

Agilent
Metal Scrap Sorting Machine Installation Made Easy
with U1600A Series

Application Note



Introduction

As the world becomes more aware of the environmental crisis, the metal recycling industry has grown extensively. Metal scrap sorting, which traditionally has been done laboriously by hand, is now being done by metal sorting machinery. This invention provides a cost effective and yet precise way of sorting recycled and shredded non-ferromagnetic metals on a large scale. This application note will explain how Agilent's U1600A Series handheld scope eases industrial troubleshooting and assembly validation.

Basic Structure of Metal Sorting System

A metal scrapping machine is a complicated system. It requires an optical and inductive sensing system to examine and sort specific materials from a mixture. Typically, the system consists of a feed, conveyor belt, CCD camera, inductive sensor array, air ejector, and fluorescent tube or a halogen lamp. Figure 1 shows a detailed block diagram of a metal scrapping machine.

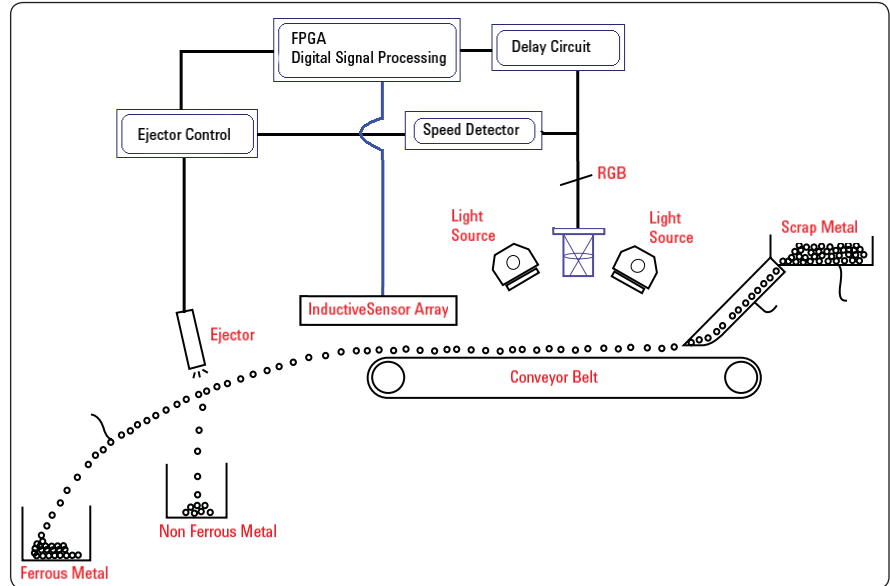


Figure 1. Illustration of a metal scrapping machine

Installation Made Easy With U1600A Series

The U1600A Series 3-in-1 integrated test tool solution — oscilloscope, multimeter, and data-logging — allows you to perform primary check on printed-circuit board (PCB) continuity on a power supply with built-in multimeter function. You do not need to worry about carrying an extra digital multimeter just for this purpose. Early detection of short-circuiting in the in PCB prevents massive damage to the electronics in the system.

Regulated voltage levels from the power supplies must be controlled tightly to ensure proper operation of the circuit in a metal-scrap sorting system. You have to check the minimum and maximum voltage level as well as ripple presence on regulated voltage output. The 4.5 inches color LCD of the U1600A Series gives you good viewing of both channels simultaneously.

Machine-vision technology deals with the automated analysis of an image to determine characteristics of objects and other features shown in the image. It requires high-speed microprocessors and extensive memory. The accuracy of system performance relies largely on the accuracy of the signal on each module.

An oscilloscope with a high real-time sampling rate can ease the troubleshooting and validation in such a high-speed system. It enables you to capture all waveforms without missing any information. The 200 MSa/s sampling rate in the U1600A Series is ideal for assembly installation and validation of a metal scrap sorting machine. This feature effectively captures signal anomalies, deviations, and glitches during installation of a metal-scrap sorting machine. Typical anomalies found are glitches on sine wave, glitches on pulse train, and distorted signal that causes the system to malfunction. See Figure 2.

You need to capture a signal over a long time span when measuring for better measurement. The 125 Kbyte memory is well suited for post-data analysis of waveforms. The enlarged context for the event being studied in turn enables more insightful characterization and debugging.

Fast Fourier transform (FFT) functionality in U1604A helps quickly locate the source of intermittent problems in the system. This feature is especially valuable for oscilloscope users who have limited or no access to a spectrum analyzer, yet occasionally need frequency-domain analysis capability. Any measurable distortion in the system will add harmonics that will show up in the FFT of the system's output.

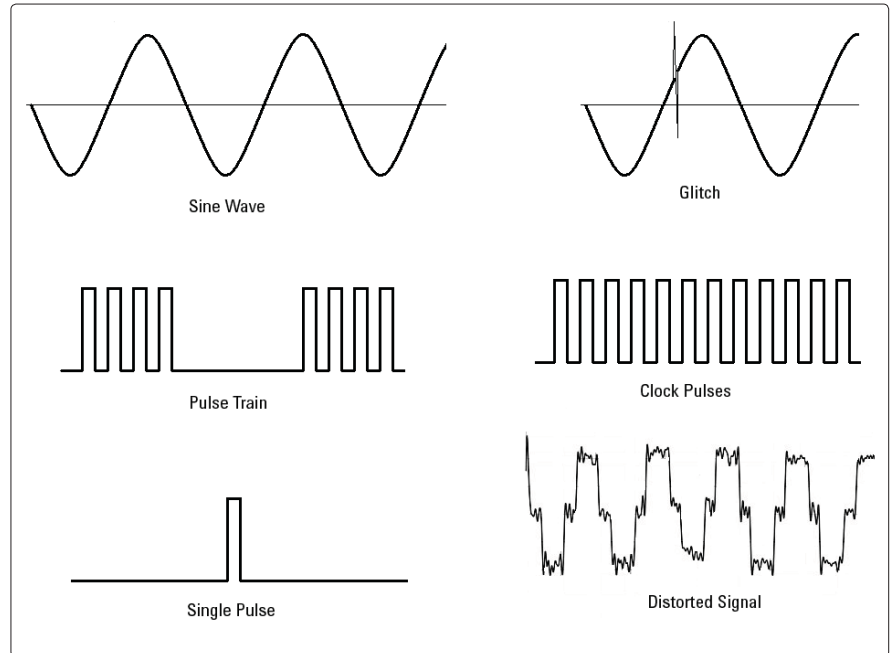


Figure 2. Typical anomalies that causes metal scrap sorting machine system malfunction

Summary

As handheld oscilloscopes are becoming indispensable tools, users in the metal scrap sorting machine assembly industry face an increasing need for high-performance portable instruments in service and maintenance. The U1600A Series addresses these market needs, allowing users to perform tests in-plant and off-site without compromising performance.



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Revised: July 17, 2008

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Printed in USA, September 20, 2008
5989-9786EN



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