

FLOOD DAMAGE RECOVERY FOR CNC EQUIPMENT

1. PURPOSE

If the CNC and related equipment are treated properly after being soaked with flood water, it is possible to reduce or even recover from the damage. The purpose of this section is to describe proper post-flood treatment.

2. SUMMARY

- In case of flood, do not open cabinets and units. It is better to wait until the flood water recedes.
- If it is possible to drain actively, the early drainage can reduce the damage.

3. PROCEDURE

Outline of the procedure after flood water recedes is as follows:

1. Remove batteries & cables
2. Wash the units
3. Dry the units
4. Check the insulation resistance
5. Check the functionality (Performed by FANUC engineers)

3-1. REMOVE BATTERIES & CABLES

In order to minimize a damage to unit, please perform following at first.

(1) PLEASE REMOVE BATTERY CABLES FROM UNITS AND PCBs (PRINTED CIRCUIT BOARD) AS SOON AS POSSIBLE. Flooded batteries may cause rust damage to PCB's circuitry and could result in irreparable PCB damage. Removing the batteries will result in loss of CNC data, but it is necessary to protect the hardware from further damage.

(2) REMOVE CABLES BEFORE WASHING. Please properly tag or mark so you will be able to connect cables back correctly.

3-2. WASHING THE UNITS

Wash the units according to the procedure below as soon as possible. Damage will worsen if washing is delayed.

(1) UNIT - Flood water often contains contaminants such as dirt and oil. This could stick to the unit and could become difficult to remove. Use a neutral detergent, such as multipurpose kitchen detergent, tap water and nylon brush (do not use metal brush) to clean them as much as possible.

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Please use a small brush such as a toothbrush and clean the entire unit with specific attention to connectors and sockets.

- (2) **RELAYS** - If relays have water inside, please open the case and clean inside. (If case cannot be opened, you will need to replace it.)
- (3) **TRANSFORMERS** - It is not possible to clean inside a transformer coil, however, please clean the unit as much as possible especially around the electrical terminals.
- (4) **CABLES** - Connector housings will contain flood water. Please disassemble the connectors to drain any water, clean them, and then dry by hanging the cable with the connector at the bottom. (It is also possible that flood water also enters between cable strands). Please be mindful of this.
- (5) **SERVO MOTOR AND SPINDLE MOTOR** - These motors cannot be disassembled by the customer. Please have FANUC engineers clean these parts. If you see waters entering inside the red or yellow cover of the motor, the cover may be removed to release the water and carefully clean around the feedback assembly.
- (6) **MOTOR DRIVE UNITS** - Please use flowing water to clean the motor drive units. Please refrain from submerging the unit during cleaning.

3- 3. DRYING UNITS

After washing, please remove as much water as possible and let then dry. The electrical resistance is lower due to the moisture, so please **DO NOT ATTEMPT TO MOUNT OR APPLY ELECTRICAL POWER UNTIL THE UNIT IS COMPLETELY DRY**. It will take a long time if you just leave the unit in room temperature. Transformers, especially, will require a few months if not dried with high temperature. It is necessary to use a high heat to evaporate the humidity inside the transformer.

(1) **DRYING OVEN** - It is possible to gain enough insulation back in a few hours if you can use a drying oven with enough high heat. However, please be careful if the temperature is too high, it may melt the insulation material. A vacuum type drying oven may be useful for this type of equipment.

Here are examples of temperature and drying time, after removing as much water as possible by hand:

- Servo Transformer - In 120 degree C (248 degree F) for 8 hours
- Servo Motors - In 80 degree C (176 degree F) for 12 hours (with Pulse coder removed)
- PCB (Printed Circuit Boards) - In 60 degree C (140 degree F) for 1 hour.

(2) **WITHOUT A DRYING OVEN**

Please prepare a fanned heater. It is a good idea to use hair dryer to send heated air (around 140 degrees F is desirable). Please be careful as it may become too hot if you send the air directly to the unit. PCB and units may be dried in a half, to one full day, but the transformer may take a few days.

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3- 4. CHECK THE INSULATION RESISTANCE

It is very important that insulation resistance is tested before applying power.

(1) TRANSFORMER - Measure the insulation resistance using 500V Mega meter between coils, and between coil and metals such as core. The measurement should be 10 Megohm or more.

(2) SERVO MOTORS AND SPINDLE MOTORS - Measure the insulation resistance between the motor windings and ground. The measurement should be 10 Megohm or more. Please note that the encoders may be damaged by the flood water. Please open the motor case and check. If you see the sign of entering water, the encoders may need to be replaced.

3- 5. CHECK THE FUNCTIONALITY

FANUC engineers and Machine tool builder engineers should work together because machine side repair and adjustment will also be required.

If the insulation resistance is adequate, then the unit may be installed. Confirm all cable connections and wiring, then apply power and confirm the operation. If insulation is not sufficiently recovered due to insufficient drying, there is a possibility of ignition due to short circuit or heat generation, so pay attention to the generation of smell and smoke for a while after energization, immediately turn off the power when there is an abnormality.

If parameters were lost and a recent back up is not readily available, it is our recommendation to contact the MTB to assist you. They will also be able to assist in any machine side adjustments and/or set up procedures before final operation is started.

It is highly recommended to have a Fanuc Serviceman on site anytime during the clean-up process or even before the start up to help you get your machine back-up and running. Our goal is to quickly and safely return your machine back into production.

PLEASE CONTACT YOUR LOCAL FANUC AMERICA SERVICE CENTER YOU HAVE ANY QUESTIONS.

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