FourJaw
Manufacturing Analytics

MachineLink

Installation Guide

Version 1.8. Revised September 2024

English

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IMPORTANT INFORMATION

Working inside Machine electrical cabinets can be dangerous.

Installation of the MachineLink should be conducted by a competent person who can safely install equipment inside an electrical cabinet.

Please read all instructions carefully before beginning installation.

These installation guidelines are provided in good faith to help prevent any potential problems caused by errors in installation.

FourJaw Manufacturing Analytics Ltd shall not be held responsible for installation actions taken or not taken. Some details of installation are assumed to be general electrical knowledge to experienced installers; which are not included in these guidelines.

All Machines are different, and it is the sole responsibility of the installer to determine which actions are safe to perform for the particular Machine they are working with.

These installation guidelines are intended to be strictly recommendations and are not to serve as a fail-safe installation checklist. The selection of an experienced installer is the sole responsibility of the customer.

FourJaw Manufacturing Analytics Ltd does not accept any responsibility for product failure resulting from or associated with improper installation.

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ITEM CHECKLIST

Current Clamps x2

Sensors to measure the electrical current draw of your machinery

Cable Clips x6

To keep cables tidy and route them safely around your machinery

USB Cable x1

To connect the SensorBox to the MachineLink

Extension Cable x3

To extend the reach of the current clamp sensors

SensorBox x1

Plugs into Current Clamps to collect and send data to the MachineLink via USB

MachineLink x1

The main computational unit that securely sends your data to the FourJaw Platform

Power Supply x1

Powers the MachineLink from a 3-pin (UK) socket

Wi-Fi Antenna x1

Plugs into the MachineLink to increase Wi-Fi signal strength

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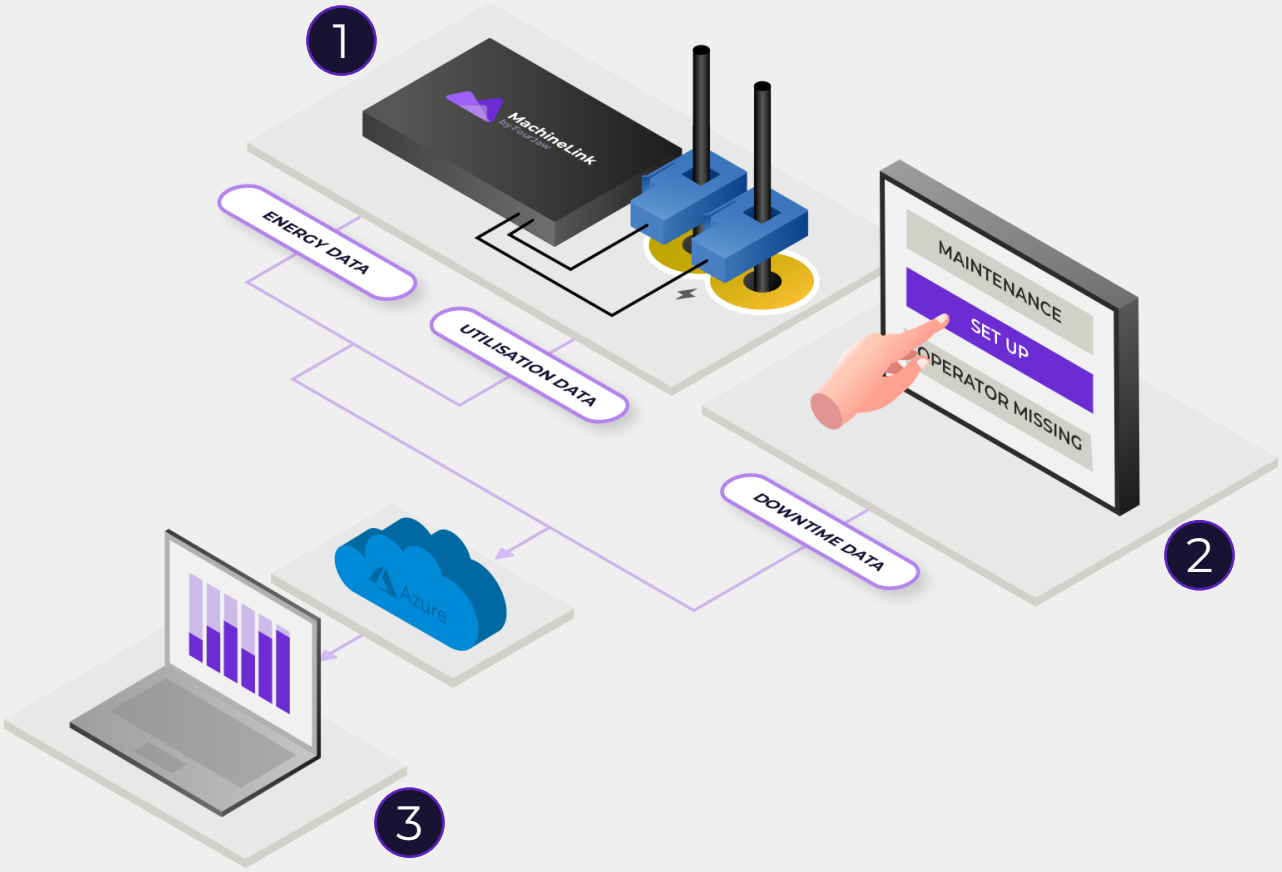
SYSTEM OVERVIEW



