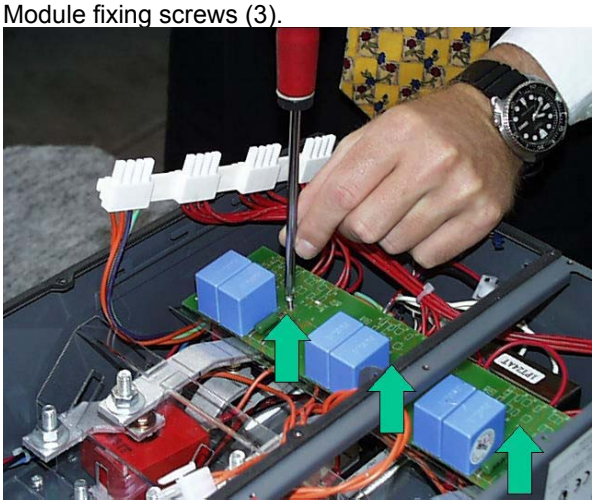
**Step 3.** Unclip the plastic firing loom connector block and lift clear (not required on the ASA-0253).



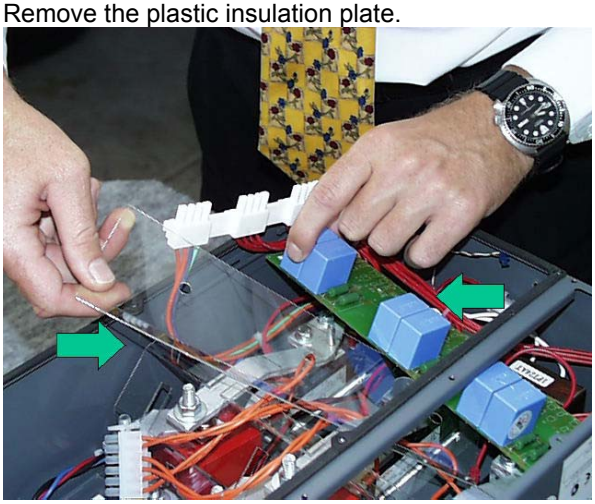
**Step 4.** Unplug the firing loom connections (12) to the Snubber/Overvoltage Protection Module (/6 models only).



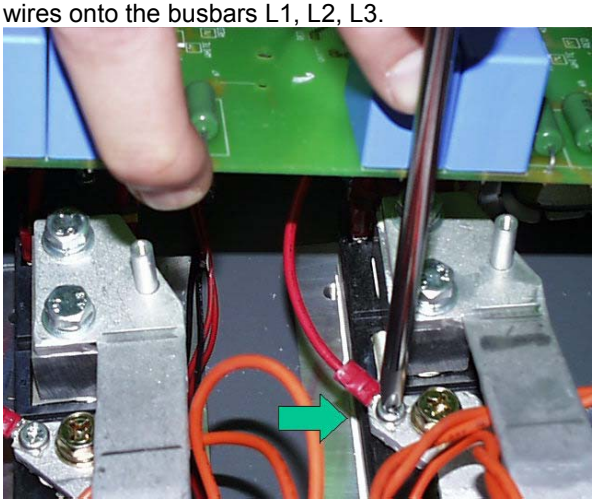

**Step 5.** Undo the Snubber/Overvoltage Protection Module fixing screws (3).



**Step 6.** Lift the Snubber/Overvoltage Protection Module up and towards the top of the chassis. Remove the plastic insulation plate.



**Step 7.** Loosen the screws (3), which connect the red wires onto the busbars L1, L2, L3.

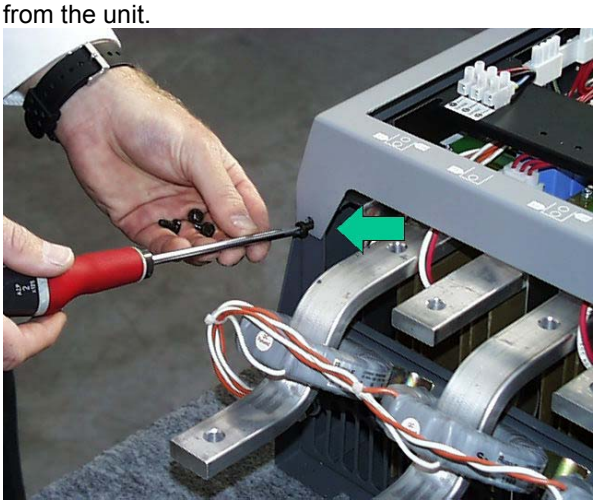


**Step 8.** Remove the Snubber/Overvoltage Protection Module. Replace in reverse order.

## Snubber/Overvoltage Protection Module: ASA-0405 ~ ASA-0897

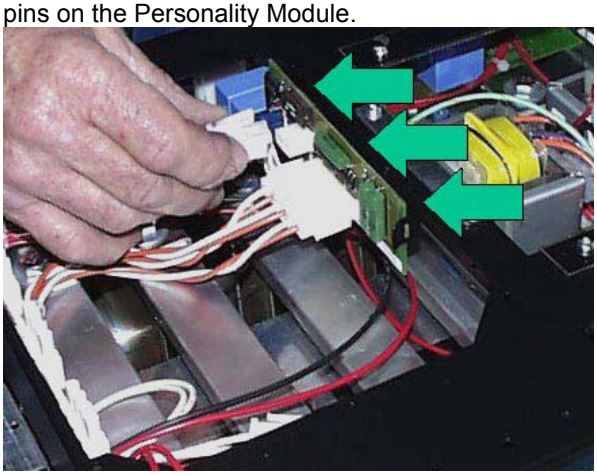
**Step 1.** Remove the Control Module using the method described on page 17.

**Step 2.** Undo the front cover fixing screws (4) and lift from the unit.

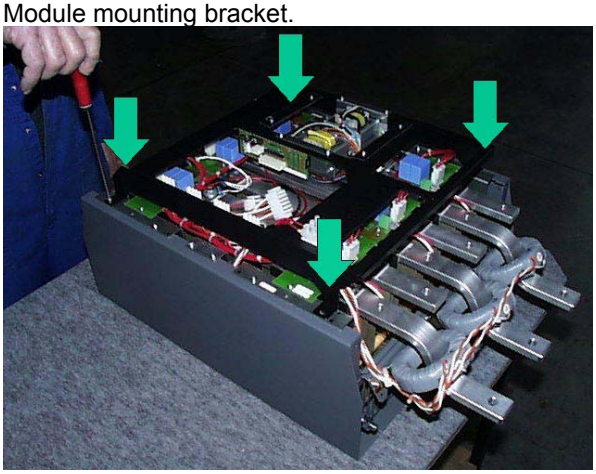


**Step 3.** Unplug all connections to the Personality Module.

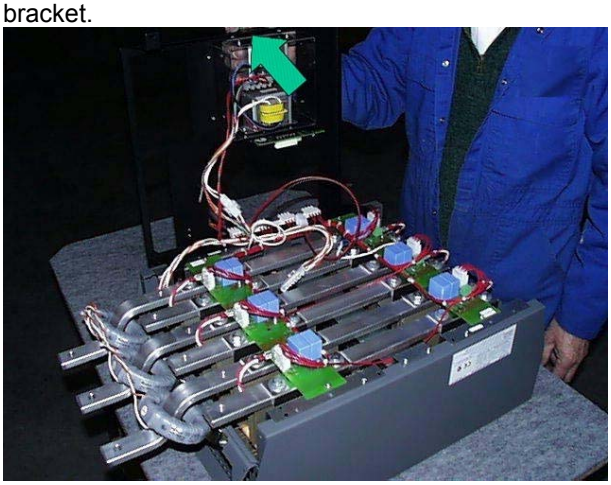
All plugs have locating mechanisms to ensure they are fitted correctly. The 3 temperature detector plugs can be connected to any of the temperature detector pins on the Personality Module.



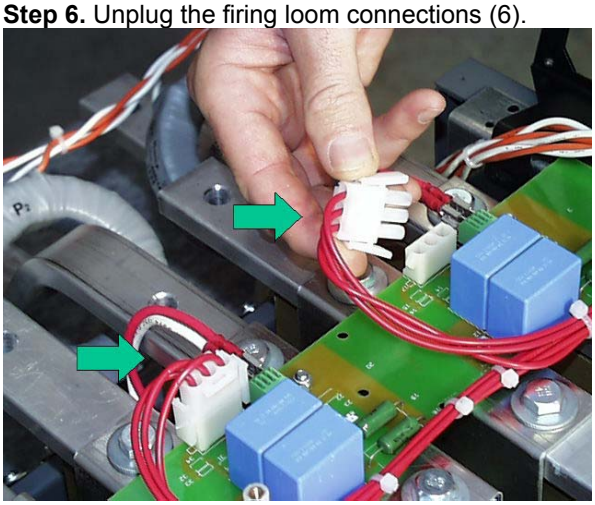
**Step 4.** Undo fixing screws (4) securing the Control Module mounting bracket.



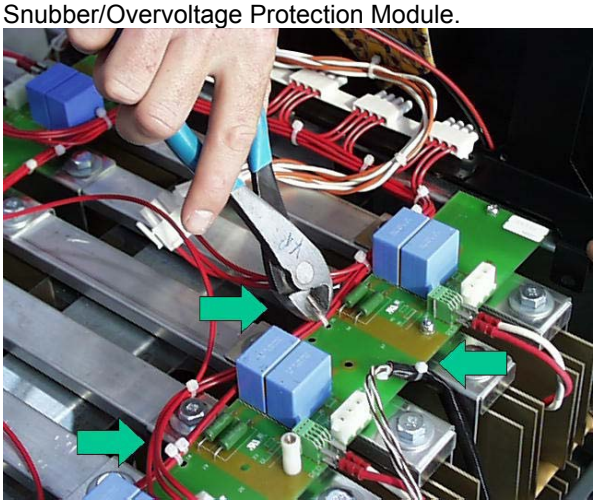
**Step 5.** Fold back the Control Module mounting bracket.



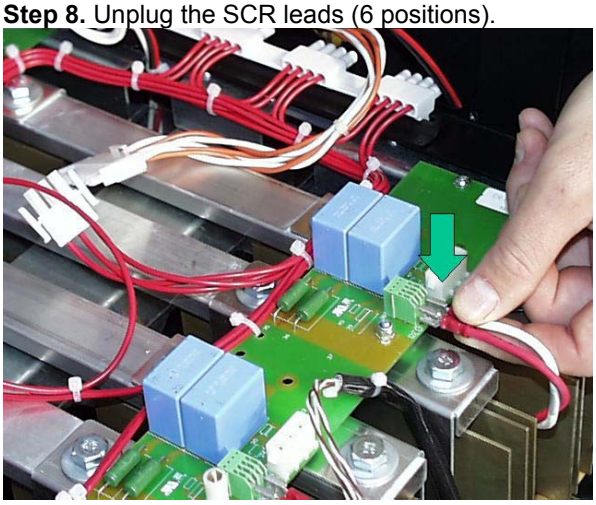
**Step 6.** Unplug the firing loom connections (6).



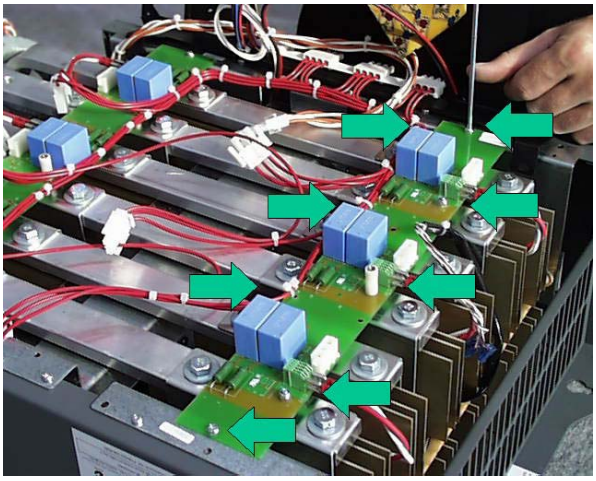
**Step 7.** Cut the cable ties securing the firing loom and temperature detector wires to the Snubber/Overvoltage Protection Module.



**Step 8.** Unplug the SCR leads (6 positions).



**Step 9.** Undo the fixing screws (2), undo the fixing nuts (6) and remove the Snubber/Overvoltage Protection Module.



**Step 10.** Fit new Snubber/Overvoltage Protection Module in reverse order.

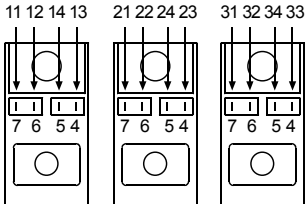
### Snubber/Overvoltage Protection Module: ASA-1153 ~ ASA-1574

**Step 1.** Refer to the replacement procedure for Snubber/Overvoltage Protection Module: ASA-0405 ~ ASA-0897, Steps 1 to 10, on page 22.

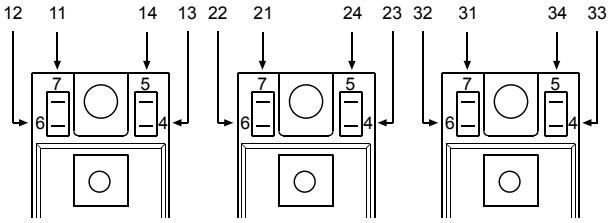
## SCRs: ASA-0018 ~ ASA-0253

**Step 1.** Remove the Control Module and Personality Module using the methods described on pages 17 & 18. For ASA-0141~ASA-0253 remove the Snubber/Overvoltage Protection Module using the method described on page 21.

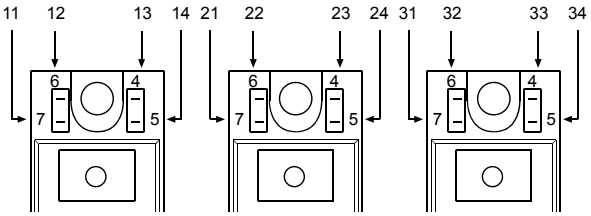
**Step 2.** Unplug the firing looms (4) connected to the SCR being replaced.



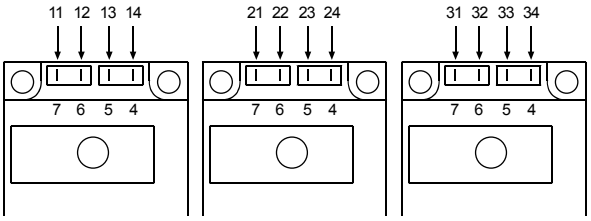
ASA-0018 ~ ASA-0067



ASA-0088



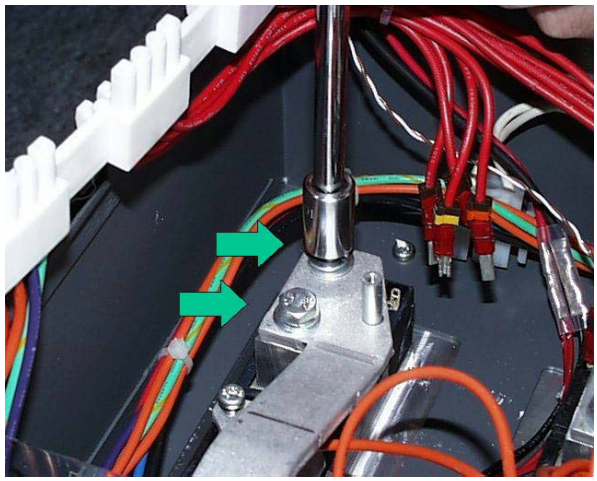
ASA-0125 ~ ASA-0141



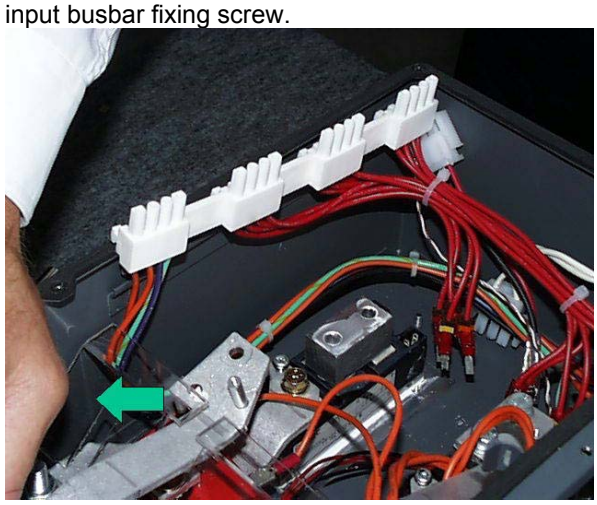
ASA-0238 ~ ASA-0253

**Step 3.** Undo the screws/bolts (2) connecting the output busbar (T1 T2 or T3) to the SCR being replaced.

| Model | Torque |
|---|---|
| ASA-0018 ~ ASA-0067 | 4 NM |
| ASA-0088 ~ ASA-0141 | 7 NM |
| ASA-0238 ~ ASA-0253 | 12 NM |

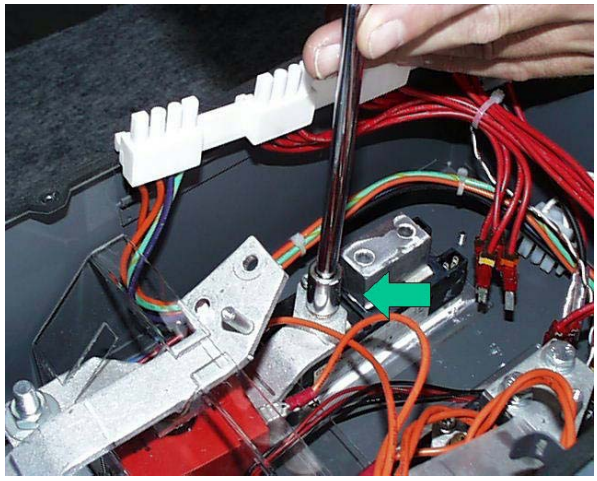


**Step 4.** Slide the busbar (up or down depending on the model) until clear of the SCR fixing screws & the input busbar fixing screw.



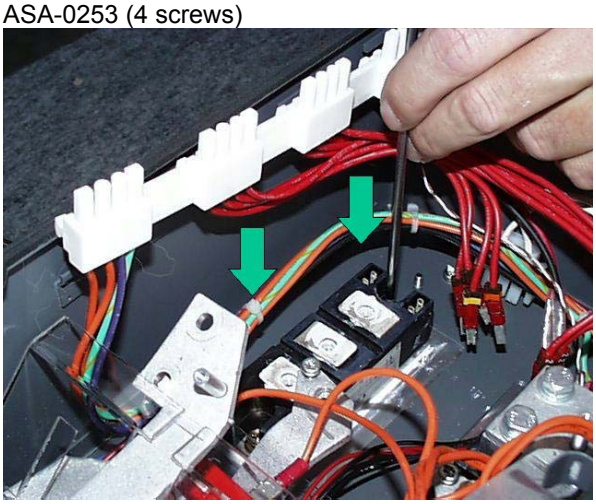
**Step 5.** Undo the screw/bolt (1) connecting the input busbar (L1 L2 or L3) to the SCR being replaced. Slide the busbar clear of the SCR.

| Model | Torque |
|---|---|
| ASA-0018 ~ ASA-0067 | 4 NM |
| ASA-0088 ~ ASA-0141 | 7 NM |
| ASA-0238 ~ ASA-0253 | 12 NM |



**Step 6.** Undo the screws securing the SCR to the heatsink. (Tightening torque = 4NM)

ASA-0018~ASA-0238 (2 screws)
ASA-0253 (4 screws)



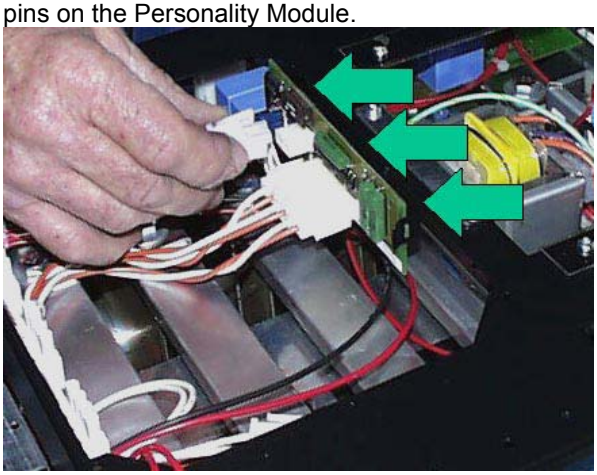
**Step 7.** Apply a thin even film of heatsink paste to the bottom of the new SCR. Replace the SCR in reverse order.

