

Soldering and Cleaning Elmo's PCB-Mounted Servo Drives



Application Note

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1. Introduction

Elmo has a wide range of PCB-Mounted Servo amplifiers and drives. The essence of PCB Mounted products is to enable the most efficient assembly and the implementation of Elmo's products within the customer's application.

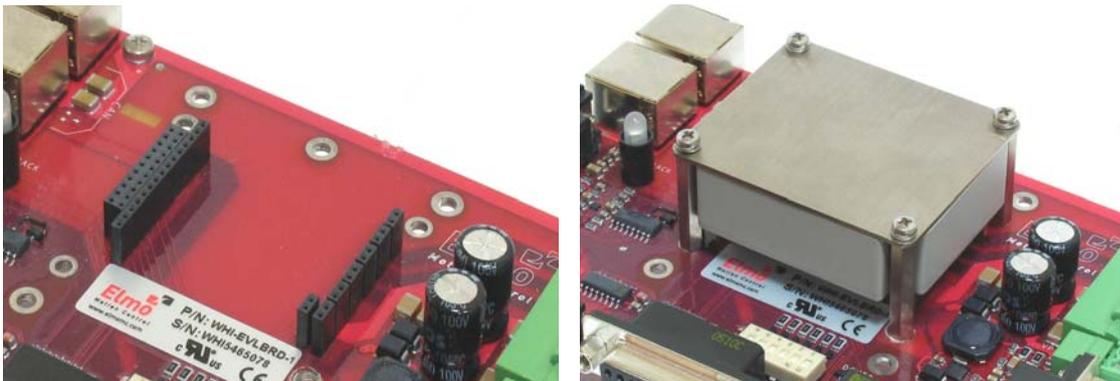
The PCB-Based Products include the following products:

Violin	Canary	Whistle
Piccolo	Robin	Tweeter
Flute	Raven	Hornet
Ocarina	Butterfly	Bee
Castanet	Dragonfly	Future Products

2. Assembling PCB-Mounted Products

There are two major ways to assemble the PCB-Based products onto the customer PCB:

2.1 Assembly via Connectors



This seems to be the simplest assembly method as the Elmo drive is attached only after PCB assembly and cleaning has been completed.

The drawbacks of this method are:

- Current Carrying Capacity of the Connectors- Elmo drives produce output current that exceed the current rating of any available connector
- Meeting Application "Ruggedness" Requirements- Ruggedness to prevent mechanical vibrations, extreme temperatures, humidity, etc. is solved by "simple" soldering and not via connectors