1. The MachineLink is installed in the electrical cabinet of your machine and uses two current clamp sensors – one to monitor machine uptime/downtime and another for energy consumption.

   The electrical data readings from these sensors are sent to our cloud platform (via Wi-Fi/ethernet) where an algorithm is tuned uniquely for each machine to recognise uptime, downtime and energy usage.

2. The operator tablet provides feedback on machine utilisation and allows downtime labelling, job booking and instant messaging.

3. The FourJaw web app shows all your machine data as user-friendly dashboards and reports.

INSTALLATION STEPS

01. Isolate the Electrical Supply

IMPORTANT: Please ensure you have read and follow the important information found at the beginning of this document before proceeding any further.

Locate the Machine you want to install the MachineLink on and **fully isolate the electrical supply**.

02. Identify the Correct MachineLink Kit

Each FourJaw MachineLink arrives pre-configured for a specific Machine. The machine name is labelled on the outside of the box and directly printed on each MachineLink.

Next, you'll need to open up your electrical cabinet to identify where to place the current clamp. Follow the guides below to get the correct clamp placement.

GOOD TO KNOW: CLAMP SIZING

Occasionally, you may find that the wires in your machine are too large for the provided current clamps. If this is the case, please email support@fourjaw.com and we will send you larger current clamps.