## Power Assemblies: ASA-0405 ~ ASA-1574

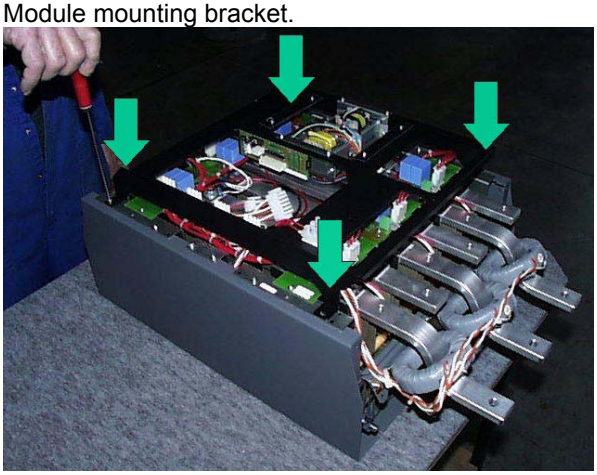
**Step 1.** Remove the Control Module using the method described on page 17. Undo the front cover fixing screws (4) and lift from the unit.

**Step 2.** Unplug all connections to the Personality Module.

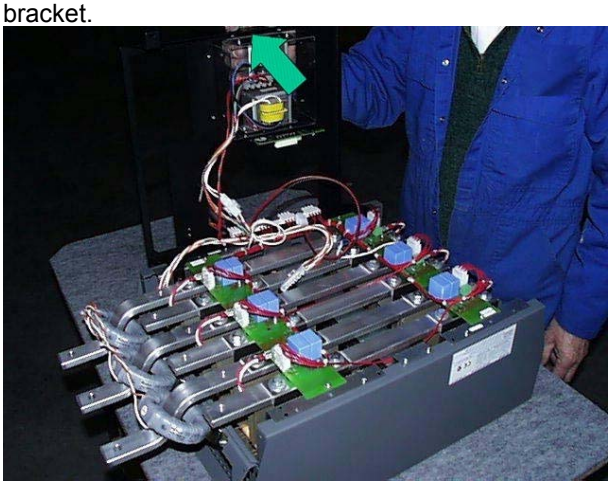
All plugs have locating mechanisms to ensure they are fitted correctly. The 3 temperature detector plugs can be connected to any of the temperature detector pins on the Personality Module.



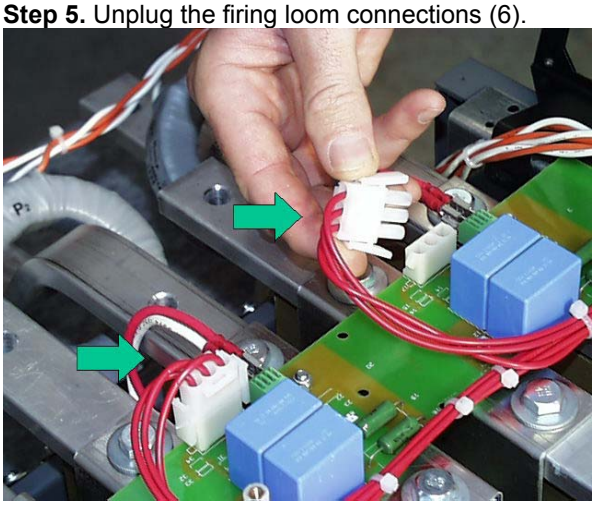
**Step 3.** Undo fixing screws (4) securing the Control Module mounting bracket.



**Step 4.** Fold back the Control Module mounting bracket.

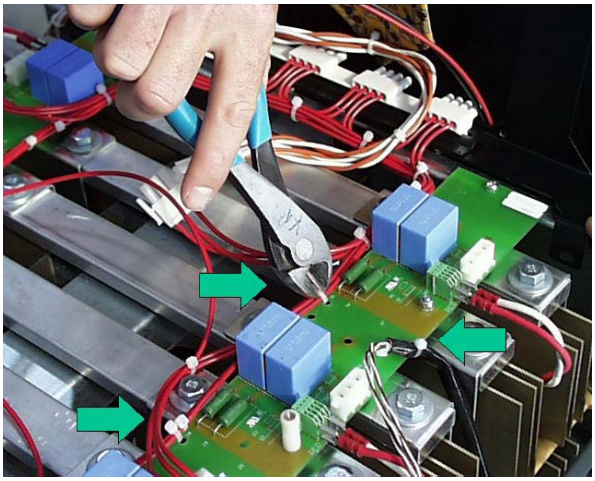


**Step 5.** Unplug the firing loom connections (6).

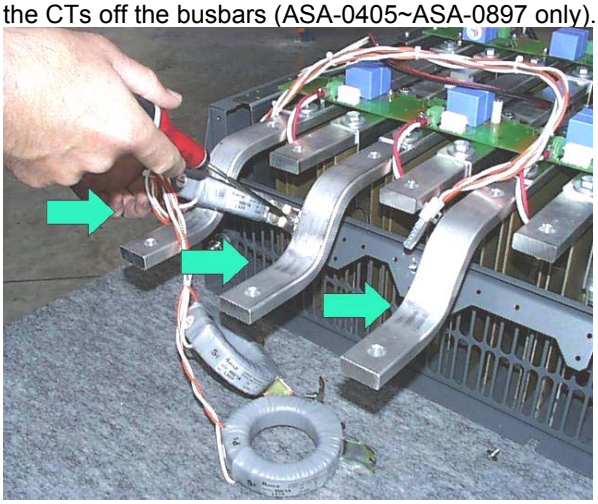


**Step 6.** Cut the cable ties securing the firing loom and temperature detector wires to the Snubber/Overvoltage Protection Module.

Remove the Control Module mounting bracket clear of the unit.

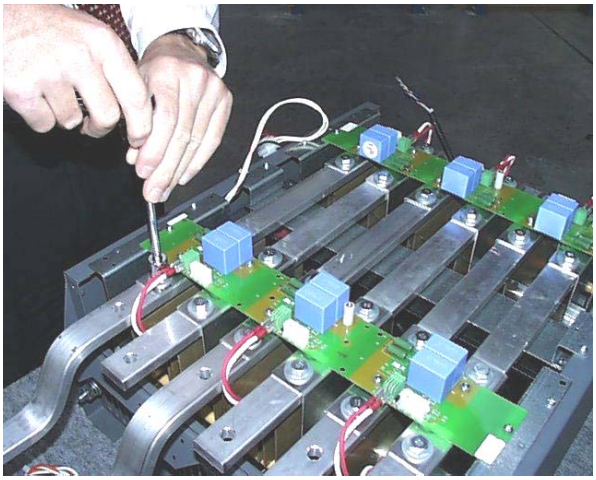


**Step 7.** Undo the CT mounting screws (2) and slide the CTs off the busbars (ASA-0405~ASA-0897 only).

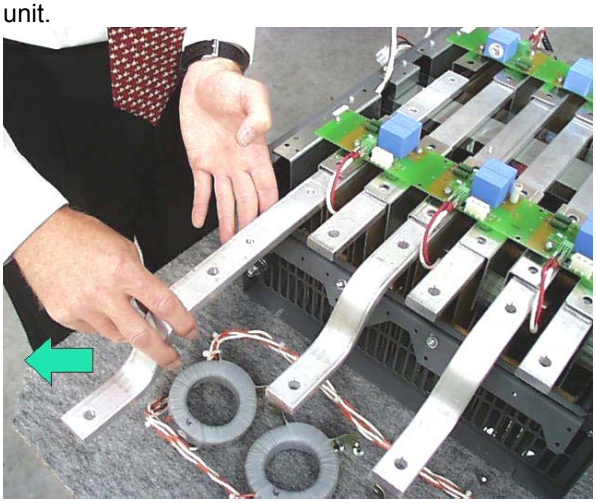


**Step 8.** Undo the bolts (24) securing the busbars to the power assemblies. These bolts are tightened to 12NM for models ASA-0405~ASA-0897 and 17NM for models ASA-1153~ASA-1574.

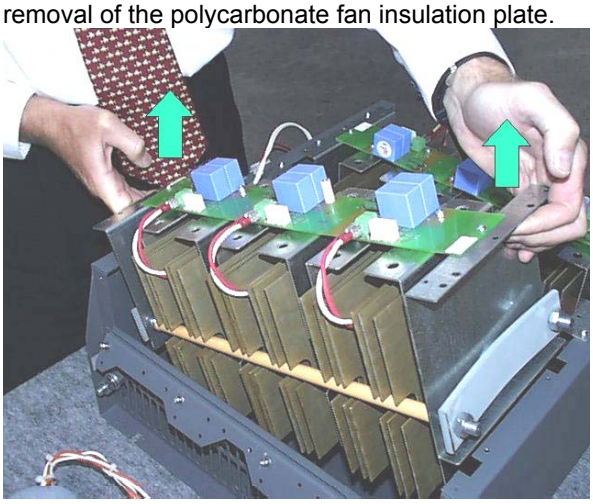
For models ASA-1153~ASA-1574 unplug the SCR firing leads (2) from the Snubber/Overvoltage Protection Module. Lift the module clear of the unit.



**Step 9.** Slide/lift the busbars (6) from the soft starter unit.



**Step 10.** Undo the Power Assembly mounting screws (4) and remove the assembly from the chassis. For models ASA-1153~ASA-1574 this will also require removal of the polycarbonate fan insulation plate.

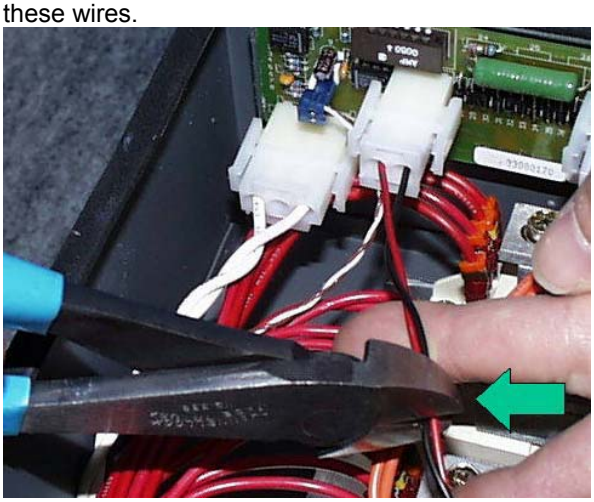


**Step 11.** Fit new Power Assembly in reverse order.

## Cooling Fans: ASA-0067 ~ ASA-0125

**Step 1.** Remove the Control Module using the method described on page 17.

**Step 2.** Cut the red and black fan supply wires (2) running from the fan to the personality module. Crimp terminals are supplied with the new fan to reconnect these wires.



**Step 3.** Undo the bottom fixing screws (2) attaching the fan to the fan housing bracket.

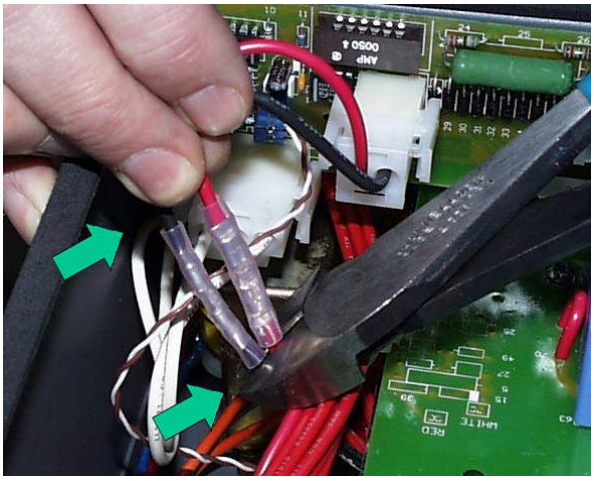
**Step 4.** Unclip the fan from the fan housing bracket and lift clear of the unit.

**Step 5.** Fit new fan in reverse order.

## Cooling Fans: ASA-0141 ~ ASA-0238

**Step 1.** Remove the Control Module using the method described on page 17.

**Step 2.** Cut the red and black fan supply wires running from the fan to the personality module. These must be cut on either side of the crimp terminals (2). Crimp terminals are supplied with the new fan to reconnect these wires.



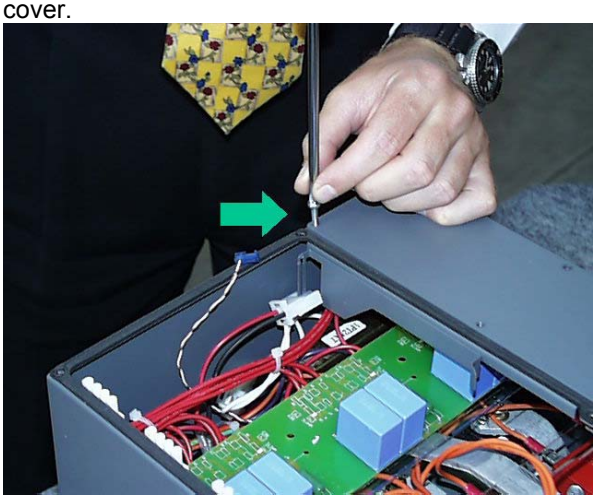
**Step 3.** Undo the fixing screws (4) attaching the fan to the fan housing bracket and lift clear of the unit.

**Step 4.** Fit new fan in reverse order.

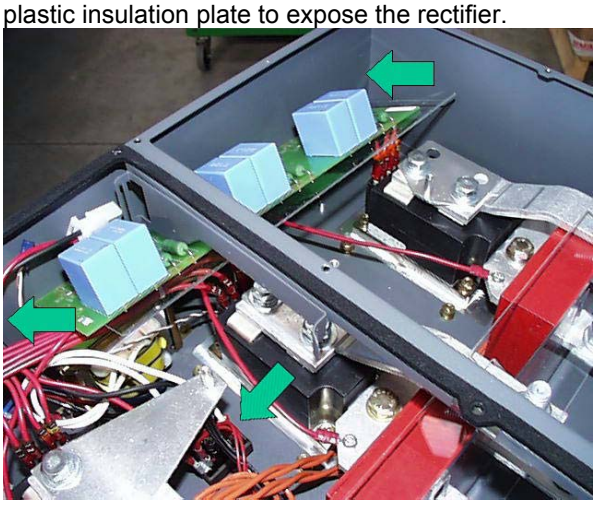
## Cooling Fans: ASA-0253

**Step 1.** Remove the Personality Module using the method described on page 18.

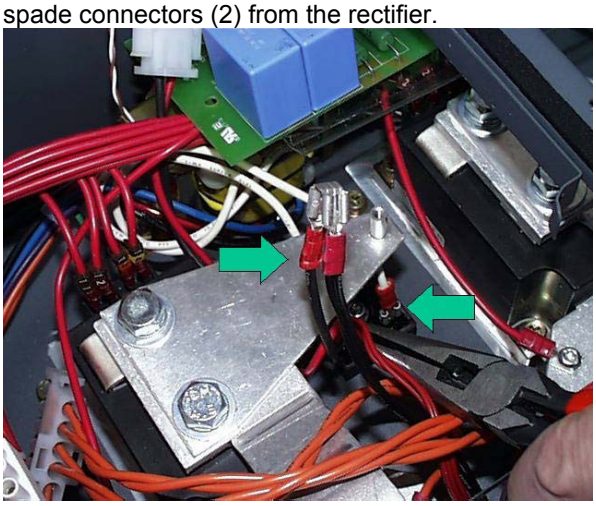
**Step 2.** Undo the screws (8) and remove the front cover.

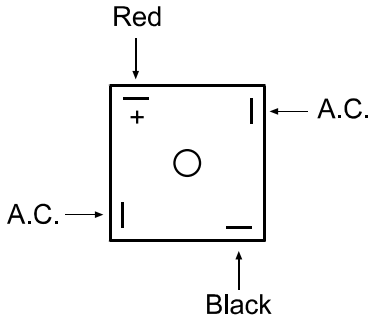


**Step 3.** Undo the Snubber/Overvoltage Protection Module fixing screws (3). Lift and move the Snubber/Overvoltage Protection Module and the plastic insulation plate to expose the rectifier.

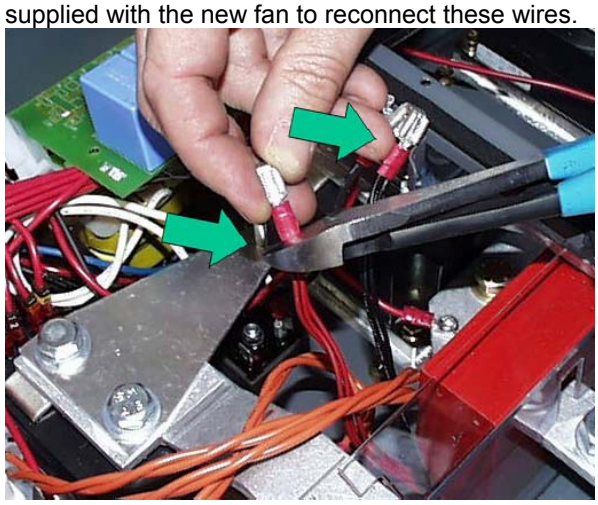


**Step 4.** Disconnect the red and black wire double spade connectors (2) from the rectifier.






**Step 5.** Disconnect the fan supply single spade connectors (2) from the double spade connectors. Cut the single spade connectors from the fan supply wires (3 red and 3 black). Spade connectors are supplied with the new fan to reconnect these wires.



**Step 6.** Undo the fixing screws (4) attaching the fan to the fan housing bracket and lift clear of the unit.

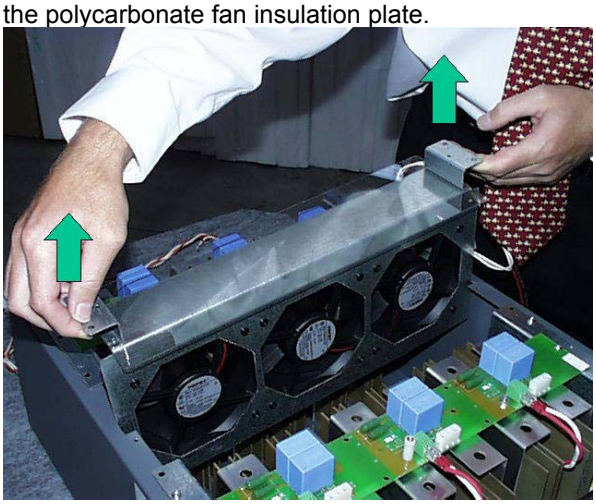
**Step 7.** Fit new fan in reverse order.

## Cooling Fans: ASA-0405 ~ ASA-1574

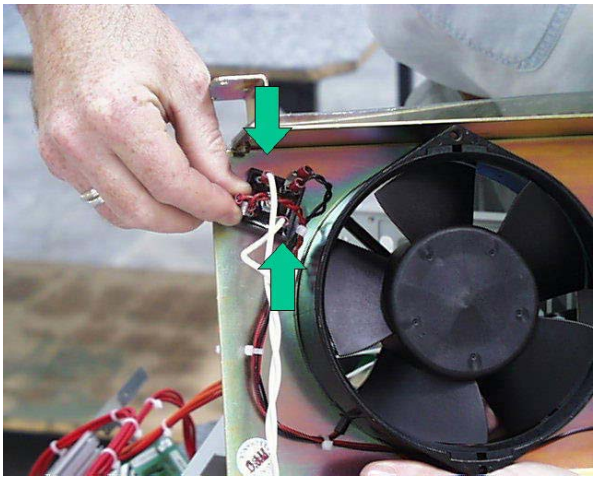
**Step 1.** Disassemble the ASA as described for the Power Assembly replacement, Steps 1 to 9 (page 27).