2.2 Assembly by Soldering

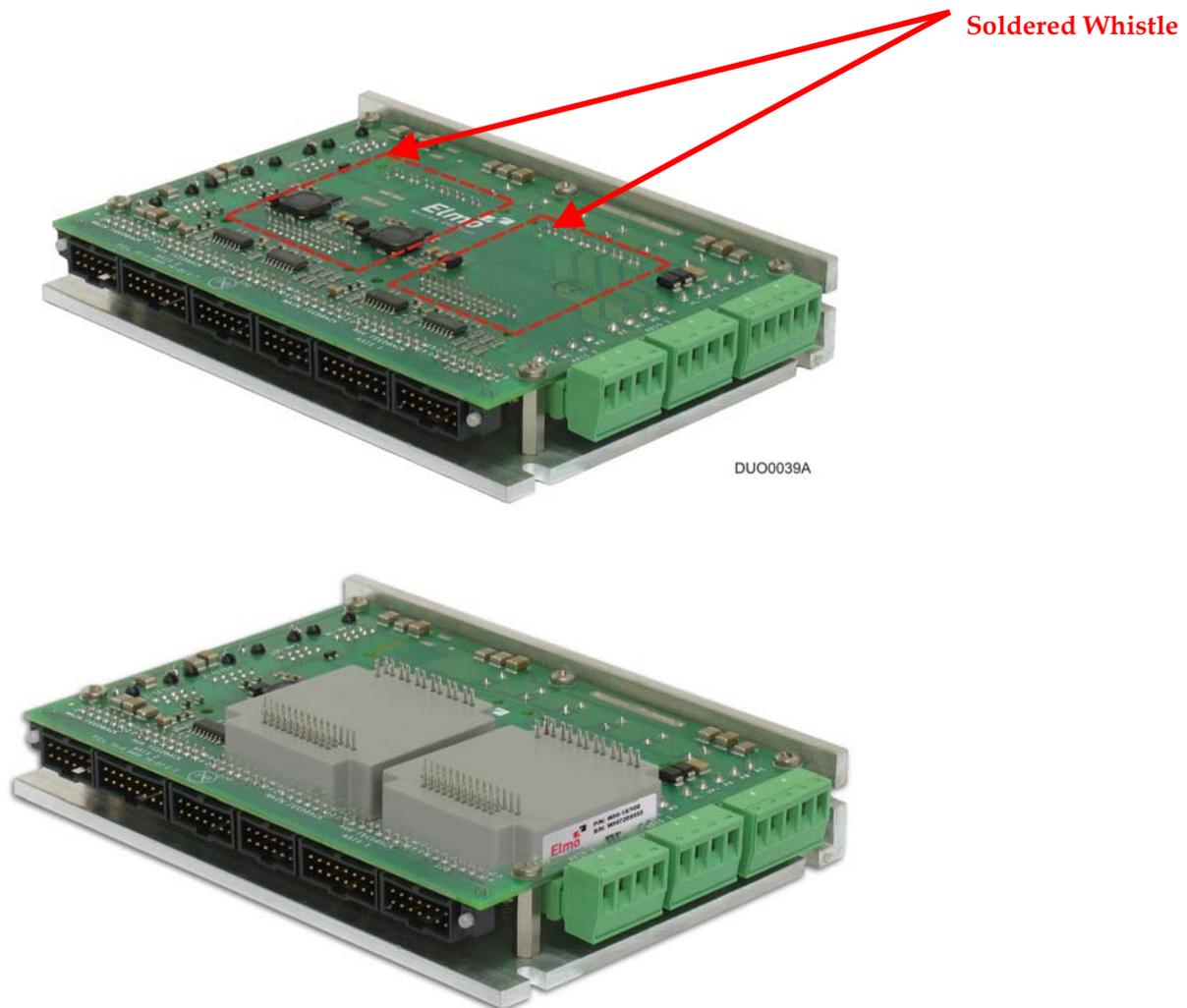
Soldering onto the customer's board, will result meeting the application requirements and achieve the best performance in:

- Current carrying capacity
- Highest mechanical ruggedness
- Cost effectiveness

Example:

The Duo, 2 Whistle (WHI) Drives in the Assembly

- *The WHI Drives are soldered onto the Interface Board*
- *"Selective Wave Soldering" with "No Clean" soldering paste was used*



Soldering Elmo's PCB-Based Drive Products is simple and straightforward when done properly. The soldering can be done in any "conventional" way:

1. Wave soldering
2. Selective wave soldering
3. "Hand" soldering

3. Considerations

In all methods, the following considerations must be taken into account:

1. **Coating.** All Elmo assembled PCBs are coated by a conformed coating that results in a significantly higher resistance to humidity and polluted environments (Elmo's standard coating is the acrylic HumiSeal - 1B31)
2. Some cleaning methods involve cleaning with solvents and then **dipping in water** (or other "conducting" liquids) to get rid of the residues and the solvents

Such a cleaning method may cause:

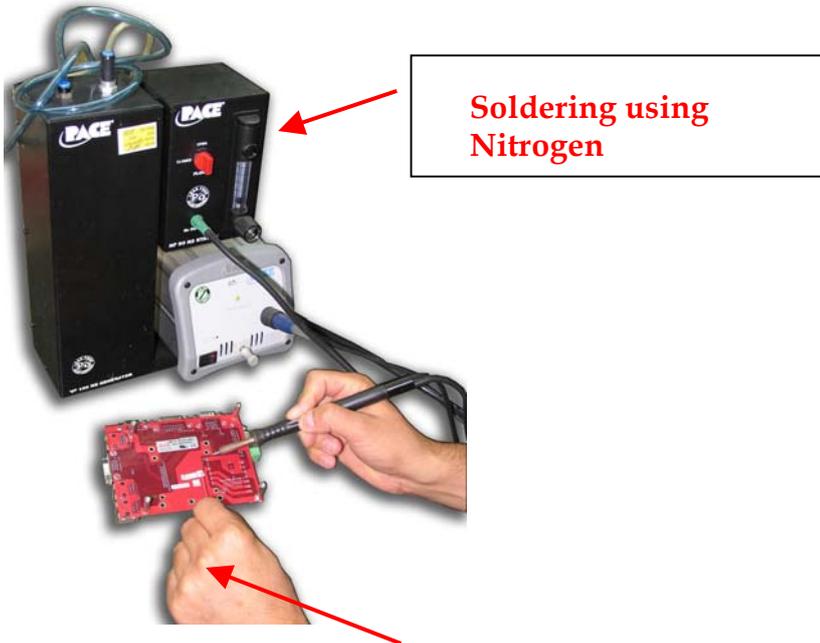
1. The acrylic protective coating to **dissolve** thus exposing the product to higher sensitivity to humidity
2. **Water** (or any other conductive liquid) **to be trapped** in the product. Even though the cleaning process has a drying stage for the product, the drying process may never fully dissipate the liquid completely allowing the wetness to remain within the product.

