



VERTEX INTERNATIONAL, INC.
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WM-4 Weld Monitor



Vertex International, Inc. can supply new Weld Monitors based on the original Metal Box design but incorporating our improvements to make them 'state-of-the-art'.

The relationship between the rate of electrical energy reaching a side seam overlap and the quality of the resulting weld is consistent enough for practical purposes. The Monitor makes an accurate measurement of this energy, eliminating the errors introduced by inductive factors at high welding currents. The electronic circuitry of the Monitor uses sophisticated methods to extract the true weld power from the complex signals present at the welding rolls. Both weld voltage and weld current are measured on a 'nugget by nugget' basis to judge the heat of the welded seam. A can will be rejected from the line if even one 'nugget' (weld half-cycle) fails to meet the criteria set by the operator.

This Monitor is compatible with all known types of welder power supply, including the latest high frequency 'Unisoud' type.

The WM-4 Monitor is supplied with all the internal and external components needed for installation, including a wiring harness, can reject station and current pickup assembly. The price includes two days of labor costs for a Vertex engineer on site to assist with training of plant personnel and commissioning of the installed unit.

The price for a WM-4 Weld Monitor as described above is \$32,500 USD subject to formal quotation.

RB 4/6/2006



WM-4 Weld Monitor Technical Description



The Monitor operates on the principle that the electrical power delivered to the molten metal of the side seam weld is a practical and reliable guide to the resulting heat of the weld. Simple measurements of weld voltage and current do not reveal the true weld power, since both signals are distorted by the inductive effects arising from high weld current levels (typically 5000 amps). The electronic circuitry of the Monitor uses sophisticated methods to extract the true weld power from the complex signals present at the welding rolls. The true welding voltage present across the true weld resistance is integrated for the duration of a single 'nugget' (weld half-cycle) to yield a power measurement. This is then averaged over the duration of the nugget to compensate for minor variations in nugget duration.

The resulting number is scaled to provide a 'Quality Coefficient' reading displayed on the front panel of the Monitor. Each and every nugget is calculated individually to yield a 100% high-resolution non-destructive inspection of the seam on every can.

Based on the prevailing weld conditions, the line operator sets acceptable limits of variation for the Quality Coefficient. Any nugget which falls outside these limits will cause that can to be rejected from the line into a 'reject barrel'.

Another valuable function of the Monitor is to respond to the high voltage excursions caused by contamination in the seam overlap. These usually result in welding wire breakage with the accompanying ten-minute loss of production.

WM-4 Weld Monitor Technical Description – Page Two of Two

When these are detected, the Monitor immediately cuts the welding current, minimizing the stored energy whose discharge causes the burn-throughs. In most cases, this prevents the wire breakage. The defective can is then rejected without interruption to production.

The workload on the operator is minimal, consisting primarily of two supervisory tasks. The displayed Quality Coefficient (QC) must be observed, to confirm that there is no 'drift' in the performance of the welder, and the reject tracking counter must be verified periodically.

This Monitor is compatible with all known types of welder power supply, including the latest high frequency 'Unisoud' type.

A useful optional accessory for the WM-4 is the Reject Supervisor. This is a plug-in board with an external wiring harness which offers the ability to count hot and cold reject cans separately. In addition, the Reject Supervisor can be set to halt production if the rate of defective can production exceeds a chosen percentage. Also, if cans are being welded together at the welding rolls ('twinning'), the board will stop production to prevent the resulting track elevator 'wrecks' from causing wire breakage or other damage.

The WM-4 Monitor is supplied with all the internal and external components needed for installation, including a wiring harness, can rejector station and current pickup assembly. Vertex provides instructions to guide plant electricians through the installation process, which takes approximately sixteen man-hours.

The price of the Monitor includes two days of labor costs for a Vertex engineer on site to assist with training of plant personnel and commissioning of the installed unit.