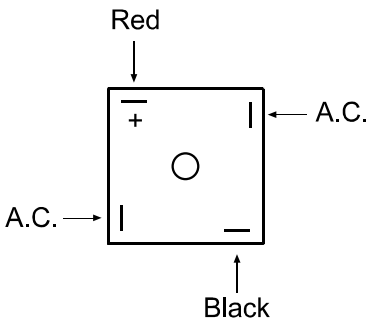
**Step 2.** Undo the cooling fan mounting bracket fixing screws (4) and remove the fan assembly.

ASA-1153~ASA-1574 will also require the removal of the polycarbonate fan insulation plate.



**Step 3.** Disconnect the fan supply from the rectifier. Unscrew the damaged fan from the fan mounting bracket.






**Step 4.** Remove the damaged fan and refit the replacement fan in reverse order.

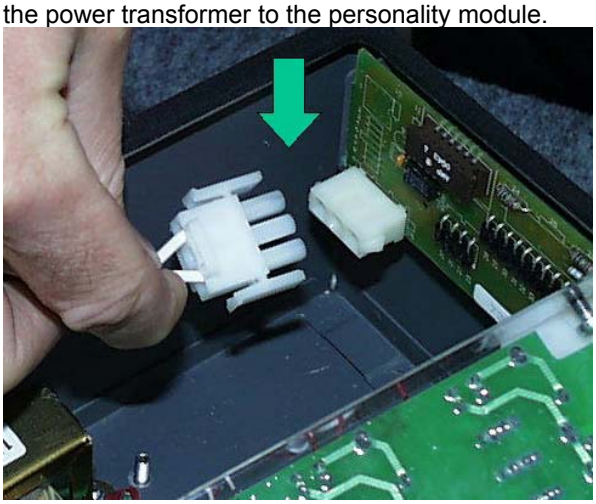
For the ASA-1153~ASA-1574 models it is critical to refit the polycarbonate fan insulation plate.

## Power Transformer: ASA-0018 ~ ASA-0047

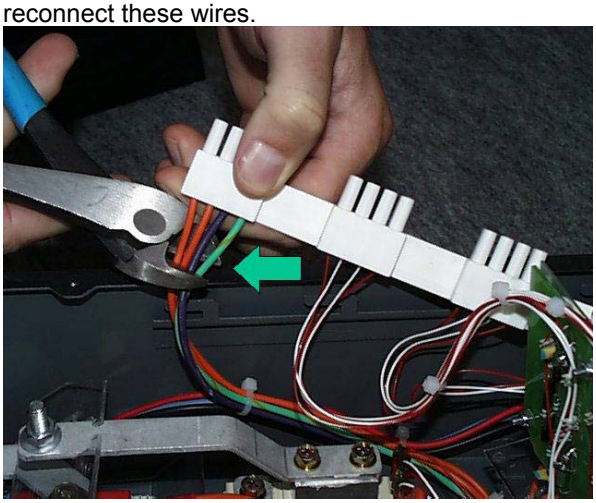
**Step 1.** Remove the Control Module using the method described on page 17.

**Step 2.** For /6 models remove the Snubber/Overvoltage Protection Module using the method described on page 19, Steps 2 to 4.

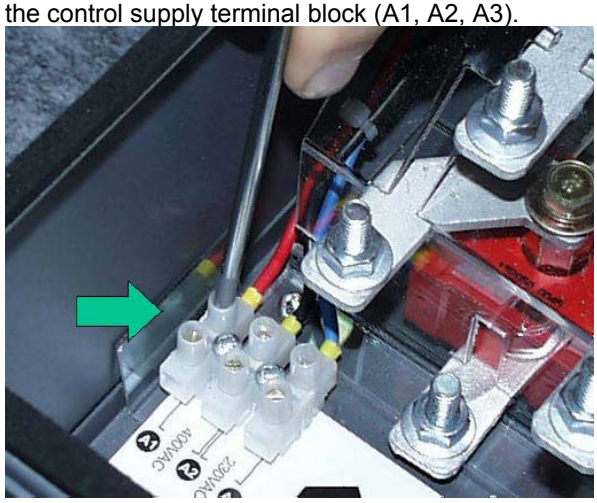
**Step 3.** Unplug the white wire connector running from the power transformer to the personality module.



**Step 4.** Slide/lift the plastic firing loom connector block clear of the chassis. Cut the wiring (orange, purple, orange, green/yellow) running from the power transformer to the plastic firing loom connector block. Crimp terminals are supplied with the new PT to reconnect these wires.



**Step 5.** Disconnect the wiring (red, black, blue) from the control supply terminal block (A1, A2, A3).



**Step 6.** Undo the fixing bolts (2) securing the power transformer and earth wire to the chassis. Remove the PT.

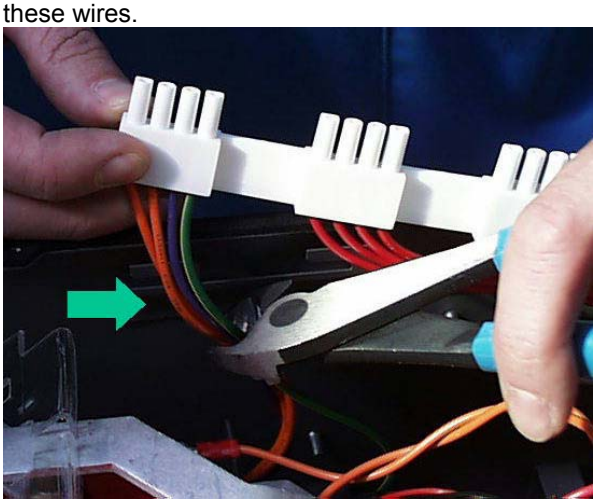
**Step 7.** Fit new power transformer in reverse order.

## Power Transformer: ASA-0067 ~ ASA-0125

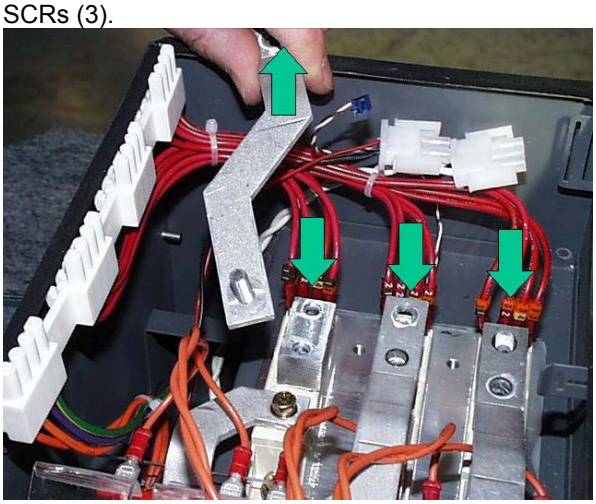
**Step 1.** Remove the Personality Module using the method described on page 18.

**Step 2.** For /6 models remove the Snubber/Overvoltage Protection Module using the method described on page 20, Steps 2 to 4.

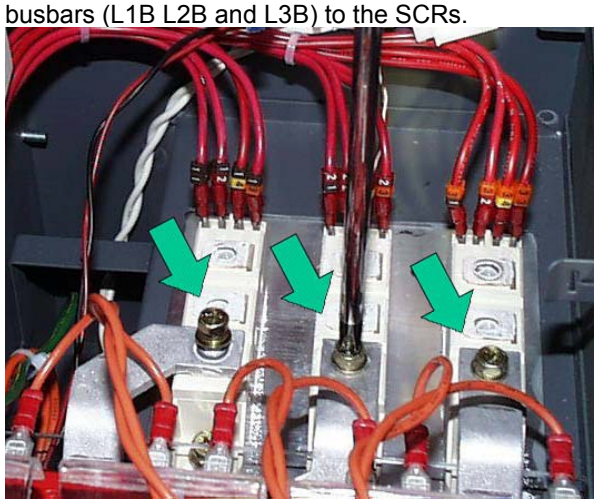
**Step 3.** Cut the wiring (orange, purple, orange, green/yellow) running from the power transformer to the plastic firing loom connector block. Crimp terminals are supplied with the new PT to reconnect these wires.



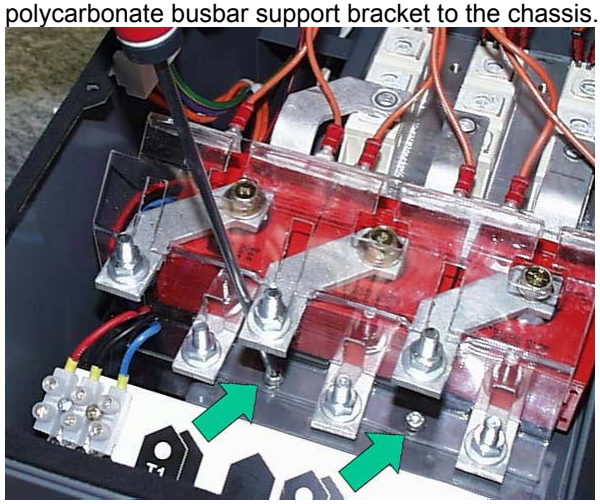
**Step 4.** Undo the bolts (6) connecting output busbars (T1 T2 and T3) to the SCRs. Slide the busbars clear of the unit.
Remove the busbar stand-off blocks from the SCRs (3).



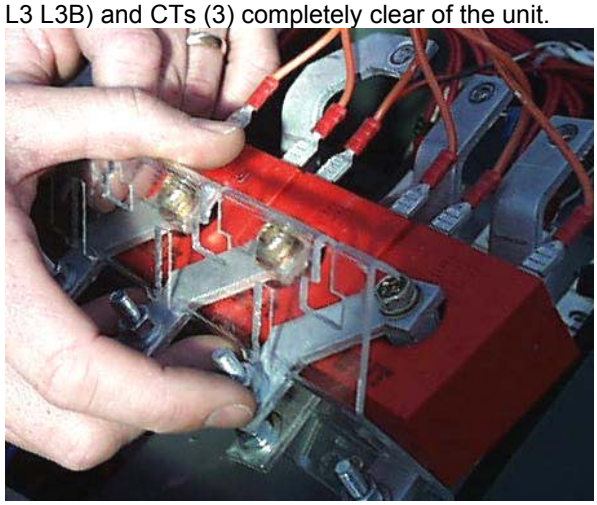
**Step 5.** Undo the bolts (3) connecting bypass busbars (L1B L2B and L3B) to the SCRs.



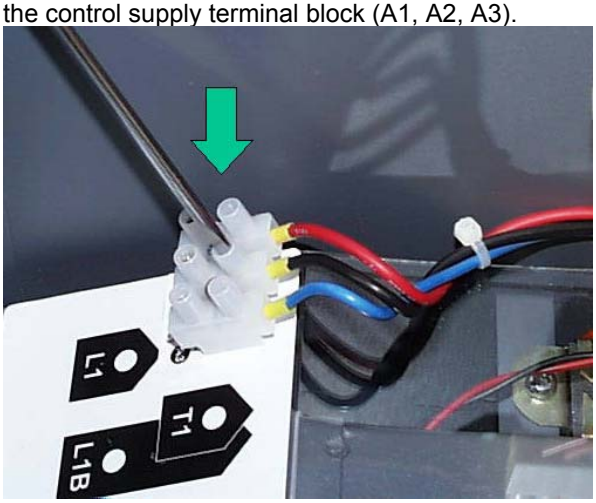
**Step 6.** Undo the screws (2) securing the polycarbonate busbar support bracket to the chassis.



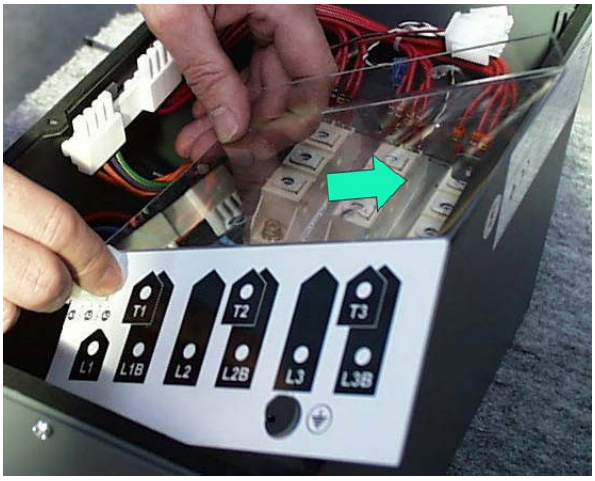
**Step 7.** Remove the polycarbonate busbar support bracket complete with busbars (L1 L1B, L2 L3B and L3 L3B) and CTs (3) completely clear of the unit.



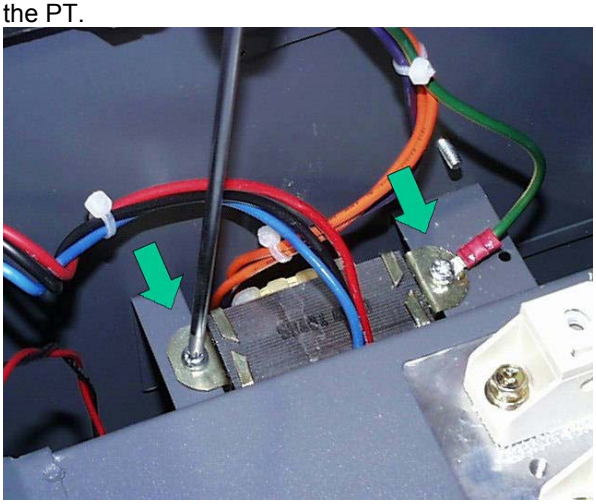
**Step 8.** Disconnect the wiring (red, black, blue) from the control supply terminal block (A1, A2, A3).




**Step 9.** Lift the bottom polycarbonate insulation plate clear of the unit.




**Step 10.** Undo the fixing bolts (2) securing the power transformer and earth wire to the chassis. Remove the PT.

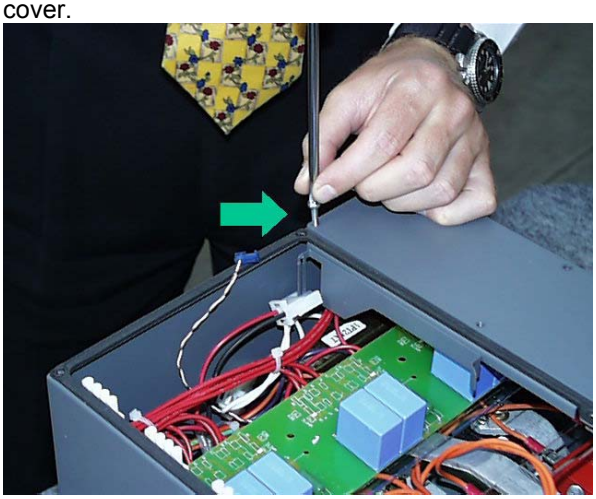


**Step 11.** Fit new power transformer in reverse order.

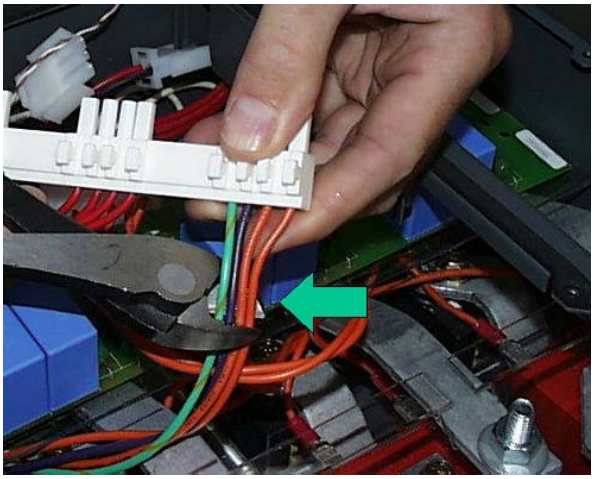
## Power Transformer: ASA-0141 ~ ASA-0238

**Step 1.** Remove the Personality Module using the method described on page 18.

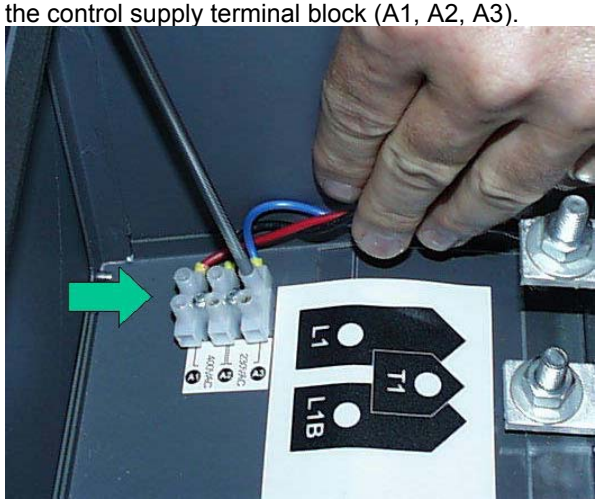
**Step 2.** Undo the screws (8) and remove the front cover.



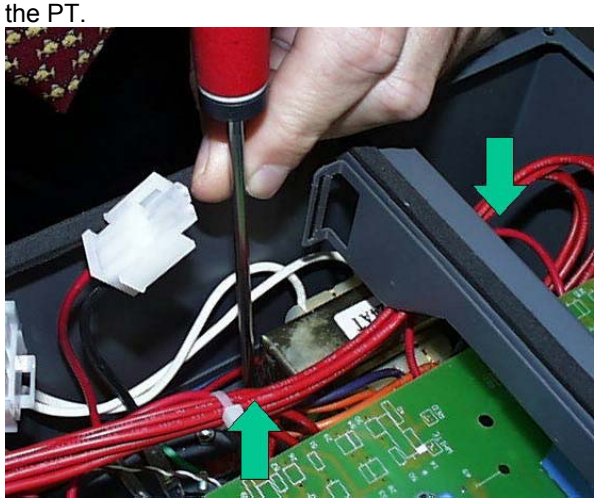
**Step 3.** Slide/lift the plastic firing loom connector block clear of the chassis. Cut the wiring (orange, purple, orange, green/yellow) running from the power transformer to the plastic firing loom connector block. Crimp terminals are supplied with the new PT to reconnect these wires.



**Step 4.** Disconnect the wiring (red, black, blue) from the control supply terminal block (A1, A2, A3).




**Step 5.** Undo the fixing bolts (2) securing the power transformer and earth wire to the chassis. Remove the PT.

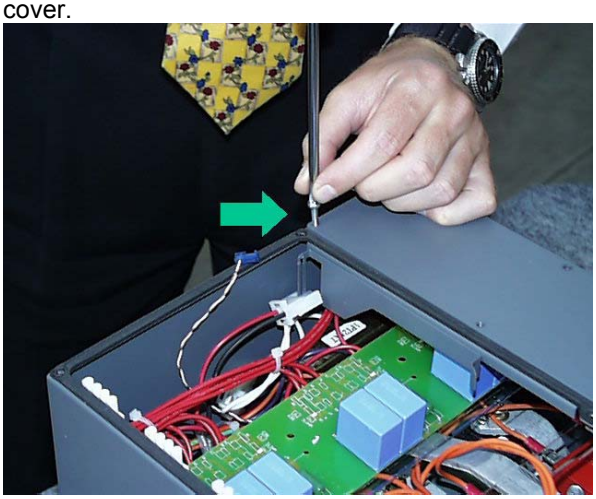


**Step 6.** Fit new power transformer in reverse order.

## Power Transformer: ASA-0253

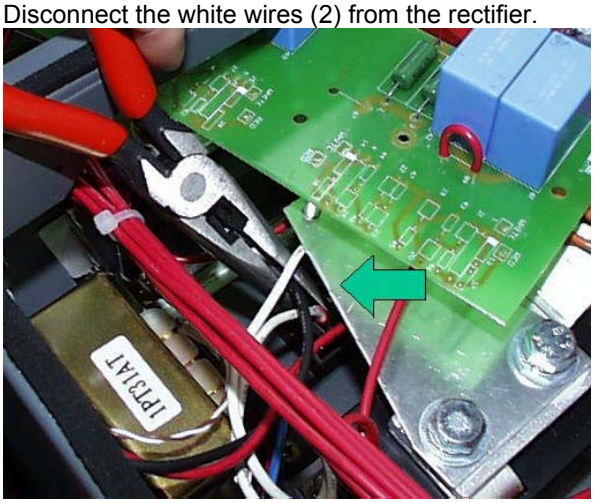
**Step 1.** Remove the Personality Module using the method described on page 18.