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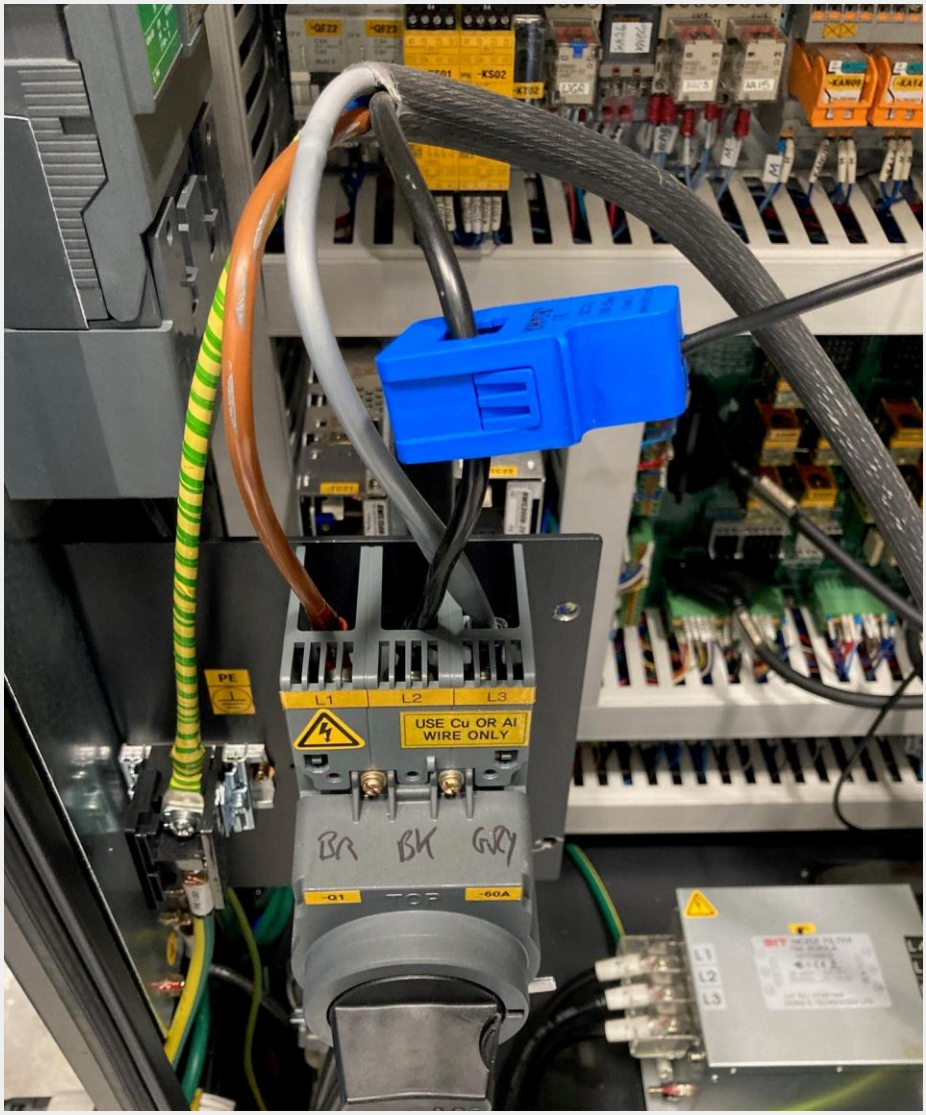
03. Install Energy Clamp

Take one of the two current clamps from your kit (either will do) to use as the Energy Clamp. The Energy Clamp is clipped to a **single phase** of the main incoming electricity supply to the machine.

The easiest way to locate the correct wire is at the machine ON/OFF isolator switch, as shown in the photo below. Place the clamp around one of the phases (usually the middle wire, L2).

IMPORTANT: Do not put the clamp around the Earth cable.



04. Install Activity Clamp

The Activity Clamp should be clipped around a wire that draws a higher electrical current when the machine is actively running.

Typically, this will be a motor that only runs when the machine is in a productive state. For example:

- The motor that turns the chuck on a lathe
- The motor that turns the cutting tool on a drill or mill
- The drive motor for a saw blade or grinding wheel
- The in-feed or out-feed motor on a production line

Please skip to the detailed guidance based on the options below.

Skip to 4A: If the activity of your machine can be measured from a single motor. For example, a single spindle mill, lathe or drill.

Skip to 4B: If your machine's productivity is derived from numerous motors, any of which might show productivity. (e.g. a twin spindle CNC machine, a lathe with live tooling, or a combined sawing/drilling machine).

Skip to 4C: If your machine does not have any obvious motors that indicate activity. For example, a furnace with only a heating element.

GOOD TO KNOW: STILL UNSURE?