The price for a WM-4 Weld Monitor as described above is \$32,500 USD subject to formal quotation. The optional Reject Supervisor costs an additional \$5,611 USD.

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On-Line Measurement Capability

Vertex has carried out successful feasibility trials of a system which measures can dimensions 'live' as the cans proceed down the production or filling line. Initially, the dimension tested was the double seam height (also known as the double seam length), but the same principle can be used for other visible parameters such as can height. Potentially, flange width and even bead depth can be measured. The system is camera-based and generates a stream of numerical measurements. These are associated with their corresponding seamer, flanger or beader heads, as appropriate.

Vertex has the capability to write its own software programs (such as the double seam analysis program which accompanies its 'VideoGauge' static measurement system). This will allow us to provide statistical analysis of the live data arriving from the on-line gauging unit. In the past, Vertex has linked its software's output data to the well-known Northwest Analytical 'Quality Analyst' program, but other formats can be accommodated.

At present, we would like to discuss our customers' priorities so that we can tailor a solution that best serves their needs.

We are confident that a two-piece can filling plant can now be supplied with a double seam height gauge, once preferences for data processing are finalized.

We expect that the same system can be used in a three-piece can manufacturing plant to measure the 'manufacturer's end' double seam height, if this is worthwhile.

The system can be modified for use in a three-piece can manufacturing plant to measure the finished can height. We can confirm this hypothesis here at Vertex.

We also believe that this system can be used in a three-piece can manufacturing plant to measure flange width. We will need to obtain a supply of typical flanged can bodies to test this theory.

We invite our interested customers to submit their requirements so that we may discuss how best to fulfill them.

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Wireless Plant Supervision

Developments in the field of wireless data transmission (typified by the license-free 'Wi-Fi' technology) have opened the door to remote supervision of a production plant. This is timely, since personnel reductions have increased the risk that process changes will go undetected. Changes in the process often lead to the manufacture of defective product, with high associated costs.

Vertex has confirmed that inexpensive commercial grade wireless networks work reliably in typical can manufacturing plants. With regard to Vertex' Weld Monitor customers, the way is now clear to make use of a long-dormant accessory for these machines. The Performance Data Link Board fits into the Weld Monitor chassis and provides a data stream describing the performance of the bodymaker (see details below). In the past, this data was intended to be printed out at the machine for later analysis. In practice, this did not happen, and the value of the information was lost. With the advent of a wireless link to a central location, the data can be automatically captured, logged and acted upon. Custom software will alert personnel to critical process changes, and line performance records can be made available without further operator action. In simpler terms, if the line is running well, you can prove it – if it is not, you can react quickly to correct it.

Vertex writes its own software programs (such as the double seam analysis program which accompanies its 'VideoGauge' static measurement system). This will allow us to provide statistical analysis of the live data arriving from wireless stations. In the past, Vertex has linked its software's output data to the well-known Northwest Analytical 'Quality Analyst' program, but other formats can be accommodated.

The Performance Data Link is not the only source of production data – 4000 and 5000 series Soudronic Bodymakers can be configured to provide a data output, and Vertex can link other production machines as needed. The low cost of installation, together with the minimal disruption to production, allows an entry-level system to be installed without a great commitment of time or money. Later expansion would be equally simple.

At present, we would like to discuss our customers' priorities so that we can tailor a solution that best serves their needs.

We invite our interested customers to submit their requirements so that we may discuss how best to fulfill them.

Wireless Plant Supervision – Page Two of Two

Data available from the Weld Monitor, via the Performance Data Link option board:

- Bodymaker uptime (duration machine is operative)
- Bodymaker downtime
- Number of cans produced
- Number of cans rejected as hot
- Number of cans rejected as cold
- Average Quality Coefficient (QC) reading during previous period
- Present QC reading

Data available from the Soudronic Bodymaker:

- Wire speed
- Can output rate
- Runout conveyor speed
- Welding current

Other data can be obtained – such as oven temperature, lacquer flow rate, can dimensions

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4/6/2006