**Step 2.** Undo the screws (8) and remove the front cover.

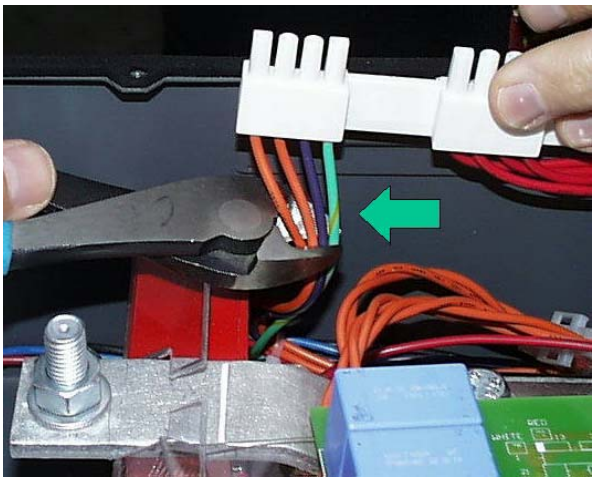


**Step 3.** Undo the Snubber/Overvoltage Protection Module fixing screws (3). Move the Snubber/Overvoltage Protection Module and the plastic insulation plate to expose the rectifier.

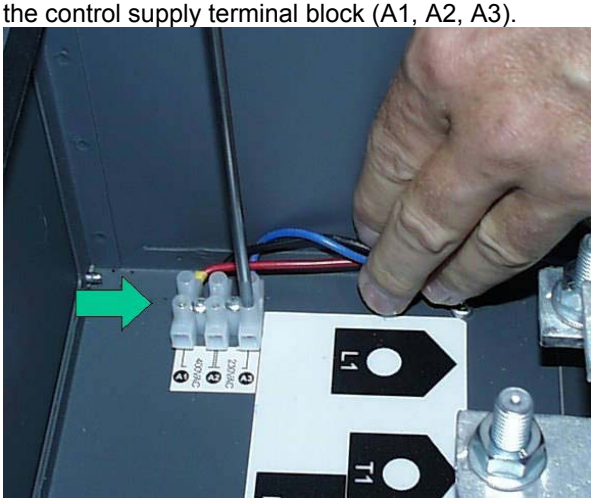
Disconnect the white wires (2) from the rectifier.



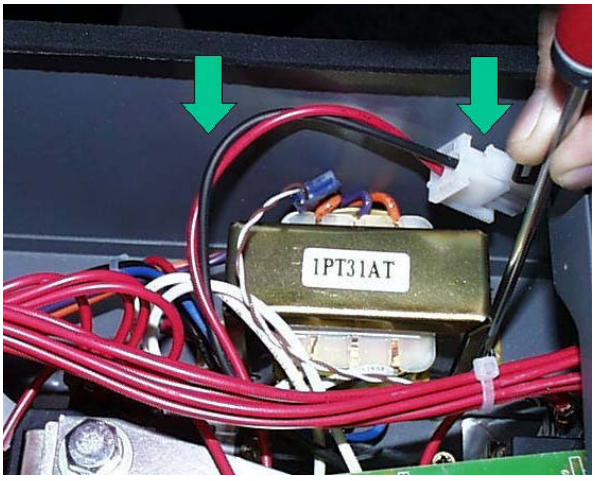

**Step 4.** Slide/lift the plastic firing loom connector block clear of the chassis. Cut the wiring (orange, purple, orange, green/yellow) running from the power transformer to the plastic firing loom connector block. Crimp terminals are supplied with the new PT to reconnect these wires.



**Step 5.** Disconnect the wiring (red, black, blue) from the control supply terminal block (A1, A2, A3).




**Step 6.** Undo the fixing bolts (2) securing the power transformer and earth wire to the chassis. Remove the PT.

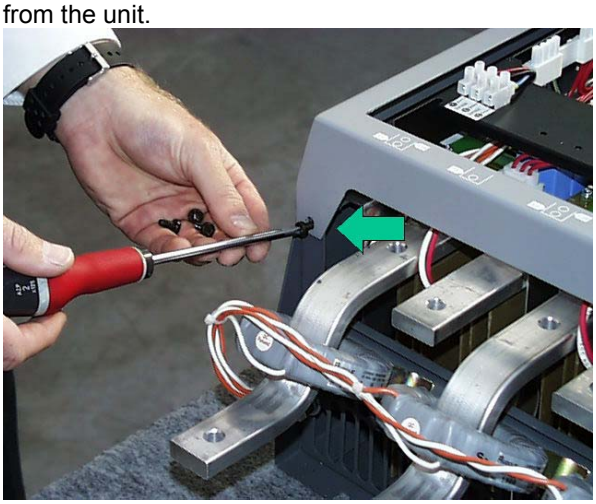



**Step 7.** Fit new power transformer in reverse order.

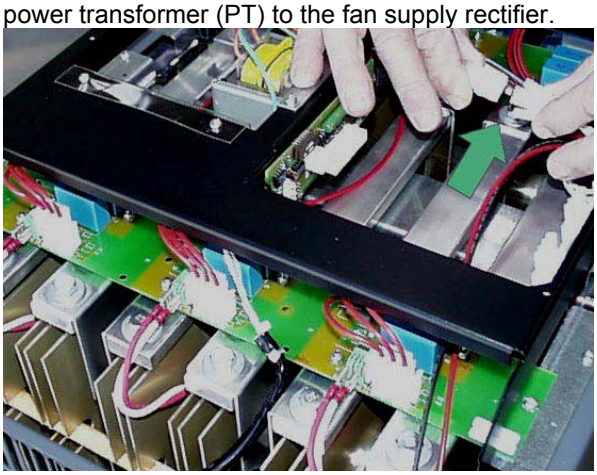
## Power Transformer: ASA-0405 ~ ASA-0897

**Step 1.** Remove the Control Module using the method described on page 17.

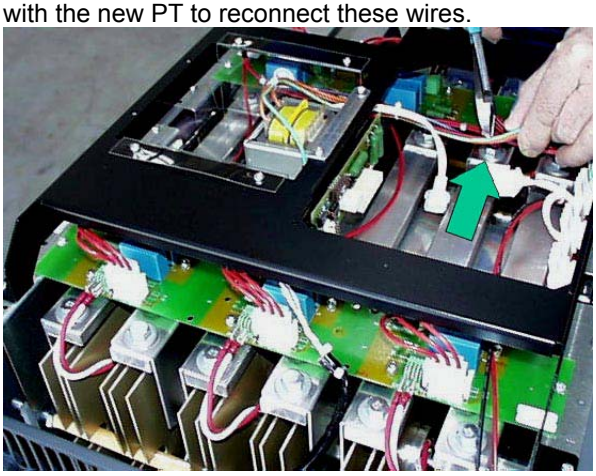
**Step 2.** Undo the front cover fixing screws (4) and lift from the unit.



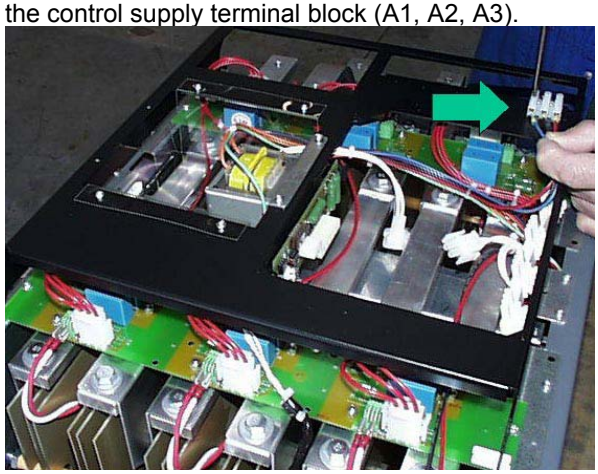
**Step 3.** Unplug the white wires (2) running from the power transformer (PT) to the fan supply rectifier.



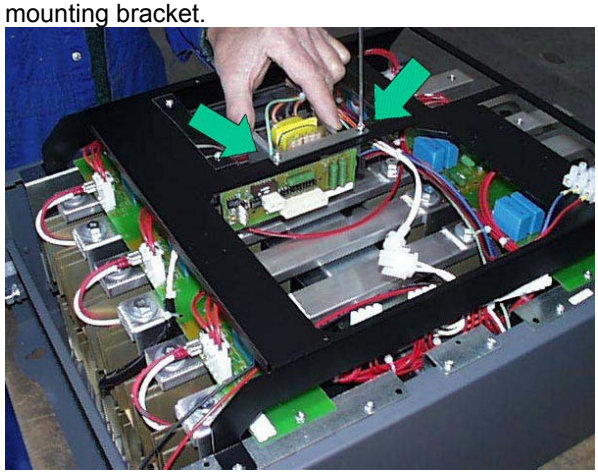
**Step 4.** Cut the wiring (orange, purple, orange, green/yellow) running from the PT to the plastic firing loom connector block. Crimp terminals are supplied with the new PT to reconnect these wires.



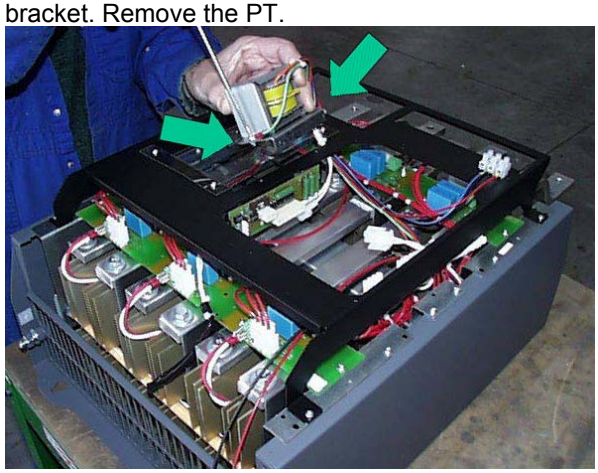
**Step 5.** Disconnect the wiring (red, black, blue) from the control supply terminal block (A1, A2, A3).



**Step 6.** Undo the fixing screws (2) securing the power transformer mounting bracket to the control module mounting bracket.



**Step 7.** Undo the fixing screws (2) securing the power transformer and earth wire to the PT mounting bracket. Remove the PT.

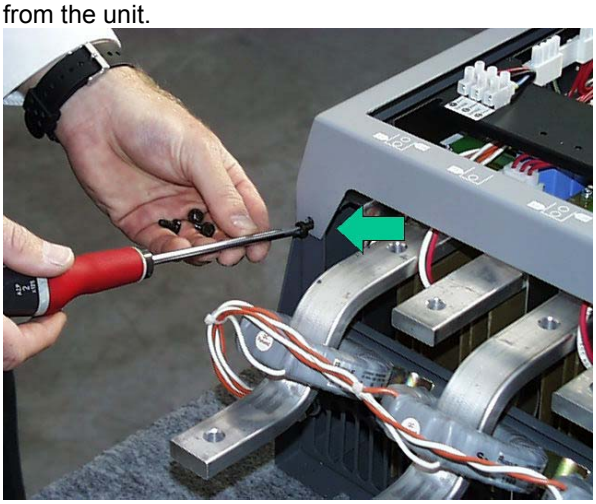


**Step 8.** Fit new power transformer in reverse order.

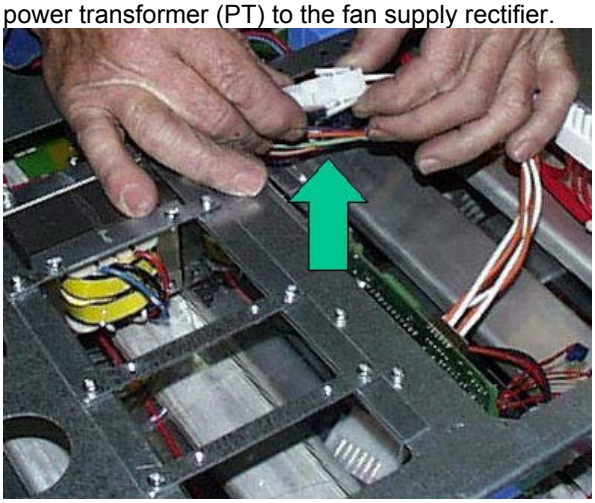
## Power Transformer: ASA-1153 ~ ASA-1574

**Step 1.** Remove the Control Module using the method described on page 17.

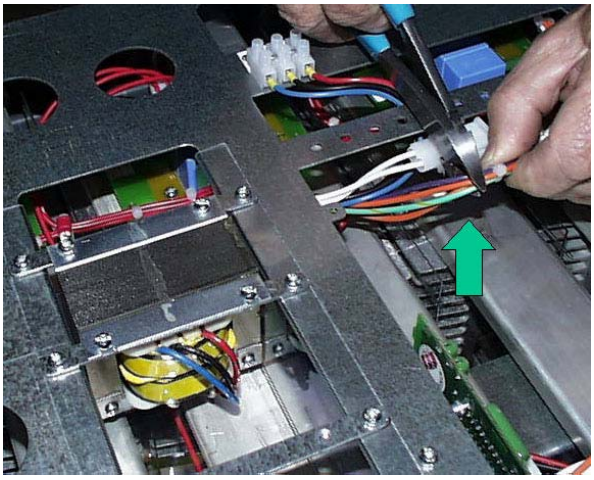
**Step 2.** Undo the front cover fixing screws (4) and lift from the unit.



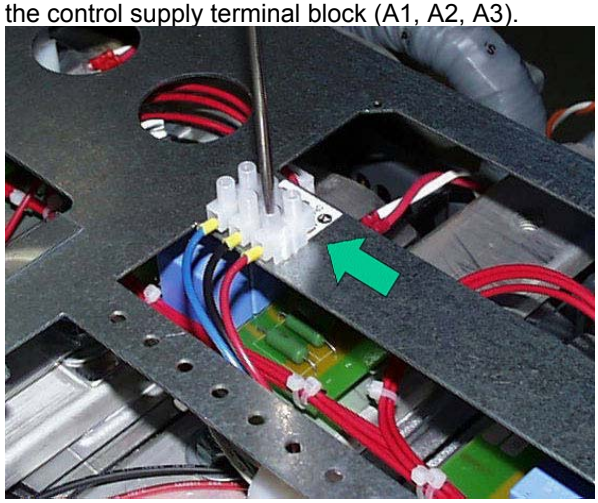
**Step 3.** Unplug the white wires (2) running from the power transformer (PT) to the fan supply rectifier.



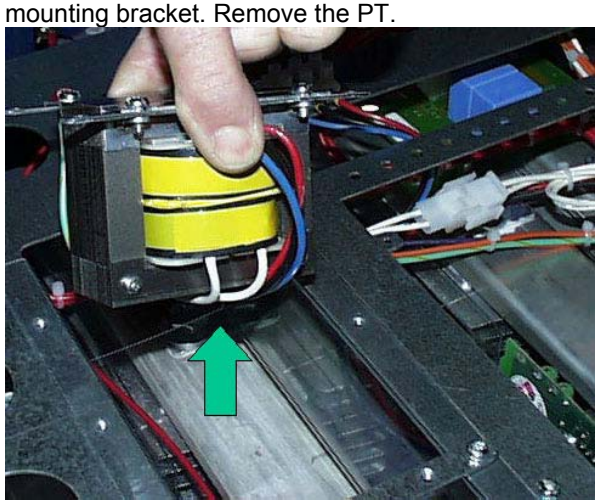
**Step 4.** Cut the wiring (orange, purple, orange) running from the PT to the plastic firing loom connector block. Do not cut the green/yellow earth wire. Crimp terminals are supplied with the new PT to reconnect these wires.