Our support team is here to help - If in doubt, please call: (+44) 0114 400 0158

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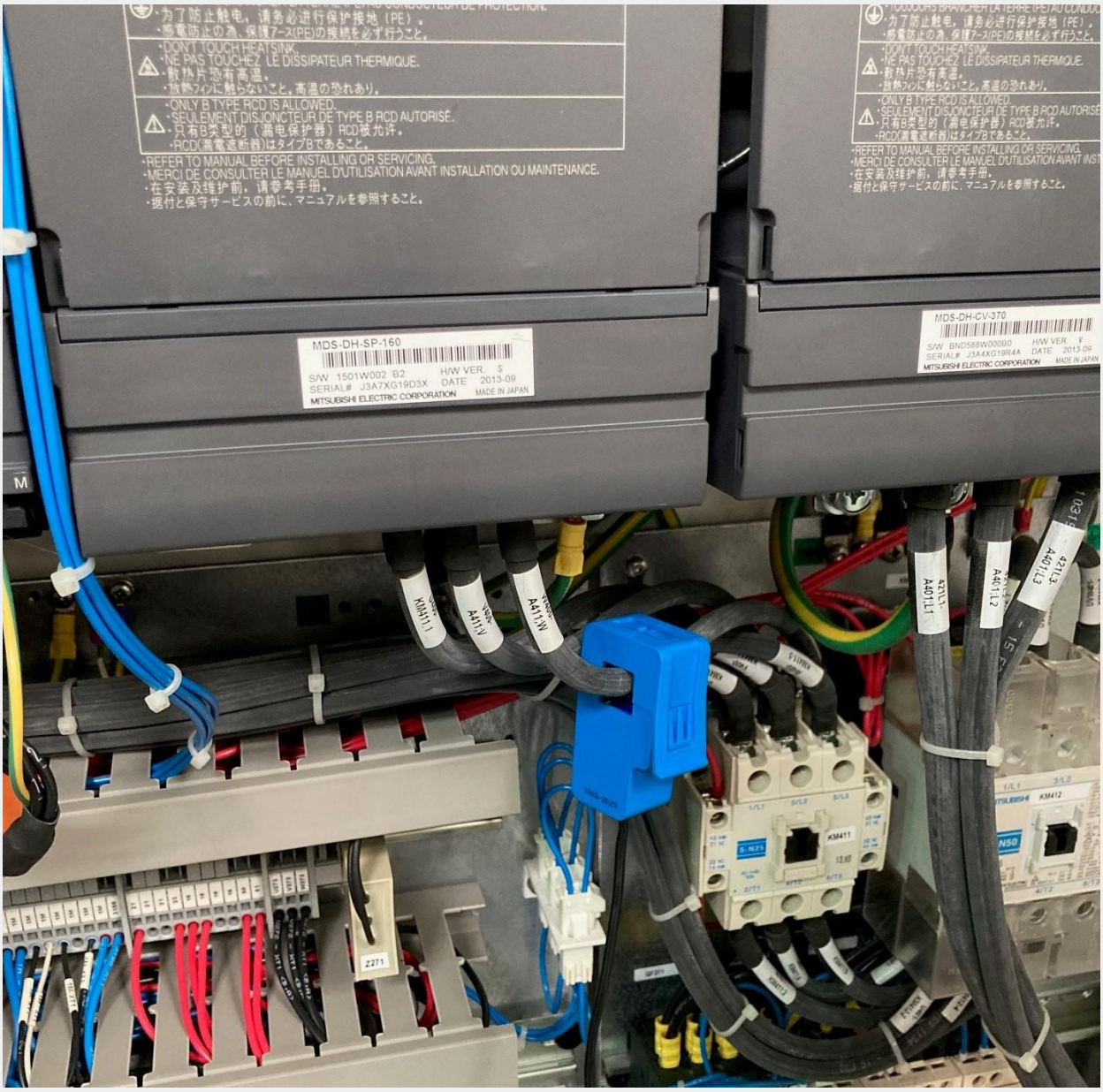
04A. Detailed Guidance for Single Motors

Identify the drive unit for your motor of choice. The drive units are typically large rectangular units with three wires coming out the bottom. Place your Activity Clamp around one of the three phases. If in doubt, the largest drive unit is normally the correct one.