The scenario above, of stripping off the conformal coating plus the "trapped water" might cause destructive short circuits on "Power On".

The Best and Recommended Assembly Process options are:

Method 1: No Cleaning Required

1. No cleaning at all by using "Non-Clean" soldering pastes
 - a. **Remark:** Using "Non-Clean" soldering paste and operating at high temperatures such as "higher than 60°C" may cause "re-activating" of the Non-Clean Flux residues. In very extreme cases, this may result in conduction paths. Therefore, when the product operates at high temperatures it is recommended to also clean the "Non-Clean" paste residues. The simplest method is by hand brushing.
2. No need to clean when using a Nitrogen "environment" (hand station or Nitrogen wave soldering) with fluxless soldering pastes



An example of Nitrogen hands soldering station:

Remark: The world is becoming “greener and greener” and the “clean” (no fluxes, no residues, no pollution) Nitrogen soldering (Hand and wave soldering) will become more and more popular. In addition, the Nitrogen soldering environment ensures the high quality of the soldering process. Elmo is gradually implementing this “Clean and Qualitative” soldering method to all Elmo products.

Method 2: Clean Simply

This method is used when cleaning is required after soldering with flux solder paste:

The cleaning process should be done by hand using a **soft** brush. Simply and gently brush the cleaning agent on the area needing to be cleaned.

Remark: If the Interface Board is “heavily” populated with components it recommended to:

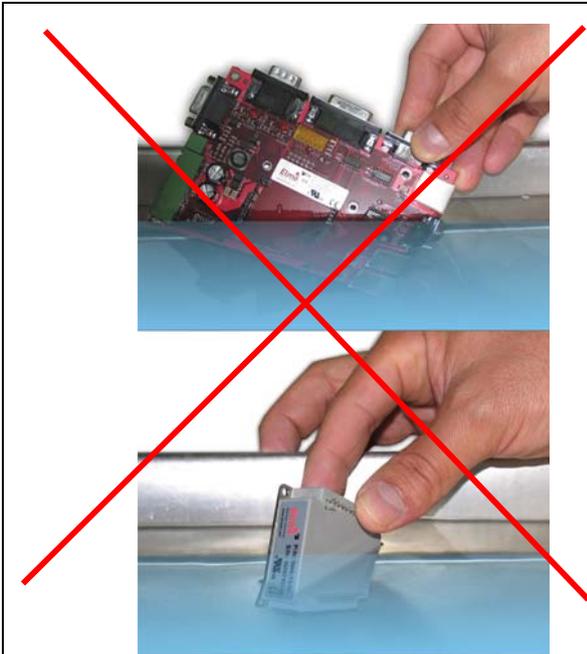
Option 1:

1. Wave soldering the whole assembly including the Elmo drive
2. Hand cleaning of the whole assembly

Option 2:

1. Wave soldering of the assembly without the Elmo drive
2. Clean the assembly using any method
3. Hand soldering the Elmo drive onto the interface board
4. Hand clean the Elmo drive soldering pins if required

Immersion of the boards in cleaning baths or spray cleaning of any kind are absolutely forbidden by all means.



1. Immersion is FORBIDDEN



2. Cleaning by hand brushing is recommended.

DO NOT PRESS WHEN BRUSHING AND PAY ATTENTION NOT TO SPLASH THE CLEANER AND THE RESIDUES