**Step 5.** Disconnect the wiring (red, black, blue) from the control supply terminal block (A1, A2, A3).

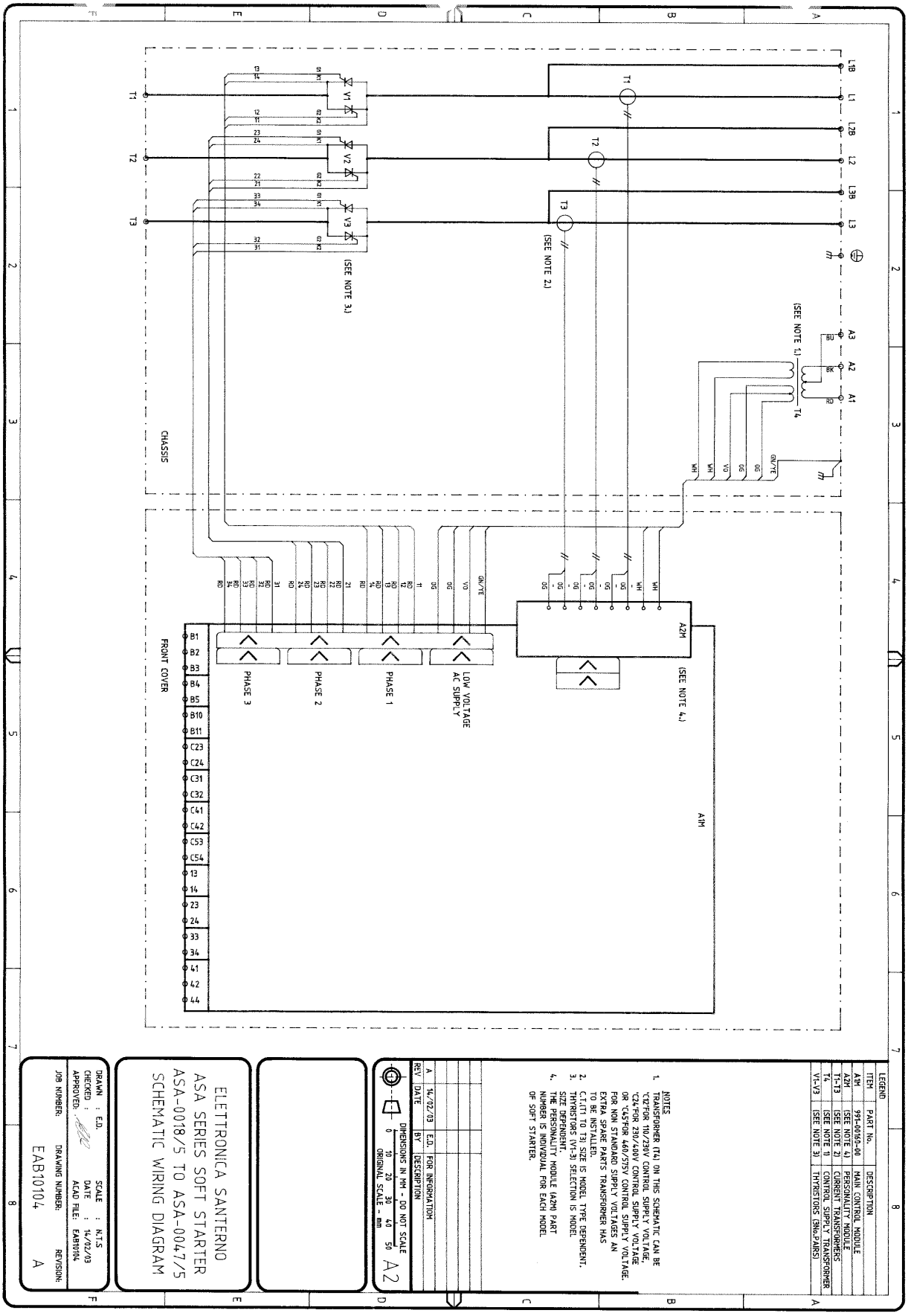


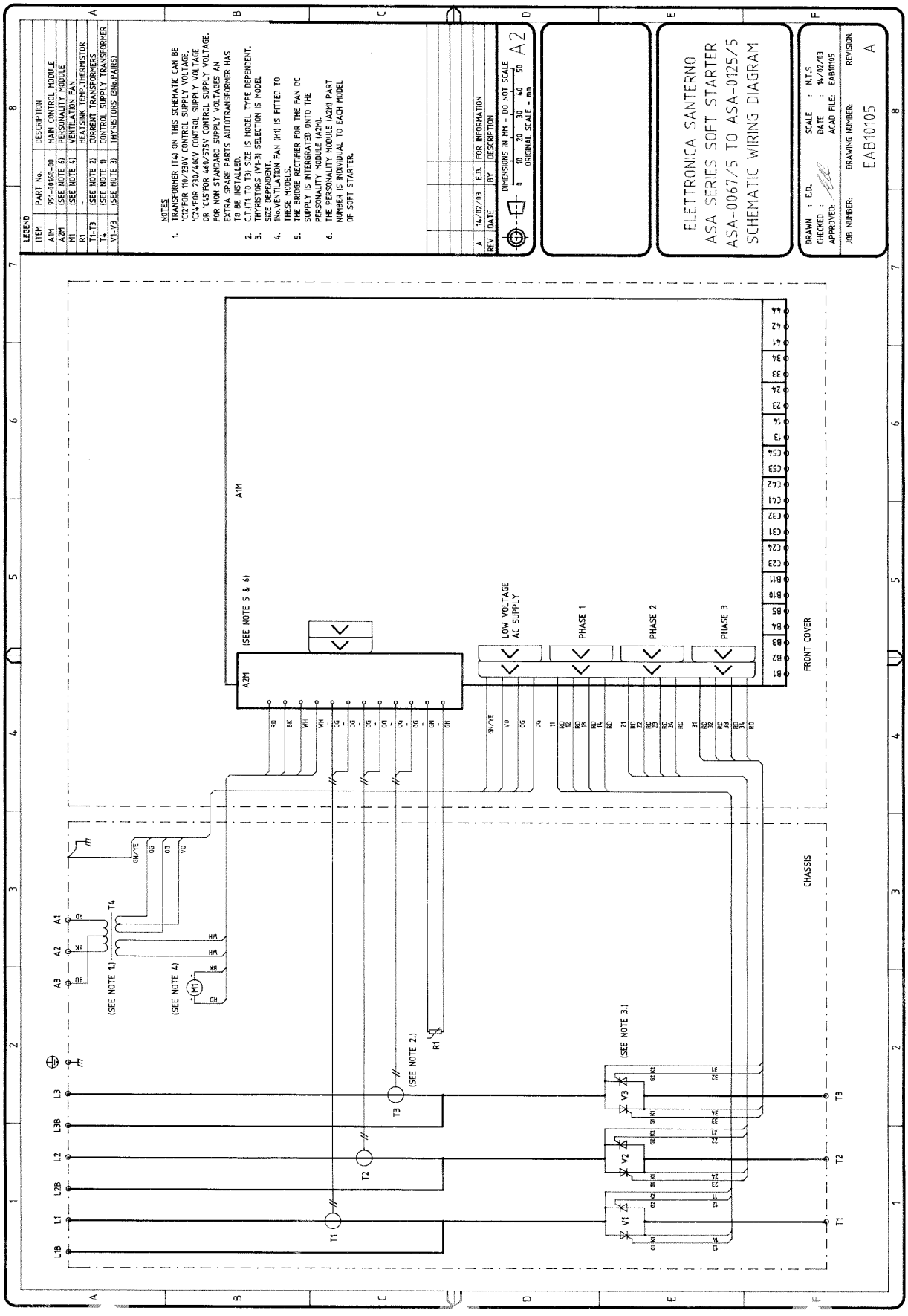
**Step 6.** Undo the fixing screws (5) securing the power transformer and earth wire to the control module mounting bracket. Remove the PT.

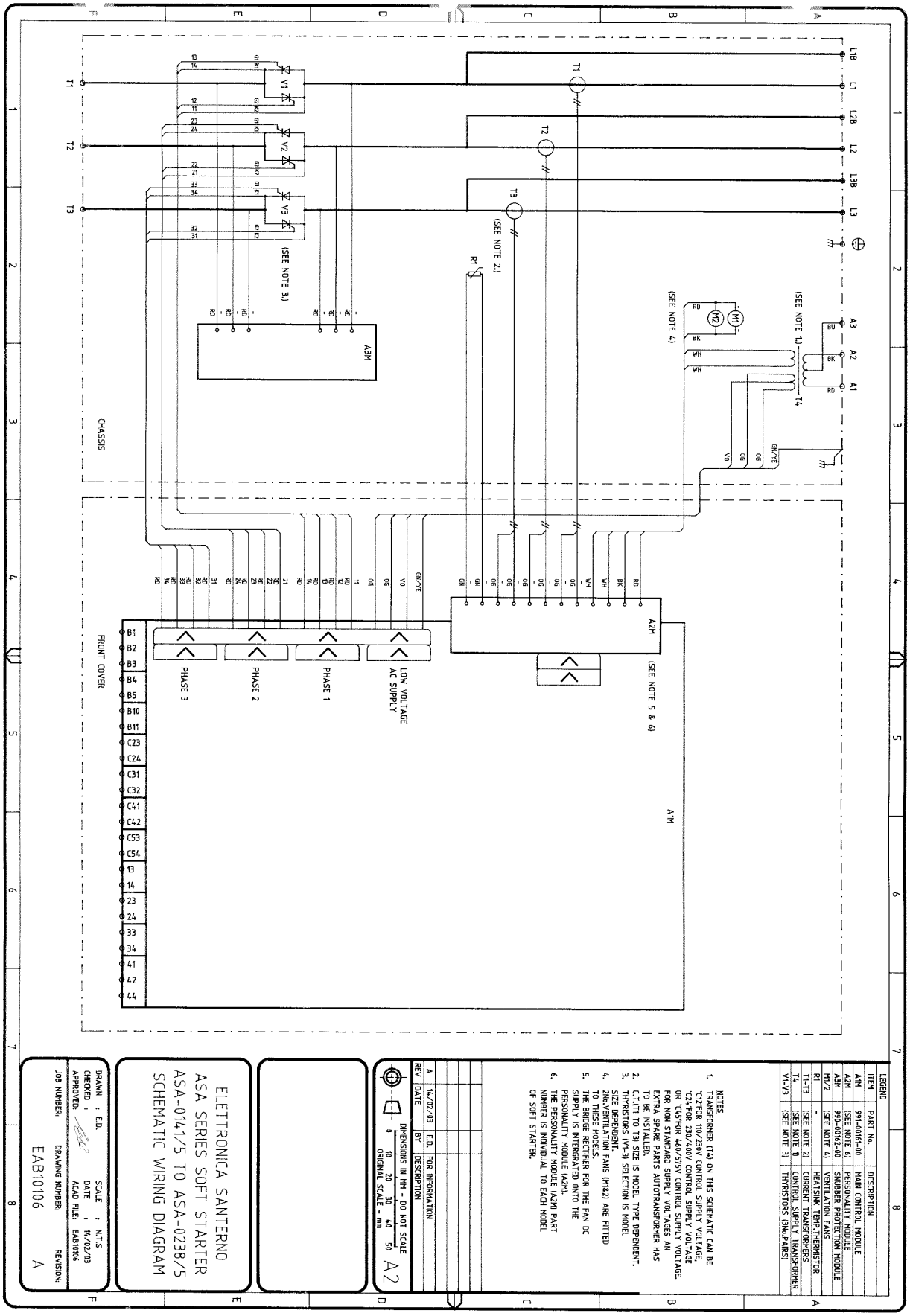


**Step 7.** Fit new power transformer in reverse order.

## ■ Schematics


ELETTRONICA SANTERNO
ASA SERIES SOFT STARTER
ASA-0018/5 TO ASA-0047/5
SCHEMATIC WIRING DIAGRAM
EAB10104
A
NOTES
1. TRANSFORMER (T4) ON THIS SCHEMATIC CAN BE 'CE'FOR 110/230V CONTROL SUPPLY VOLTAGE, 'C24'FOR 230/400V CONTROL SUPPLY VOLTAGE OR 'C45'FOR 460/575V CONTROL SUPPLY VOLTAGE. FOR NON STANDARD SUPPLY VOLTAGES AN EXTRA SPARE PARTS TRANSFORMER HAS TO BE INSTALLED.
2. C.T.(T1 TO T3) SIZE IS MODEL TYPE DEPENDENT.
3. THYRISTORS (V1-3) SELECTION IS MODEL SIZE DEPENDENT.
4. THE PERSONALITY MODULE (A2M) PART NUMBER IS INDIVIDUAL FOR EACH MODEL OF SOFT STARTER.
LEGEND
ITEM | PART No. | DESCRIPTION
A1M | 99I-00161-00 | MAIN CONTROL MODULE
A2M | (SEE NOTE 4) | PERSONALITY MODULE
T1-T3 | (SEE NOTE 2) | CURRENT TRANSFORMERS
T4 | (SEE NOTE 1) | CONTROL SUPPLY TRANSFORMER
V1-V3 | (SEE NOTE 3) | THYRISTORS (3No.PAIRS)
REV | DATE | BY | DESCRIPTION
A | 14/02/03 | E.D. | FOR INFORMATION
DIMENSIONS IN MM - DO NOT SCALE
ORIGINAL SCALE - mm
A2
DRAWN : E.D.
CHECKED :
APPROVED :
SCALE : N.T.S
DATE : 14/02/03
ACAD FILE: EAB10104
JOB NUMBER:
DRAWING NUMBER:
REVISION:
CHASSIS
FRONT COVER
A1M
A2M
(SEE NOTE 1.)
(SEE NOTE 2.)
(SEE NOTE 3.)
(SEE NOTE 4.)
PHASE 1
PHASE 2
PHASE 3
LOW VOLTAGE AC SUPPLY


ELETTRONICA SANTERNO
ASA SERIES SOFT STARTER
ASA-0067/5 TO ASA-0125/5
SCHEMATIC WIRING DIAGRAM
LEGEND
ITEM | PART No. | DESCRIPTION
A1M | 991-00169-00 | MAIN CONTROL MODULE
A2M | (SEE NOTE 6) | PERSONALITY MODULE
M1 | (SEE NOTE 4) | VENTILATION FAN
R1 | - | HEATSINK TEMP.THERMISTOR
T1-T3 | (SEE NOTE 2) | CURRENT TRANSFORMERS
T4 | (SEE NOTE 1) | CONTROL SUPPLY TRANSFORMER
V1-V3 | (SEE NOTE 3) | THYRISTORS (3No.PAIRS)
NOTES
1. TRANSFORMER (T4) ON THIS SCHEMATIC CAN BE 'C12'FOR 110/230V CONTROL SUPPLY VOLTAGE, 'C24'FOR 230/400V CONTROL SUPPLY VOLTAGE OR 'C45'FOR 460/575V CONTROL SUPPLY VOLTAGE. FOR NON STANDARD SUPPLY VOLTAGES AN EXTRA SPARE PARTS AUTOTRANSFORMER HAS TO BE INSTALLED.
2. C.T.(T1 TO T3) SIZE IS MODEL TYPE DEPENDENT.
3. THYRISTORS (V1-3) SELECTION IS MODEL SIZE DEPENDENT.
4. No.VENTILATION FAN (M1) IS FITTED TO THESE MODELS.
5. THE BRIDGE RECTIFIER FOR THE FAN DC SUPPLY IS INTEGRATED ONTO THE PERSONALITY MODULE (A2M).
6. THE PERSONALITY MODULE (A2M) PART NUMBER IS INDIVIDUAL TO EACH MODEL OF SOFT STARTER.
REV | DATE | BY | DESCRIPTION
A | 14/02/03 | E.D. | FOR INFORMATION
DIMENSIONS IN MM - DO NOT SCALE
ORIGINAL SCALE - mm
A2
DRAWN : E.D.
CHECKED :
APPROVED :
SCALE : N.T.S
DATE : 14/02/03
ACAD FILE: EAB10105
JOB NUMBER:
DRAWING NUMBER: EAB10105
REVISION: A
A1M
A2M
(SEE NOTE 5 & 6)
LOW VOLTAGE AC SUPPLY
PHASE 1
PHASE 2
PHASE 3
FRONT COVER
CHASSIS
(SEE NOTE 1.)
(SEE NOTE 4)
(SEE NOTE 2.)
(SEE NOTE 3.)
T4
R1
T1
T2
T3
V1
V2
V3
L1B
L1
L2B
L2
L3B
L3




| ITEM | PART No. | DESCRIPTION |
|---|---|---|
| A1M | 991-00165-00 | MAIN CONTROL MODULE |
| A2M | (SEE NOTE 6) | PERSONALITY MODULE |
| A3M | 990-00152-00 | SNUBBER PROTECTION MODULE |
| M1/2 | (SEE NOTE 4) | VENTILATION FANS |
| R1 | - | HEATSINK TEMP.THERMISTOR |
| T1-T3 | (SEE NOTE 2) | CURRENT TRANSFORMERS |
| T4 | (SEE NOTE 1) | CONTROL SUPPLY TRANSFORMER |
| V1-V3 | (SEE NOTE 3) | THYRISTORS (1No.PAIR) |

NOTES

1. TRANSFORMER (T4) ON THIS SCHEMATIC CAN BE 'C12'FOR 110/230V CONTROL SUPPLY VOLTAGE, 'C24'FOR 230/400V CONTROL SUPPLY VOLTAGE OR 'C45'FOR 460/575V CONTROL SUPPLY VOLTAGE. FOR NON STANDARD SUPPLY VOLTAGES AN EXTRA SPARE PARTS AUTOTRANSFORMER HAS TO BE INSTALLED.
2. C.T.(T1 TO T3) SIZE IS MODEL TYPE DEPENDENT.
3. THYRISTORS (V1-3) SELECTION IS MODEL SIZE DEPENDENT.
4. 2No.VENTILATION FANS (M1&2) ARE FITTED TO THESE MODELS.
5. THE BRIDGE RECTIFIER FOR THE FAN DC SUPPLY IS INTERGRATED ONTO THE PERSONALITY MODULE (A2M).
6. THE PERSONALITY MODULE (A2M) PART NUMBER IS INDIVIDUAL TO EACH MODEL OF SOFT STARTER.