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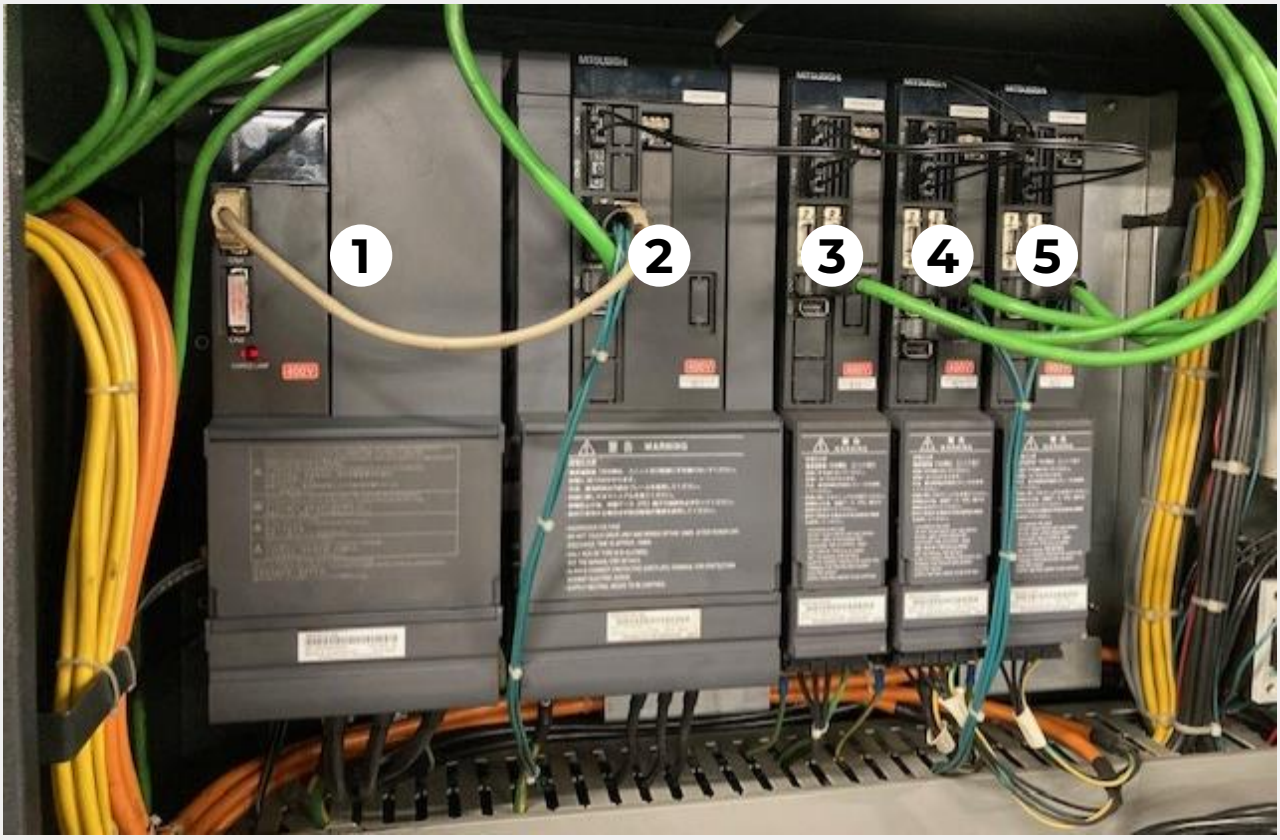
04B. Detailed Guidance for Multiple Motors

When your machine has multiple motors that can each run independently during production, you will need to place the Activity Clamp on a shared wire that supplies power to all these motors. The best place for this is a shared power supply unit that provides power for each individual drive.

For example, in the photo below, unit 1 provides the power to units 2, 3, 4 and 5. Therefore, we should clip on one of the cables underneath Unit 1.



IMPORTANT:
DO NOT do this If you can't locate a shared wire for all your motors, please instead follow the instructions under Step 4C on the next page.

04C. Detailed Guidance for Other Machinery

If it is not clear where you should attach your Activity Clamp sensor due to the nature of your machine or its wiring, please place the Activity Clamp on another phase of the main supply, alongside the Energy Clamp installed in Step 3.

Why not just do this to begin with?

