Technical Overview for Stereoscopic Width Gauge

Strip Width Measurement System

Global Gauge Corporation

Global Gauge Mission

We will consistently deliver the most advanced, accurate and reliable measurement systems to flat product producers throughout the world. We will continue to succeed because of our hard work, our innovative solutions and our intense commitment to solving our customers' problems.

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Contents

REVISION HISTORY **2**

1.0 APPLICATION INFORMATION **3**

1.1 Application Information 3

2.0 GLOBAL GAUGE RECOMMENDED SYSTEM **4**

2.1 Overview of Proposed Solution 4
2.2 System Block Diagram 5
2.3 Calibration Light Box 5
2.4 Measurement Philosophy 6
2.5 Specifications 6

3.0 SCOPE OF SUPPLY **7**

3.1 Stereoscopic Width Gauge 7
3.2 Documentation 7
3.3 Installation, Commissioning, & Training 7

4.0 GLOBAL GAUGE CORPORATION – KEY CONTACTS **8**

Revision History

Date	*Remarks*	*Revision*
April 25, 2024	Author: D. Kober	A_00

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1.0 Application Information

1.1 Application Information

Application

Desired Unit of Measurement: Metric or Imperial
Material Thickness Range: Flexible, to be provided by customer
Material Width Range: Flexible, to be provided by customer
Mill Speed Range: Flexible, to be provided by customer

Utilities

Power: 120V, 60HZ, 10-15 amp

This proposed solution covers the furnishing of all services, labour, and material required with the design, fabrication, and delivery of a Stereoscopic Width Gauging System.

The system will be engineered, designed, and manufactured to meet the requirements as defined by the customer.

The Width Gauge manufactured by Global Gauge for this application is a non-contact measurement system using state of the art digital GigE camera operating at high speed to measure the width of the material.

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2.0 Global Gauge Recommended System

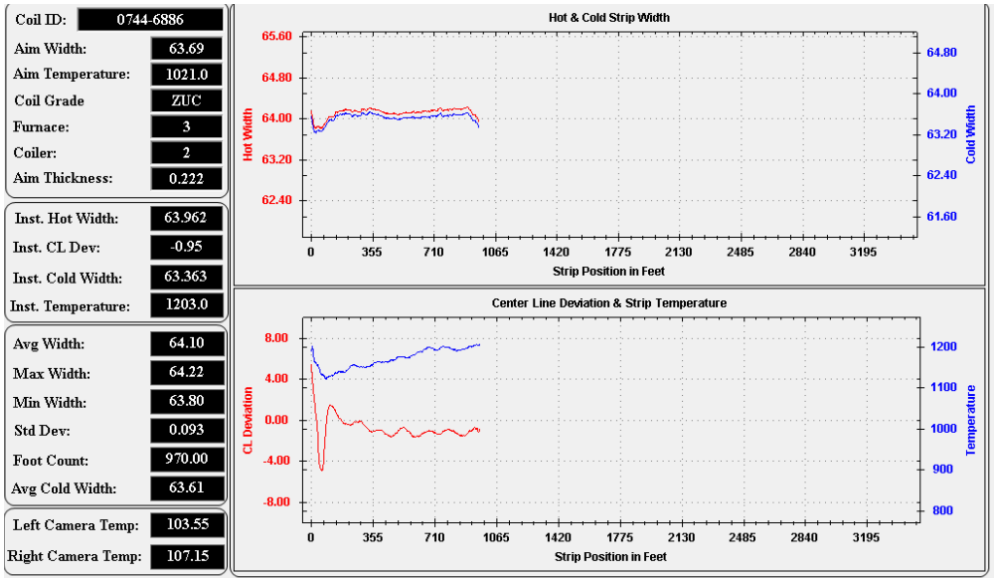
Global Gauge Corporation (GGC) is a manufacturer of industrial measurement and control systems for steel mill applications throughout the world. We have been successful providing solutions to rolling mill customers for 20+ years. Many of our staff members have 30 - 40 years of experience in this industry.

2.1 Overview of Proposed Solution

The primary purpose and objective of installing a Width Gauging System at this location is to measure the width of the Strip as it's being processed and inform of Width.

Based on the experience of installing multiple steel mill width gauging systems around the world and understanding the usage of different sensors technologies at different steel mills, GGC employs a solution that has been proven to provide extremely accurate results even in the most difficult mill environments.

The Figure below illustrates a sample HMI Screen for an existing GGC Width and Centerline Deviation measurement system. The customer application designed for this project may closely resemble this HMI, but can be customized with customer input:



GGC Width/CL Deviation Measurement System HMI

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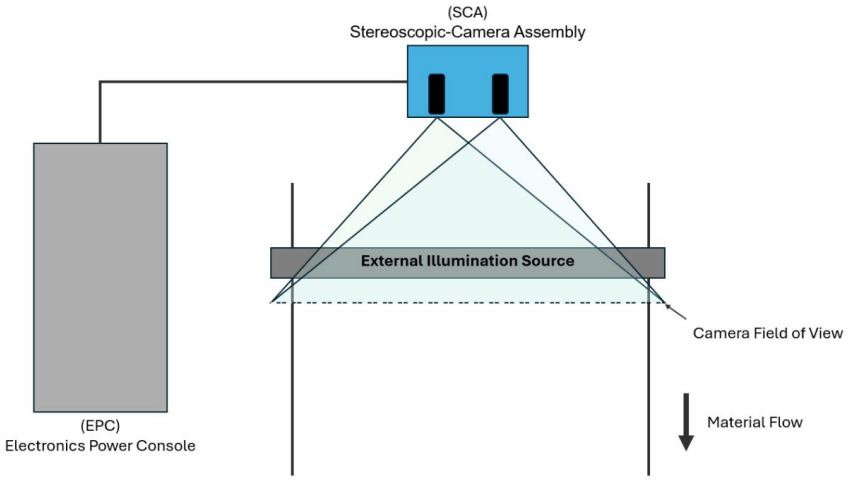
2.2 System Block Diagram