| REV. | DATE | BY | DESCRIPTION |
|---|---|---|---|
| A | 14/02/03 | E.D. | FOR INFORMATION |

DIMENSIONS IN MM - DO NOT SCALE
0 10 20 30 40 50
ORIGINAL SCALE - mm
A2

ELETTRONICA SANTERNO
ASA SERIES SOFT STARTER
ASA-0141/5 TO ASA-0238/5
SCHEMATIC WIRING DIAGRAM

DRAWN : E.D. SCALE : N.T.S
CHECKED : DATE : 14/02/03
APPROVED: ACAD FILE: EAB10106
JOB NUMBER: DRAWING NUMBER: REVISION:
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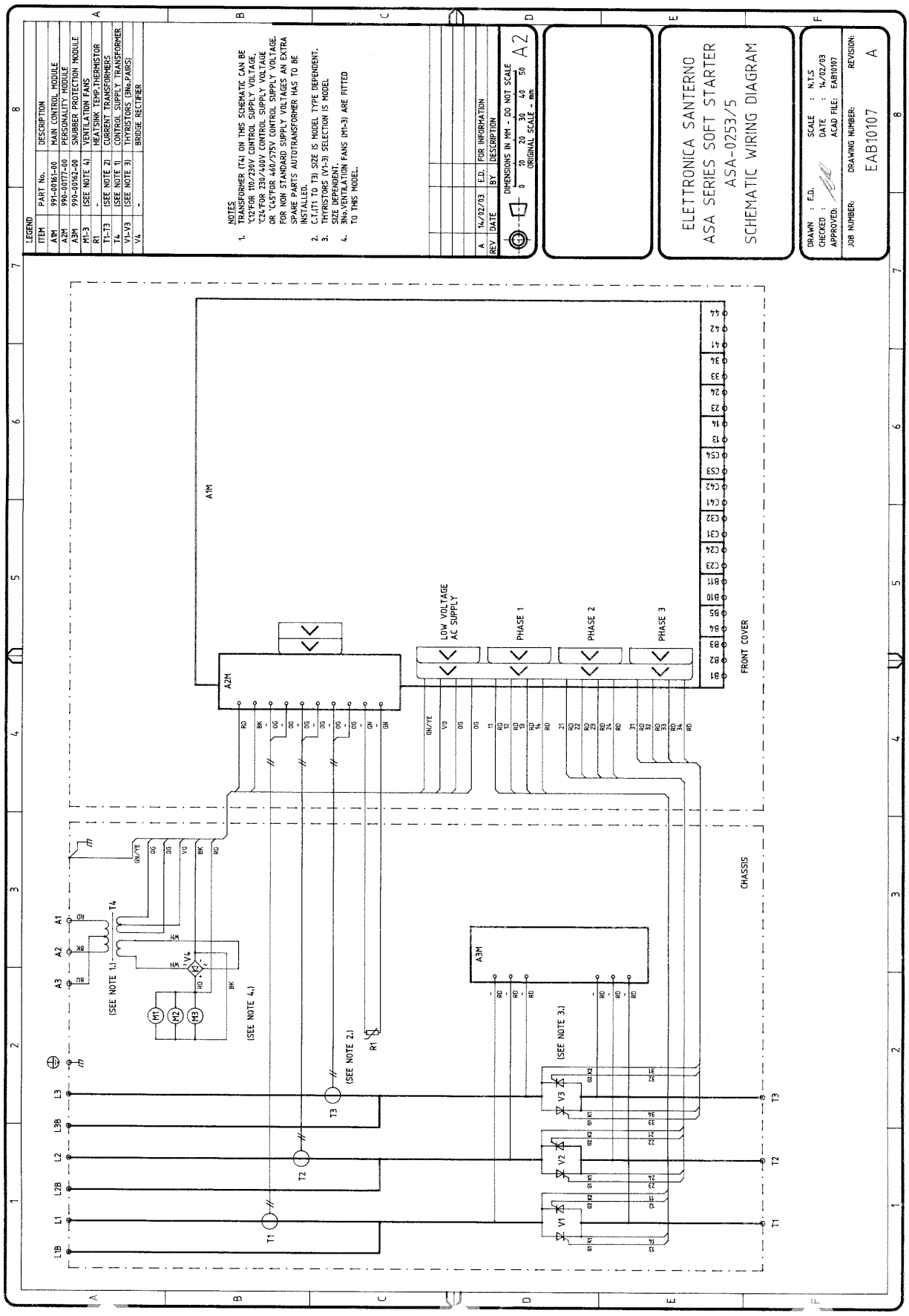
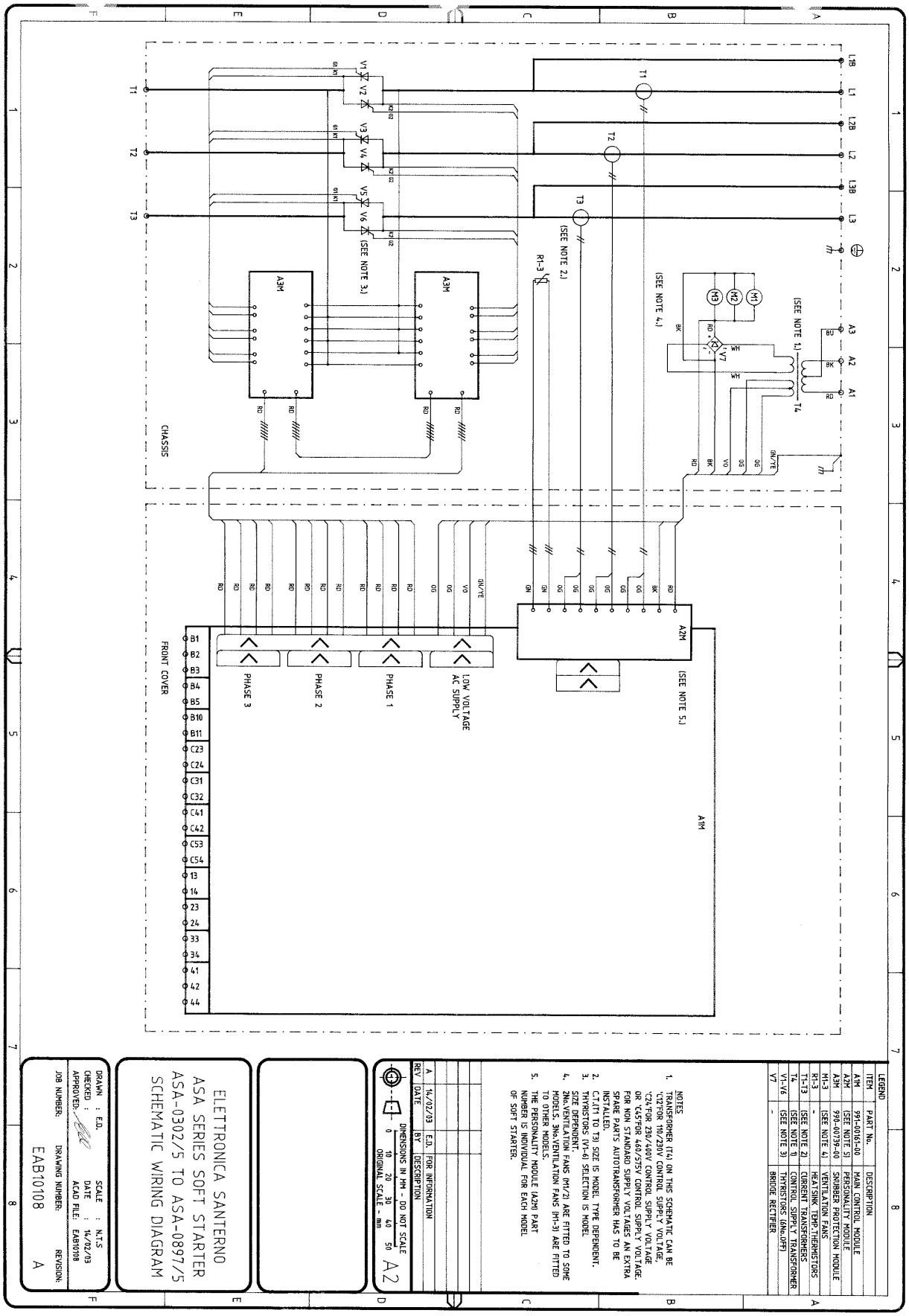
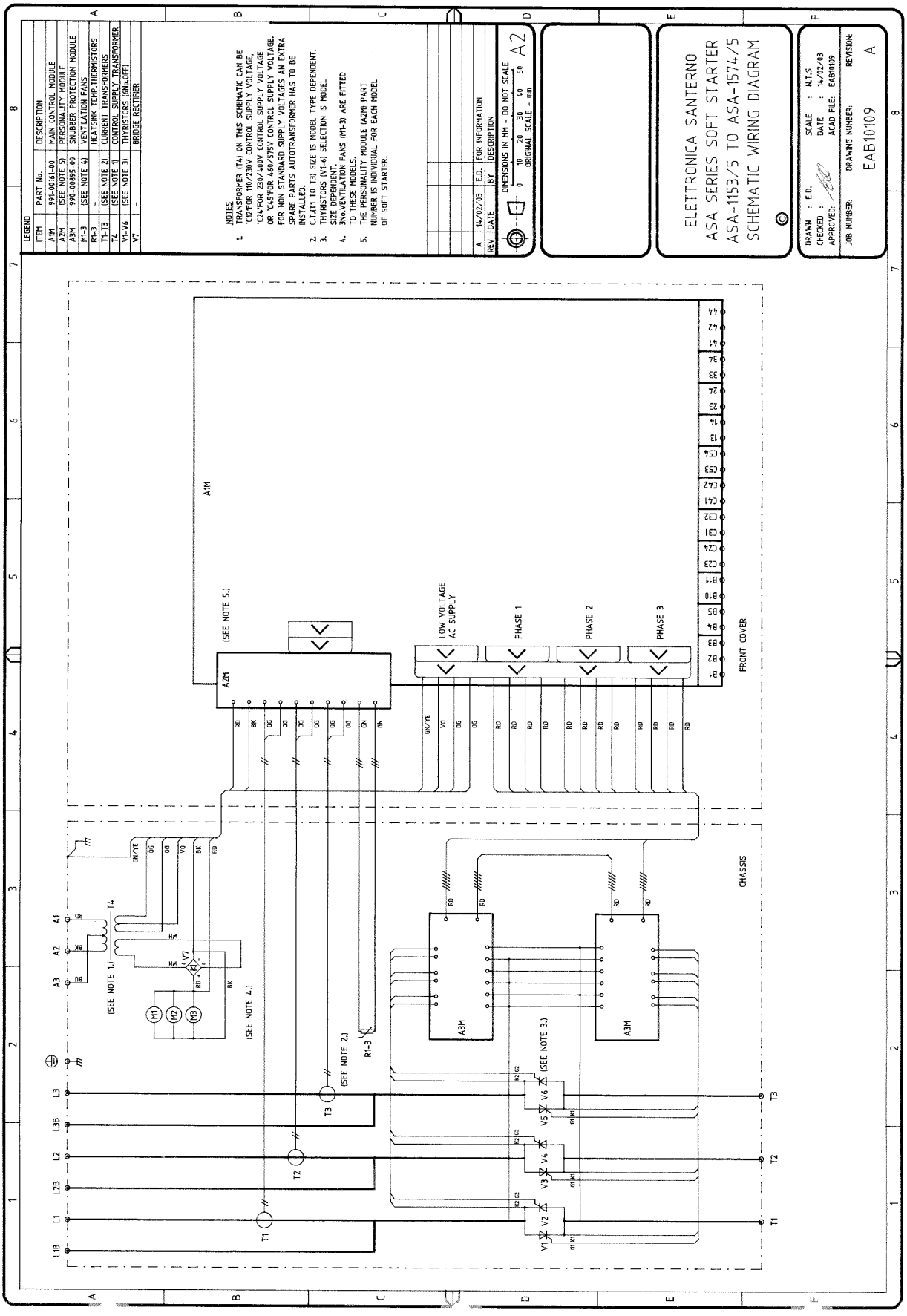
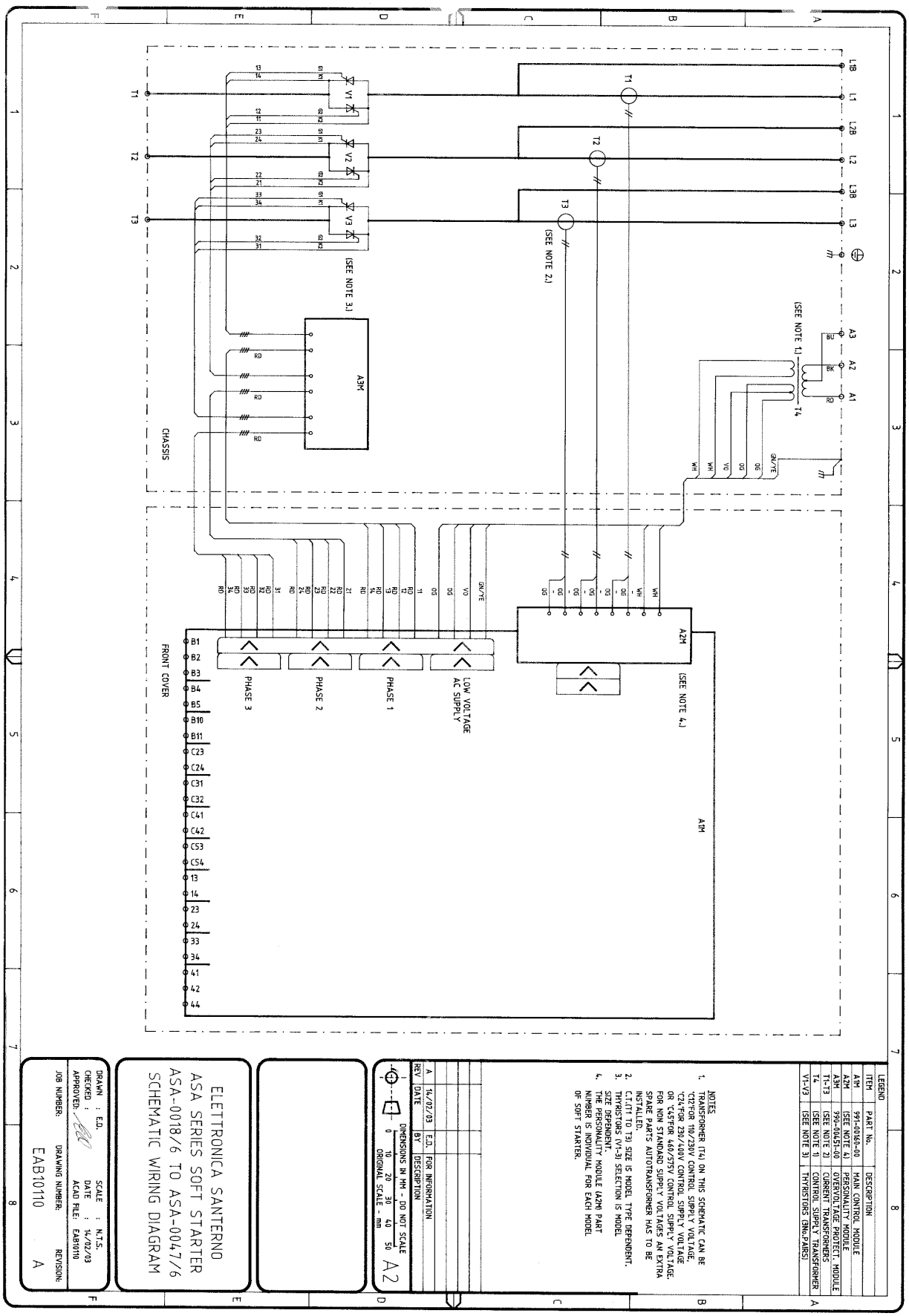
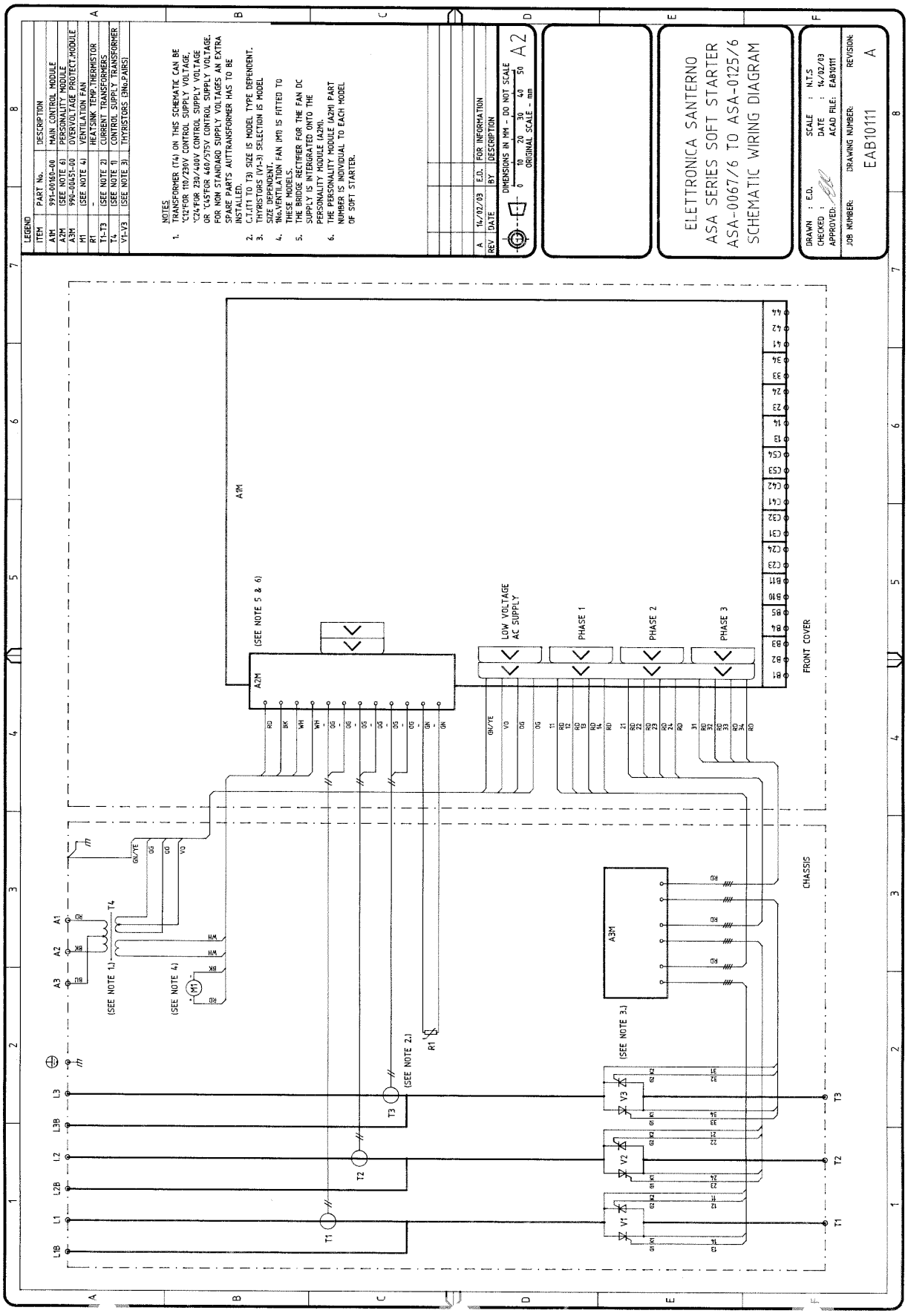
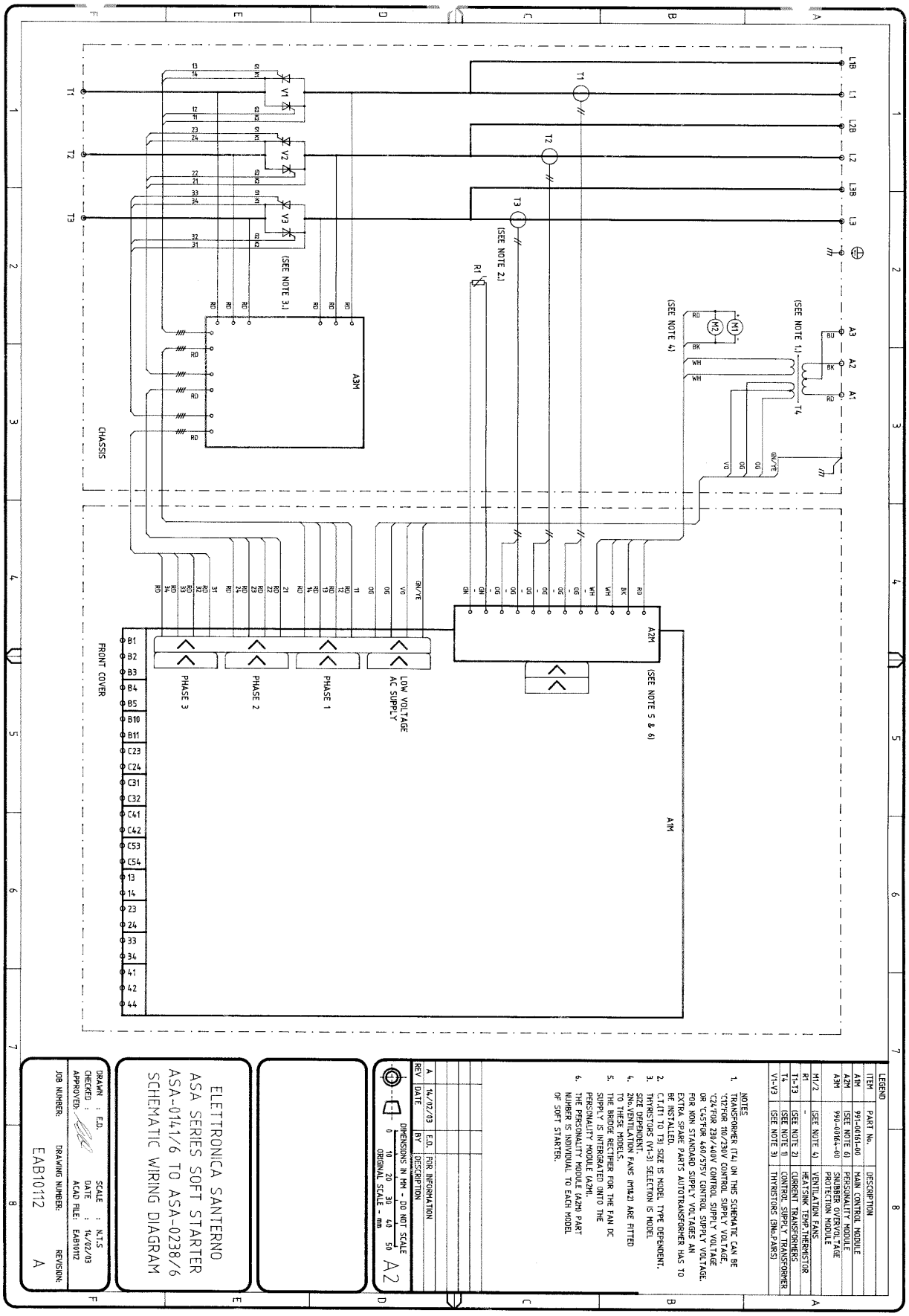

LEGEND
ITEM | PART No. | DESCRIPTION
A1M | 991-00161-00 | MAIN CONTROL MODULE
A2M | 990-00177-00 | PERSONALITY MODULE
A3M | 990-00162-00 | SNUBBER PROTECTION MODULE
M1-3 | (SEE NOTE 4.) | VENTILATION FANS
R1 | - | HEATSINK TEMP THERMISTOR
T1-T3 | (SEE NOTE 2) | CURRENT TRANSFORMERS
T4 | (SEE NOTE 1) | CONTROL SUPPLY TRANSFORMER
V1-V3 | (SEE NOTE 3) | THYRISTORS (2No.P.AIRS)
V4 | - | BRIDGE RECTIFIER
NOTES
1. TRANSFORMER (T4) ON THIS SCHEMATIC CAN BE 'C12'FOR 110/230V CONTROL SUPPLY VOLTAGE. 'C24'FOR 230/400V CONTROL SUPPLY VOLTAGE OR 'C45'FOR 440/575V CONTROL SUPPLY VOLTAGE. FOR NON STANDARD SUPPLY VOLTAGES AN EXTRA SPARE PARTS AUTOTRANSFORMER HAS TO BE INSTALLED.
2. C.T.(T1 TO T3) SIZE IS MODEL TYPE DEPENDENT.
3. THYRISTORS (V1-3) SELECTION IS MODEL SIZE DEPENDENT.
4. 3No.VENTILATION FANS (M1-3) ARE FITTED TO THIS MODEL.
REV | DATE | BY | DESCRIPTION
A | 14/02/03 | E.D. | FOR INFORMATION
DIMENSIONS IN MM - DO NOT SCALE
ORIGINAL SCALE - mm
A2
ELETTRONICA SANTERNO
ASA SERIES SOFT STARTER
ASA-0253/5
SCHEMATIC WIRING DIAGRAM
DRAWN : E.D.
CHECKED :
APPROVED:
SCALE : N.T.S
DATE : 14/02/03
ACAD FILE: EAB10107
JOB NUMBER:
DRAWING NUMBER: EAB10107
REVISION: A
A1M
A2M
A3M
LOW VOLTAGE AC SUPPLY
PHASE 1
PHASE 2
PHASE 3
FRONT COVER
CHASSIS
(SEE NOTE 1.)
(SEE NOTE 2.)
(SEE NOTE 3.)
(SEE NOTE 4.)
T1
T2
T3
T4
V1
V2
V3
V4
R1
M1
M2
M3
L1
L1B
L2
L2B
L3
L3B