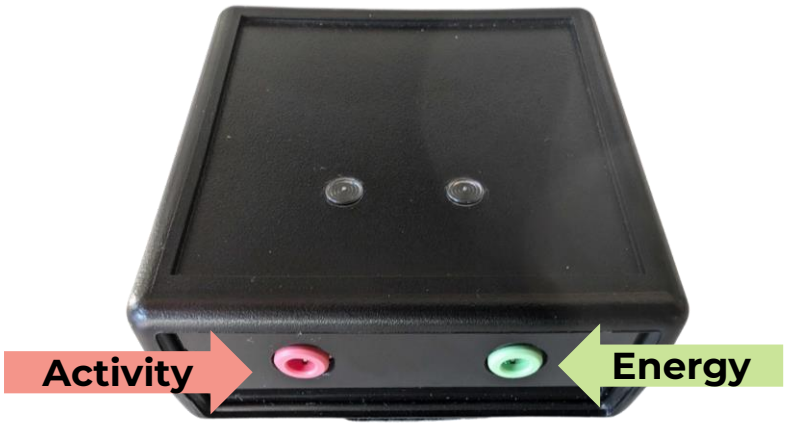
The main electrical supply contains lots of other signals from pumps, cooling fans, computers etc. which make it much harder for our algorithms to recognise machine uptime/downtime. Therefore, it is preferable for the Activity Clamp to only monitor motors directly related to machine activity/productivity where possible.

05. Plug in Current Clamps

Take the small black SensorBox from your MachineLink kit and plug the current clamps into the coloured jacks.

IMPORTANT - You must plug in the clamps as follows:

- The **pink** input (left) is for the Activity Clamp.
- The **green** input (right) is for the Energy Clamp.



GOOD TO KNOW:
If you need to, **extend the sensor cables,** please use the extra extension wires included in your kit.

06. Attach and Power SensorBox

Attach/mount the SensorBox to the machine using the fixings included in the kit. Typically, the SensorBox is installed inside the machine's electrical cabinet.

Next, plug the micro-USB cable into the SensorBox, passing the other end of the USB cable to the outside of the electrical cabinet (through a suitable opening). Once complete, close the electrical cabinet.

07. Fit and Locate the MachineLink

Position the MachineLink **up high** on the outside of the machine to help get a good Wi-Fi signal. For example, on top of the electrical cabinet.

Where possible, it should have line-of-sight to a Wi-Fi access point within 30m. Alternatively, you can connect the MachineLink via ethernet cable instead of Wi-Fi.

Once a suitable location has been found, attach the MachineLink to the machine using the fixings included in the kit. If using adhesive strips, it is best to clean the surface first to ensure adhesion.

IMPORTANT:

The MachineLink should also be within reach of the USB cable from the SensorBox.

08. Install Antenna

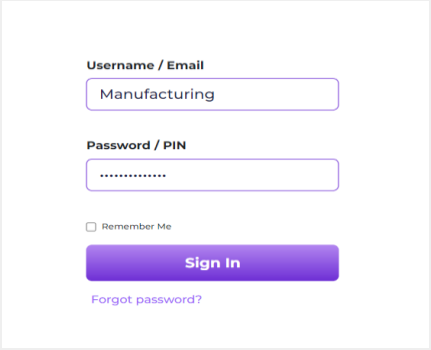
Plug the Wi-Fi antenna into one of the **blue** USB ports on the MachineLink. You will find the other USB ports blanked out – they should not be used for the antenna. Position the antenna **up high**, in clear air where it will have a good signal and point the two aerials upward.

09. Plug In and Power on

Plug-in power to the MachineLink from a nearby 3-pin plug socket. Once you're ready, turn on the power to the device and check that you can see the red power light through the two holes on the back of the MachineLink.

10. Run the Machine

Run the machine in a normal operational cycle to capture data points for at least one minute before letting the machine sit idle for at least one minute. Normal operation can then resume. This captured data will be used to calibrate the FourJaw signal.



11. Login to begin Testing

Log in to your web app portal and check you can see the machine on the MachineLink workspace. Speak to the FourJaw support team to move to the data classification phase of the installation.

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SUPPORT

Knowledge Base

Find answers to common questions and keep up to date with the latest product release features.

Visit: help.fourjaw.com

Customer Support

You can contact our customer support team Monday-Friday, 8:00 am until 5:30 pm (GMT):

Email: support@fourjaw.com
Phone: (+44) 0114 400 0158

FourJaw's MachineLink and related hardware cannot be disposed of in the normal waste system as they are WEEE (Electrical and Electronic waste).

If you need to return the equipment to us, please contact FourJaw Support. Where possible we will refurbish and reuse the equipment. If it is not possible to reuse it, we will ensure that it is disposed of safely following the WEEE requirements.