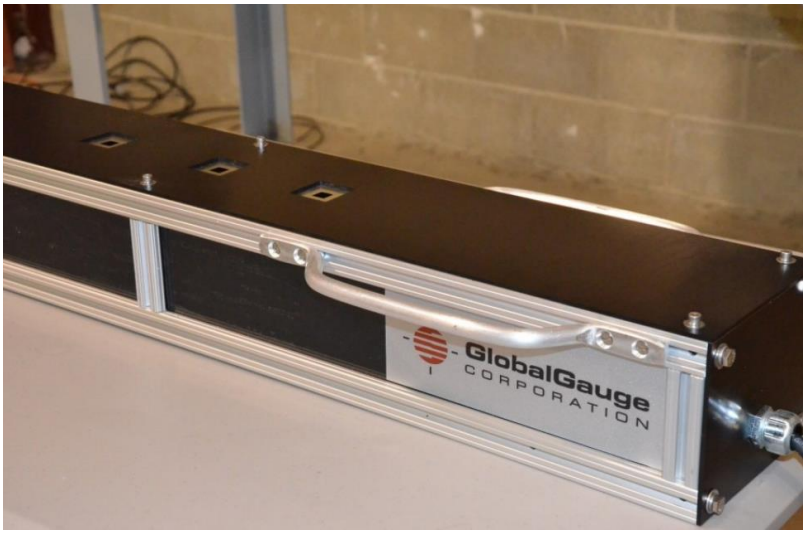
The primary system components of the Global Gauge Width Gauge are the Electronics Power Console (EPC) and Stereoscopic-Camera Assembly (SCA). The EPC houses the Gauge PC and associated components. The Figure below illustrates the block diagram of the width gauge system.



Width Gauge Basic Block Diagram

2.3 Calibration Light Box

A certified calibration light box will be provided for calibrating and verifying the camera calibration. The primary purpose of this light box is to align and calibrate the camera. The light box can also be used for verifying the camera alignment and calibration periodically.



Calibration Light Box

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2.4 Measurement Philosophy

The measurement philosophy for measuring the width of the material using line scan cameras depends on the following factors:

- Using external illumination source to illuminate the roller table across the width.
- Ensuring the camera line of sight is in between two rolls or has contrast for determining edges.
- Operating the Line scan camera at high speed.

The following describe the sequence of steps for the required measurements of width:

1) As the material travels under the camera, the camera is continuously imaging the width and the gauge software processes the acquired images to determine the precise location of the material edges both on the operator and drive side.

2) These edges are converted into physical locations on the roller table and width computed. This width and centerline deviation are displayed in real time on a user-friendly supplied HMI screen.

3) When the material finally leaves the camera line of sight or signal of coil completion, all the strip data will be archived for quality purposes.

2.5 Specifications

The Global Gauge Width Gauge will operate under the following specifications:

S.NO.	SPECIFICATION	SPECIFICATION VALUE
1	Number of cameras	Qty. 2 in stereoscopic arrangement
2	Type of cameras	Linescan Camera with 4096 pixels
3	Camera mounting height	TBD
4	Camera Interface	GIG E
5	Measurement Accuracy	± 0.015” (adjustable)
6	Mill Interface	TCP/IP
7	Strip temperature range	Ambient
8	Software Package	HMI software, diagnostics software and data archiving software

Standard I/O (can be adjusted and configured based on customer’s needs/desires)

4 Digital Input	2 Analog Input
4 Digital Output	2 Analog Output

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3.0 Scope of Supply

The following equipment would be provided under this project. All components are being provided to result in a fully functional Width Gauge System, including all interconnecting cables.

3.1 Stereoscopic Width Gauge

Stereoscopic Camera Assembly (SCA)
1 Unit, including but not limited to:

- Camera enclosure, sealed for camera protection.
- High Speed Digital Linescan Camera Assembly (GigE), including Lenses & Focus Bodies.
- Industrial Mount for Camera Alignment
- Optical Ports for Camera Imaging, including Optical Filters

Electronics Power Cabinet (EPC), Rittal, including:
1 Unit, including but not limited to:

- Industrial PC, Win10 with Flat Panel Monitor, Keyboard and mouse
- GGC Width Gauge Software

Certified Calibration Light Box

- For calibrating the Width Gauge

Illumination Source – As Required

- LED Lights to illuminate the roller table across the width

System Cables as Required

- System cables from the EPCs to the camera assembly
- Cat 6 cables, up to 100m
- Local Power Cables, up to 25 m

3.2 Documentation

- System drawings, Operator's and Maintenance Manuals, in standard GGC format

3.3 Installation, Commissioning, & Training

- Supervision, Commissioning, and Training Services as Required (billed separately at actual costs)

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4.0 Global Gauge Corporation – Key Contacts

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