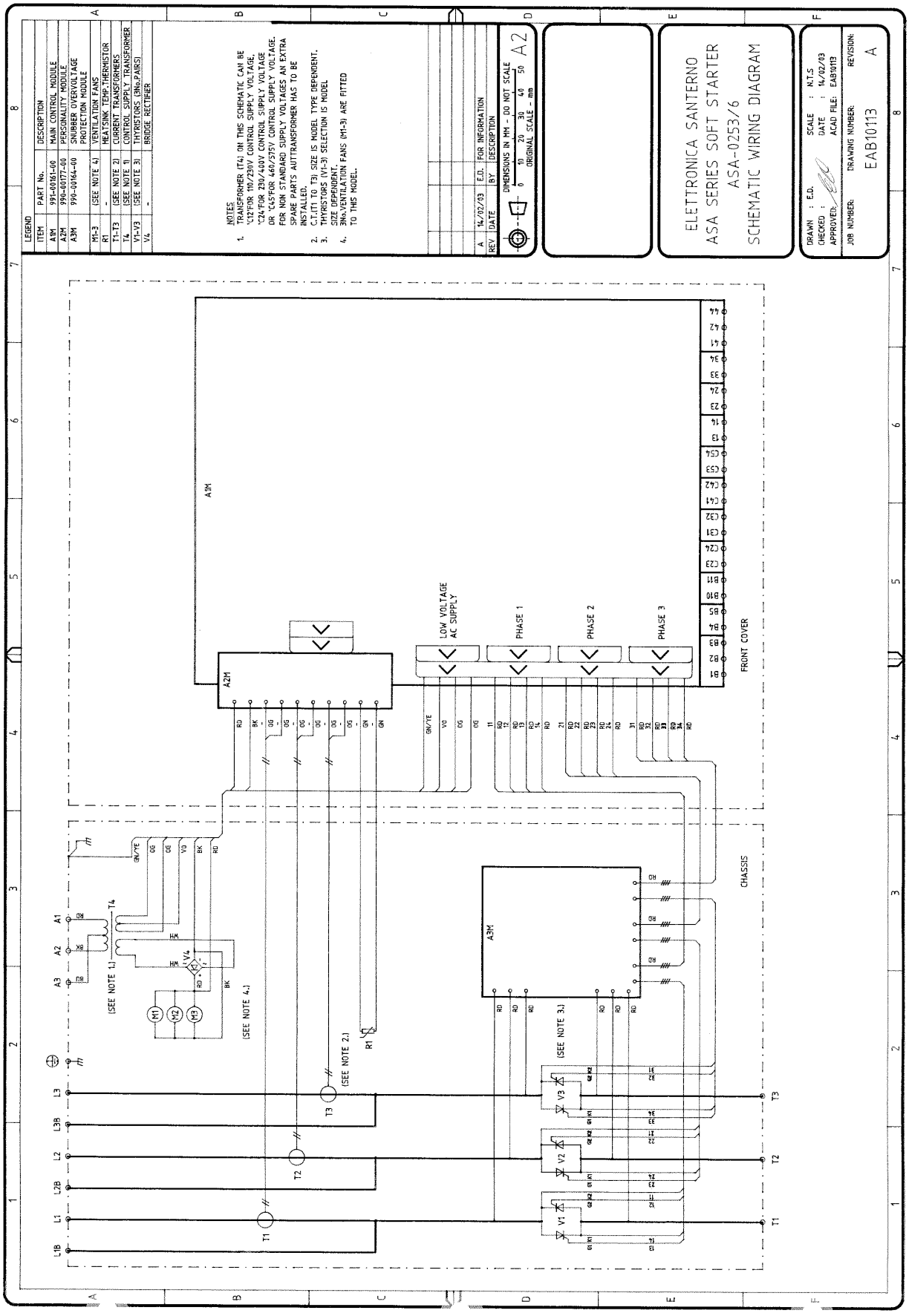

L1B L1 L2B L2 L3B L3
T1 T2 T3
V1 V2 V3 V4 V5 V6 (SEE NOTE 3.)
R1-3 (SEE NOTE 2.)
(SEE NOTE 4.)
M1 M2 M3
V7
(SEE NOTE 1.)
A3 A2 A1
T4
A3M
CHASSIS
A2M
(SEE NOTE 5.)
A1M
FRONT COVER
B1 B2 B3 B4 B5 B10 B11 C23 C24 C31 C32 C41 C42 C53 C54 13 14 23 24 33 34 41 42 44
PHASE 3
PHASE 2
PHASE 1
LOW VOLTAGE AC SUPPLY
NOTES
1. TRANSFORMER (T4) ON THIS SCHEMATIC CAN BE 'C12'FOR 110/230V CONTROL SUPPLY VOLTAGE, 'C24'FOR 230/400V CONTROL SUPPLY VOLTAGE OR 'C45'FOR 460/575V CONTROL SUPPLY VOLTAGE. FOR NON STANDARD SUPPLY VOLTAGES AN EXTRA SPARE PARTS AUTOTRANSFORMER HAS TO BE INSTALLED.
2. C.T.(T1 TO T3) SIZE IS MODEL TYPE DEPENDENT.
3. THYRISTORS (V1-6) SELECTION IS MODEL SIZE DEPENDENT.
4. 2No.VENTILATION FANS (M1/2) ARE FITTED TO SOME MODELS. 3No.VENTILATION FANS (M1-3) ARE FITTED TO OTHER MODELS.
5. THE PERSONALITY MODULE (A2M) PART NUMBER IS INDIVIDUAL FOR EACH MODEL OF SOFT STARTER.
LEGEND
ITEM | PART No. | DESCRIPTION
A1M | 999-00161-00 | MAIN CONTROL MODULE
A2M | (SEE NOTE 5) | PERSONALITY MODULE
A3M | 999-00739-00 | SNUBBER PROTECTION MODULE
M1-3 | (SEE NOTE 4) | VENTILATION FANS
R1-3 | - | HEATSINK TEMP.THERMISTORS
T1-T3 | (SEE NOTE 2) | CURRENT TRANSFORMERS
T4 | (SEE NOTE 1) | CONTROL SUPPLY TRANSFORMER
V1-V6 | (SEE NOTE 3) | THYRISTORS (6No.OFF)
V7 | - | BRIDGE RECTIFIER
REV. | DATE | BY | DESCRIPTION
A | 14/02/03 | E.D. | FOR INFORMATION
DIMENSIONS IN MM - DO NOT SCALE
0 10 20 30 40 50
ORIGINAL SCALE - mm
A2
ELETTRONICA SANTERNO
ASA SERIES SOFT STARTER
ASA-0302/5 TO ASA-0897/5
SCHEMATIC WIRING DIAGRAM
DRAWN : E.D.
CHECKED :
APPROVED:
SCALE : N.T.S
DATE : 14/02/03
ACAD FILE: EAB10108
JOB NUMBER: EAB10108
DRAWING NUMBER:
REVISION: A

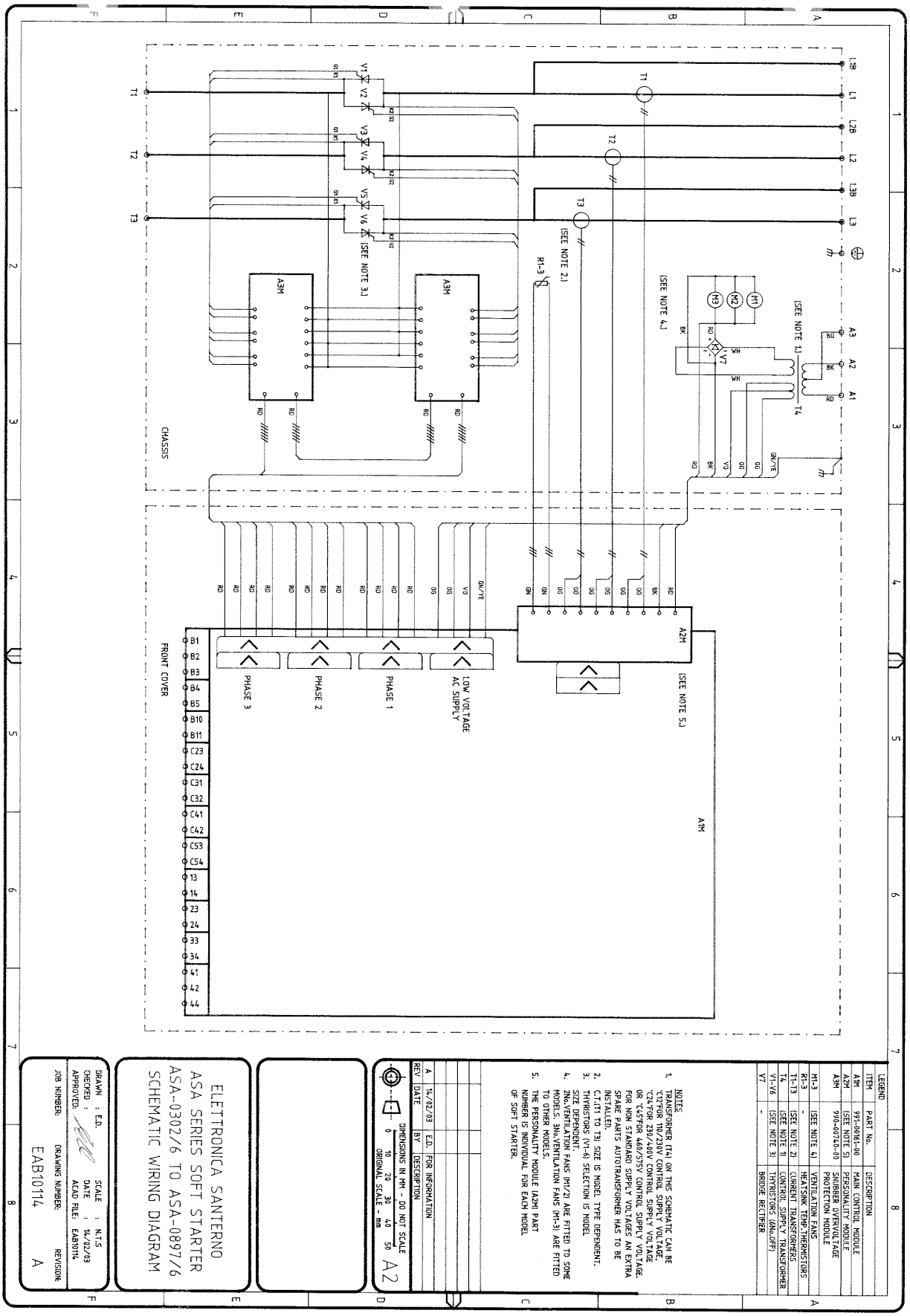

ELETTRONICA SANTERNO
ASA SERIES SOFT STARTER
ASA-1153/5 TO ASA-1574/5
SCHEMATIC WIRING DIAGRAM
DRAWN : E.D.
CHECKED :
APPROVED:
SCALE : N.T.S
DATE : 14/02/03
ACAD FILE: EAB10109
JOB NUMBER:
DRAWING NUMBER: EAB10109
REVISION: A
LEGEND
ITEM PART No. DESCRIPTION
A1M 991-00161-00 MAIN CONTROL MODULE
A2M (SEE NOTE 5) PERSONALITY MODULE
A3M 990-00895-00 SNUBBER PROTECTION MODULE
M1-3 (SEE NOTE 4) VENTILATION FANS
R1-3 - HEATSINK TEMP.THERMISTORS
T1-T3 (SEE NOTE 2) CURRENT TRANSFORMERS
T4 (SEE NOTE 1) CONTROL SUPPLY TRANSFORMER
V1-V6 (SEE NOTE 3) THYRISTORS (6No.OFF)
V7 - BRIDGE RECTIFIER
NOTES
1. TRANSFORMER (T4) ON THIS SCHEMATIC CAN BE 'C12'FOR 110/230V CONTROL SUPPLY VOLTAGE, 'C24'FOR 230/400V CONTROL SUPPLY VOLTAGE OR 'C45'FOR 460/575V CONTROL SUPPLY VOLTAGE. FOR NON STANDARD SUPPLY VOLTAGES AN EXTRA SPARE PARTS AUTOTRANSFORMER HAS TO BE INSTALLED.
2. C.T.(T1 TO T3) SIZE IS MODEL TYPE DEPENDENT.
3. THYRISTORS (V1-6) SELECTION IS MODEL SIZE DEPENDENT.
4. 3No.VENTILATION FANS (M1-3) ARE FITTED TO THESE MODELS.
5. THE PERSONALITY MODULE (A2M) PART NUMBER IS INDIVIDUAL FOR EACH MODEL OF SOFT STARTER.
A 14/02/03 E.D. FOR INFORMATION
REV DATE BY DESCRIPTION
DIMENSIONS IN MM - DO NOT SCALE
0 10 20 30 40 50
ORIGINAL SCALE - mm
A2
A1M
A2M
(SEE NOTE 5.)
LOW VOLTAGE AC SUPPLY
PHASE 1
PHASE 2
PHASE 3
FRONT COVER
CHASSIS
A3M
(SEE NOTE 1.)
(SEE NOTE 4.)
(SEE NOTE 2.)
(SEE NOTE 3.)
T4
V7
R1-3
M1
M2
M3
T1
T2
T3
V1
V2
V3
V4
V5
V6
L1
L1B
L2
L2B
L3
L3B

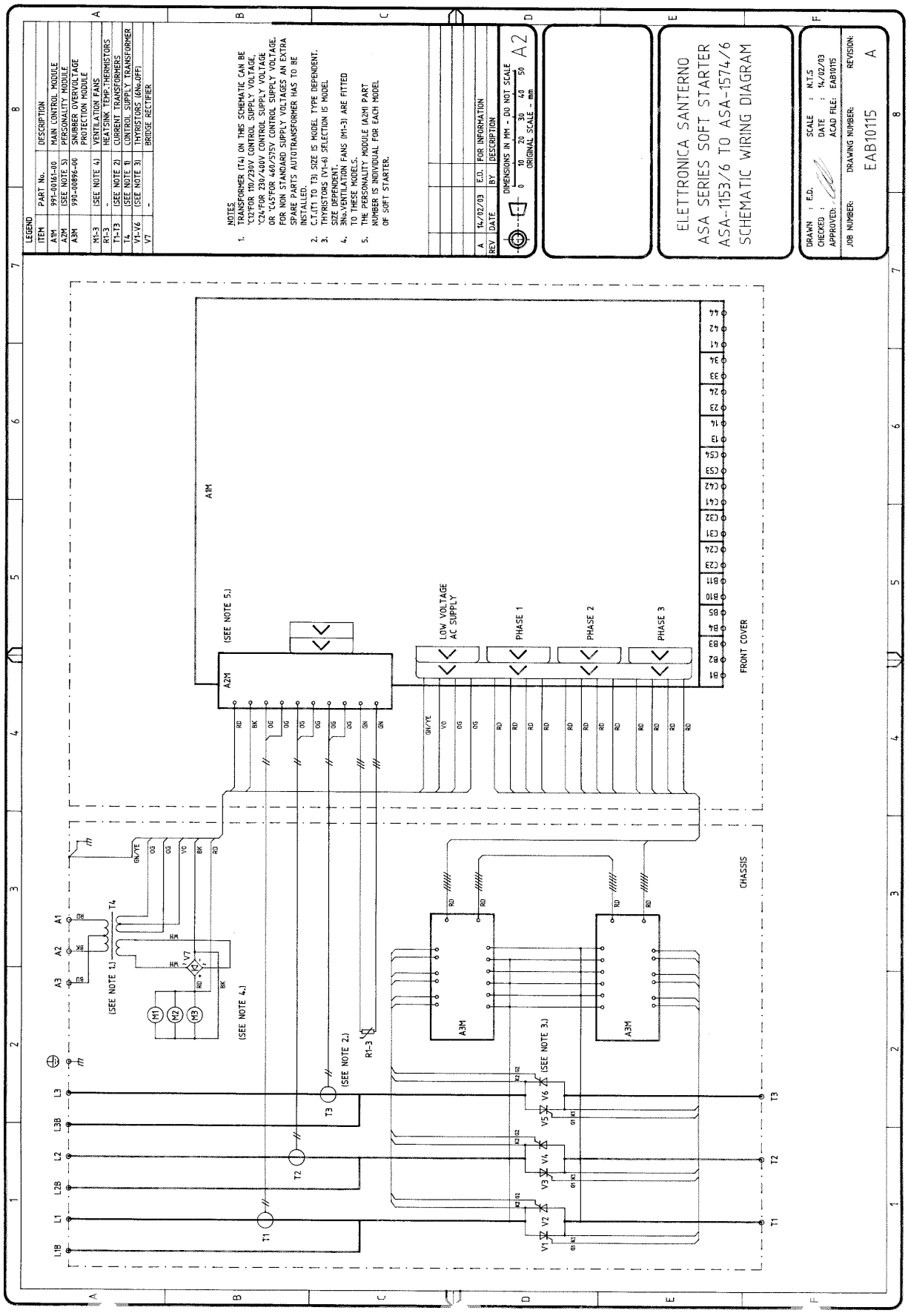

L1B L1 L2B L2 L3B L3
T1 T2 T3
V1 V2 V3
(SEE NOTE 2.)
(SEE NOTE 3.)
(SEE NOTE 1.)
T4
A3 A2 A1
A3M
A2M
A1M
CHASSIS
FRONT COVER
PHASE 3
PHASE 2
PHASE 1
LOW VOLTAGE AC SUPPLY
(SEE NOTE 4.)
B1 B2 B3 B4 B5 B10 B11 C23 C24 C31 C32 C41 C42 C53 C54 13 14 23 24 33 34 41 42 44
NOTES
1. TRANSFORMER (T4) ON THIS SCHEMATIC CAN BE 'C12'FOR 110/230V CONTROL SUPPLY VOLTAGE, 'C24'FOR 230/400V CONTROL SUPPLY VOLTAGE OR 'C45'FOR 460/575V CONTROL SUPPLY VOLTAGE. FOR NON STANDARD SUPPLY VOLTAGES AN EXTRA SPARE PART'S AUTOTRANSFORMER HAS TO BE INSTALLED.
2. C.T.(T1 TO T3) SIZE IS MODEL TYPE DEPENDENT.
3. THYRISTORS (V1÷3) SELECTION IS MODEL SIZE DEPENDENT.
4. THE PERSONALITY MODULE (A2M) PART NUMBER IS INDIVIDUAL FOR EACH MODEL OF SOFT STARTER.
LEGEND
ITEM | PART No. | DESCRIPTION
A1M | 999-60160-00 | MAIN CONTROL MODULE
A2M | (SEE NOTE 4) | PERSONALITY MODULE
A3M | 999-60451-00 | OVERVOLTAGE PROTECT. MODULE
T1-T3 | (SEE NOTE 2) | CURRENT TRANSFORMERS
T4 | (SEE NOTE 1) | CONTROL SUPPLY TRANSFORMER
V1-V3 | (SEE NOTE 3) | THYRISTORS (3No.PAIRS)
REV. | DATE | BY | DESCRIPTION
A | 14/02/03 | E.D. | FOR INFORMATION
DIMENSIONS IN MM - DO NOT SCALE
ORIGINAL SCALE - mm
A2
ELETTRONICA SANTERNO
ASA SERIES SOFT STARTER
ASA-0018/6 TO ASA-0047/6
SCHEMATIC WIRING DIAGRAM
DRAWN : E.D.
CHECKED :
APPROVED :
SCALE : N.T.S.
DATE : 14/02/03
ACAD FILE: EAB10110
JOB NUMBER: EAB10110
DRAWING NUMBER:
REVISION: A


LEGEND
ITEM | PART No. | DESCRIPTION
A1M | 999-00160-00 | MAIN CONTROL MODULE
A2M | (SEE NOTE 6) | PERSONALITY MODULE
A3M | 996-00451-00 | OVERVOLTAGE PROTECT.MODULE
M1 | (SEE NOTE 4) | VENTILATION FAN
R1 | - | HEATSINK TEMP.THERMISTOR
T1-T3 | (SEE NOTE 2) | CURRENT TRANSFORMERS
T4 | (SEE NOTE 1) | CONTROL SUPPLY TRANSFORMER
V1-V3 | (SEE NOTE 3) | THYRISTORS (3No.PAIRS)
NOTES
1. TRANSFORMER (T4) ON THIS SCHEMATIC CAN BE 'C12'FOR 110/230V CONTROL SUPPLY VOLTAGE; 'C24'FOR 230/400V CONTROL SUPPLY VOLTAGE OR 'C45'FOR 460/575V CONTROL SUPPLY VOLTAGE. FOR NON STANDARD SUPPLY VOLTAGES AN EXTRA SPARE PART'S AUTTRANSFORMER HAS TO BE INSTALLED.
2. C.T.(T1 TO T3) SIZE IS MODEL TYPE DEPENDENT.
3. THYRISTORS (V1-3) SELECTION IS MODEL SIZE DEPENDENT.
4. 1No.VENTILATION FAN (M1) IS FITTED TO THESE MODELS.
5. THE BRIDGE RECTIFIER FOR THE FAN DC SUPPLY IS INTERGRATED ONTO THE PERSONALITY MODULE (A2M).
6. THE PERSONALITY MODULE (A2M) PART NUMBER IS INDIVIDUAL TO EACH MODEL OF SOFT STARTER.
A | 14/02/03 | E.D. | FOR INFORMATION
REV | DATE | BY | DESCRIPTION
DIMENSIONS IN MM - DO NOT SCALE
ORIGINAL SCALE - mm
A2
ELETTRONICA SANTERNO
ASA SERIES SOFT STARTER
ASA-0067/6 TO ASA-0125/6
SCHEMATIC WIRING DIAGRAM
DRAWN : E.D.
CHECKED :
APPROVED:
SCALE : N.T.S
DATE : 14/02/03
ACAD FILE: EAB10111
JOB NUMBER:
DRAWING NUMBER: EAB10111
REVISION: A
A1M
A2M
(SEE NOTE 5 & 6)
LOW VOLTAGE AC SUPPLY
PHASE 1
PHASE 2
PHASE 3
FRONT COVER
CHASSIS
A3M
T4
(SEE NOTE 1.)
(SEE NOTE 4)
M1
(SEE NOTE 2.)
R1
(SEE NOTE 3.)
V1
V2
V3
T1
T2
T3
L1B
L1
L2B
L2
L3B
L3


L1B
L1
L2B
L2
L3B
L3
T1
T2
T3
V1
V2
V3
R1
T4
A3
A2
A1
A3M
A2M
A1M
M1
M2
CHASSIS
FRONT COVER
PHASE 3
PHASE 2
PHASE 1
LOW VOLTAGE AC SUPPLY
(SEE NOTE 1)
(SEE NOTE 2)
(SEE NOTE 3)
(SEE NOTE 4)
(SEE NOTE 5 & 6)
LEGEND
ITEM
PART No.
DESCRIPTION
A3M
999-00161-00
MAIN CONTROL MODULE
A2M
(SEE NOTE 6)
PERSONALITY MODULE
A3M
999-00164-00
SNUBBER OVERVOLTAGE PROTECTION MODULE
M1/2
(SEE NOTE 4)
VENTILATION FANS
R1
-
HEATSINK TEMP.THERMISTOR
T1-T3
(SEE NOTE 2)
CURRENT TRANSFORMERS
T4
(SEE NOTE 1)
CONTROL SUPPLY TRANSFORMER
V1-V3
(SEE NOTE 3)
THYRISTORS (INC.PAIRS)
NOTES
1. TRANSFORMER (T4) ON THIS SCHEMATIC CAN BE '012' FOR 110/230V CONTROL SUPPLY VOLTAGE. '024' FOR 230/400V CONTROL SUPPLY VOLTAGE. OR '045' FOR 460/575V CONTROL SUPPLY VOLTAGE.
2. FOR NON STANDARD SUPPLY VOLTAGES AN EXTRA SPARE PARTS AUTOTRANSFORMER HAS TO BE INSTALLED.
3. C.T.(T1 TO T3) SIZE IS MODEL TYPE DEPENDENT. THYRISTORS (V1-3) SELECTION IS MODEL SIZE DEPENDENT.
4. 2No.VENTILATION FANS (M1&2) ARE FITTED TO HEATSINK MODULES.
5. THE BRIDGE RECTIFIER FOR THE FAN DC SUPPLY IS INTERGRATED ONTO THE PERSONALITY MODULE (A2M).
6. THE PERSONALITY MODULE (A2M) PART NUMBER IS INDIVIDUAL TO EACH MODEL OF SOFT STARTER.
REV
DATE
BY
DESCRIPTION
A
14/02/03
E.D.
FOR INFORMATION
DIMENSIONS IN MM - DO NOT SCALE
ORIGINAL SCALE - mm
A2
ELETTRONICA SANTERNO
ASA SERIES SOFT STARTER
ASA-0141/6 TO ASA-0238/6
SCHEMATIC WIRING DIAGRAM
DRAWN : E.D.
CHECKED :
APPROVED:
SCALE : N.T.S
DATE : 14/02/03
ACAD FILE: EAB10112
JOB NUMBER:
DRAWING NUMBER: EAB10112
REVISION: A


LEGEND
ITEM | PART No. | DESCRIPTION
A1M | 991-00161-00 | MAIN CONTROL MODULE
A2M | 990-00177-00 | PERSONALITY MODULE
A3M | 990-00164-00 | SNUBBER OVERVOLTAGE PROTECTION MODULE
M1-3 | (SEE NOTE 4) | VENTILATION FANS
R1 | - | HEATSINK TEMP.THERMISTOR
T1-T3 | (SEE NOTE 2) | CURRENT TRANSFORMERS
T4 | (SEE NOTE 1) | CONTROL SUPPLY TRANSFORMER
V1-V3 | (SEE NOTE 3) | THYRISTORS (3No.PAIRS)
V4 | - | BRIDGE RECTIFIER
NOTES
1. TRANSFORMER (T4) ON THIS SCHEMATIC CAN BE '12'FOR 110/230V CONTROL SUPPLY VOLTAGE. '24'FOR 230/400V CONTROL SUPPLY VOLTAGE OR '24S'FOR 460/575V CONTROL SUPPLY VOLTAGE. FOR NON STANDARD SUPPLY VOLTAGES AN EXTRA SPARE PARTS AUTTRANSFORMER HAS TO BE INSTALLED.
2. C.T.(T1 TO T3) SIZE IS MODEL TYPE DEPENDENT.
3. THYRISTORS (V1-3) SELECTION IS MODEL SIZE DEPENDENT.
4. 3No.VENTILATION FANS (M1-3) ARE FITTED TO THIS MODEL.
REV | DATE | BY | DESCRIPTION
A | 14/02/03 | E.D. | FOR INFORMATION
DIMENSIONS IN MM - DO NOT SCALE
ORIGINAL SCALE - mm
A2
ELETTRONICA SANTERNO
ASA SERIES SOFT STARTER
ASA-0253/6
SCHEMATIC WIRING DIAGRAM
DRAWN : E.D.
CHECKED :
APPROVED:
SCALE : N.T.S
DATE : 14/02/03
ACAD FILE: EAB10113
JOB NUMBER:
DRAWING NUMBER: EAB10113
REVISION: A
A1M
A2M
A3M
LOW VOLTAGE AC SUPPLY
PHASE 1
PHASE 2
PHASE 3
FRONT COVER
CHASSIS
(SEE NOTE 1.)
(SEE NOTE 2.)
(SEE NOTE 3.)
(SEE NOTE 4.)
T1
T2
T3
T4
R1
V1
V2
V3
V4
M1
M2
M3
L1
L1B
L2
L2B
L3
L3B


L1B L1 L2B L2 L3B L3
T1 T2 T3
V1 V2 V3 V4 V5 V6
(SEE NOTE 3.)
A3M
CHASSIS
R1-3
(SEE NOTE 2.)
(SEE NOTE 4.)
M1 M2 M3
V7
(SEE NOTE 1.)
T4
A3 A2 A1
A2M
(SEE NOTE 5.)
A1M
FRONT COVER
B1 B2 B3 B4 B5 B10 B11 C23 C24 C31 C32 C41 C42 C53 C54 13 14 23 24 33 34 41 42 44
PHASE 3
PHASE 2
PHASE 1
LOW VOLTAGE AC SUPPLY
NOTES
1. TRANSFORMER (T4) ON THIS SCHEMATIC CAN BE 'C12'FOR 110/230V CONTROL SUPPLY VOLTAGE, 'C24'FOR 230/400V CONTROL SUPPLY VOLTAGE OR 'C45'FOR 460/575V CONTROL SUPPLY VOLTAGE. FOR NON STANDARD SUPPLY VOLTAGES AN EXTRA SPARE PARTS AUTOTRANSFORMER HAS TO BE INSTALLED.
2. C.T.(T1 TO T3) SIZE IS MODEL TYPE DEPENDENT.
3. THYRISTORS (V1-6) SELECTION IS MODEL SIZE DEPENDENT.
4. 2No.VENTILATION FANS (M1/2) ARE FITTED TO SOME MODELS. 3No.VENTILATION FANS (M1-3) ARE FITTED TO OTHER MODELS.
5. THE PERSONALITY MODULE (A2M) PART NUMBER IS INDIVIDUAL FOR EACH MODEL OF SOFT STARTER.
LEGEND
ITEM | PART No. | DESCRIPTION
A1M | 991-00161-00 | MAIN CONTROL MODULE
A2M | (SEE NOTE 5) | PERSONALITY MODULE
A3M | 990-00740-00 | SNUBBER OVERVOLTAGE PROTECTION MODULE
M1-3 | (SEE NOTE 4) | VENTILATION FANS
R1-3 | - | HEATSINK TEMP.THERMISTORS
T1-T3 | (SEE NOTE 2) | CURRENT TRANSFORMERS
T4 | (SEE NOTE 1) | CONTROL SUPPLY TRANSFORMER
V1-V6 | (SEE NOTE 3) | THYRISTORS (ANo.OFF)
V7 | - | BRIDGE RECTIFIER
REV | DATE | BY | DESCRIPTION
A | 14/02/03 | E.D. | FOR INFORMATION
DIMENSIONS IN MM - DO NOT SCALE
0 10 20 30 40 50
ORIGINAL SCALE - mm
A2
ELETTRONICA SANTERNO
ASA SERIES SOFT STARTER
ASA-0302/6 TO ASA-0897/6
SCHEMATIC WIRING DIAGRAM
DRAWN : E.D.
CHECKED :
APPROVED:
SCALE : N.T.S
DATE : 14/02/03
ACAD FILE: EAB10114
JOB NUMBER: EAB10114
DRAWING NUMBER:
REVISION: A


LEGEND
ITEM | PART No. | DESCRIPTION
A1M | 991-00161-00 | MAIN CONTROL MODULE
A2M | (SEE NOTE 5) | PERSONALITY MODULE
A3M | 990-00896-00 | SNUBBER OVERVOLTAGE PROTECTION MODULE
M1-3 | (SEE NOTE 4) | VENTILATION FANS
R1-3 | - | HEATSINK TEMP.THERMISTORS
T1-T3 | (SEE NOTE 2) | CURRENT TRANSFORMERS
T4 | (SEE NOTE 1) | CONTROL SUPPLY TRANSFORMER
V1-V6 | (SEE NOTE 3) | THYRISTORS (6No.OFF)
V7 | - | BRIDGE RECTIFIER
NOTES
1. TRANSFORMER (T4) ON THIS SCHEMATIC CAN BE 'C12'FOR 110/230V CONTROL SUPPLY VOLTAGE. 'C24'FOR 230/400V CONTROL SUPPLY VOLTAGE OR 'C45'FOR 460/575V CONTROL SUPPLY VOLTAGE. FOR NON STANDARD SUPPLY VOLTAGES AN EXTRA SPARE PARTS AUTOTRANSFORMER HAS TO BE INSTALLED.
2. C.T.(T1 TO T3) SIZE IS MODEL TYPE DEPENDENT.
3. THYRISTORS (V1-6) SELECTION IS MODEL SIZE DEPENDENT.
4. 3No.VENTILATION FANS (M1-3) ARE FITTED TO THESE MODELS.
5. THE PERSONALITY MODULE (A2M) PART NUMBER IS INDIVIDUAL FOR EACH MODEL OF SOFT STARTER.
REV | DATE | BY | DESCRIPTION
A | 14/02/03 | E.D. | FOR INFORMATION
DIMENSIONS IN MM - DO NOT SCALE
ORIGINAL SCALE - mm
A2
ELETTRONICA SANTERNO
ASA SERIES SOFT STARTER
ASA-1153/6 TO ASA-1574/6
SCHEMATIC WIRING DIAGRAM
DRAWN : E.D.
CHECKED :
APPROVED:
SCALE : N.T.S
DATE : 14/02/03
ACAD FILE: EAB10115
JOB NUMBER:
DRAWING NUMBER: EAB10115
REVISION: A
A1M
A2M
(SEE NOTE 5.)
LOW VOLTAGE AC SUPPLY
PHASE 1
PHASE 2
PHASE 3
FRONT COVER
CHASSIS
A3M
(SEE NOTE 3.)
(SEE NOTE 1.)
(SEE NOTE 4.)
(SEE NOTE 2.)
R1-3
T1
T2
T3
T4
V7
M1
M2
M3
L1B
L1
L2B
L2
L3B
L3

## ■ Appendix

### Typical Causes of SCR Damage

#### Overview

The reliability of the modern SCRs as used in the ASA Series soft starters is such that failures attributable to faulty manufacture are almost nil. SCR damage is almost always caused by external influences. Often these influences can be identified but in other cases the identification may prove difficult or impossible because the damaging event was temporary in nature.

#### Typical causes of SCR damage

SCR damage is generally caused by one of three mechanisms, overcurrent, overvoltage or overtemperature. Before replacing damaged SCRs it is important to identify the cause of damage if at all possible. The following list details some of the common problems.

Overcurrent

- Cable fault on output of soft starter.
- Motor fault.
- Start current and/or start time exceeds the soft starter ratings.

Overvoltage

- Power supply transient or surge.
- Lightening strike on power supply.
- Motor fault.
- Loose connection in power circuit, before or after the starter.
- Power factor correction connected to the output of the soft starter.
- Over corrected bulk power factor correction on a lightly loaded system causing severe ringing voltages.

Overtemperature

- Blocked heatsinks or restricted ventilation.
- Faulty cooling fans.
- Inadequate ventilation.
- Excessive ambient temperatures.

#### Protecting SCRs

The SCRs used in modern soft starters are rugged and provide reliable operation in most industrial environments without the need for additional protection. However the potential for SCR damage can be reduced by use of semiconductor fuses and/or line contactors.

Semiconductor fuses: Use of semiconductor fuses reduces the potential for SCR damage caused by short circuits on the output of the starter. Note that protection systems such as circuit breakers or HRC fuses do not operate quickly enough to protect SCRs from short circuits.

Line contactors: SCRs are most vulnerable to damage caused by overvoltage when they are in the off state and have voltage applied to their input terminal. In this condition the SCR is blocking the full line voltage. Use of a line contactor to remove voltage from the SCR input when the starter is in the off state eliminates the chance of SCR damage due to overvoltage.

Note that when the soft starter is operating and the SCRs are fully conducting the SCR is not blocking line voltage and is thus immune to damage caused by voltage fluctuations.

## Output Relay Compatibility

### Overview

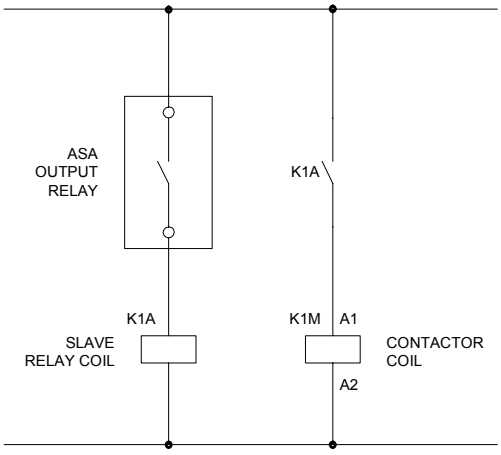
The ASA soft starter has three programmable output relays (Output A, B, C), and one fixed output relay (Run). These PCB mount relays are often used for line or bypass contactor control.

Recent advances in contactor design have lead to many manufacturers using electronic contactor coils. Initially these coils may appear to meet the specifications of the PCB mount relays. However, in some instances these electronic contactor coils have a high initial inrush current due to the internal switch mode power supply circuitry. This can have a damaging effect on the PCB mount relays if the contactor coil is switched directly.

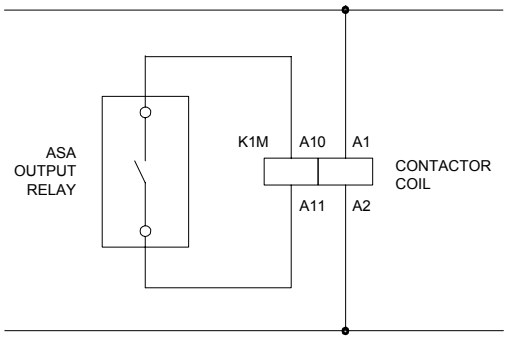
### Solution

Before using an ASA soft starter PCB mount output relay for direct switching of an electronic contactor coil, consult the contactor manufacturer/supplier to see if this is advisable. Certain contactor manufacturers (eg Klockner-Moeller) state that you cannot use PCB mount relays for direct switching of their electronic contactor coils.
If this is the case, there are two solutions:

1. Use an ASA soft starter output relay to control a slave relay. This slave relay can then be used to directly switch the electronic contactor coil circuit.




2. Some contactor brands have a volt free electronic input (low voltage/low current). If this is available, the ASA output relay can be wired directly into this input for contactor control.



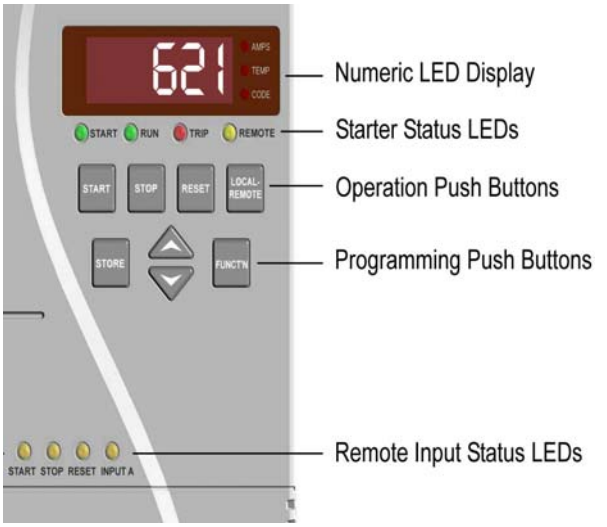
## Remote Control Input failure

### Overview

The ASA soft starter can be operated in Local or Remote mode. The operational mode is selected using the LOCAL/REMOTE pushbutton on the front control panel of the ASA.

In local mode the REMOTE LED is not illuminated and the soft starter is operated using the Start, Stop, and Reset operational pushbuttons on the ASA front control panel.

In Remote mode the REMOTE LED is illuminated and the soft starter is operated using the four remote control inputs. When a remote control input is closed using an external contact, the associated remote control input status LED is illuminated.




### Cause of Remote Control Input failure

External contacts used for operating the remote control inputs must be low voltage / low current types (gold flash or similar). These inputs are internally powered by 24VDC and must only be operated by external volt free contacts.

**CAUTION:**
Application of external voltages to the remote control inputs will cause equipment damage and necessitate replacement of the Main Control Module.

### Testing for Remote Control Input failure

When the ASA soft starter is operated in Remote mode, the associated remote control input status LED will illuminate when the input is closed using an external contact. If the status LED does not illuminate, damage has occurred to the remote control input on the Main Control Module.

This damage is caused by applying external voltage, either directly or indirectly (eg, induced voltage from lightning strike) to the remote control input.

**NOTE:**
Damage to the remote control inputs caused by application of external voltages is not covered by warranty.