General Specifications

Online Coat Weight Measurement System for Battery Electrode Sheets System Specifications

WEBFREX3ES

GS 14M04A10-20E-Z1

[Style: S1]

■ Overview

WEBFREX3ES is a system specifically designed to measure coat weights of battery electrode sheets. The beta-ray sensors accommodated on the scanner frames measure the weight of sheet at before and after coating, and the coat weight is obtained by the calculation of the difference of the weight values (indirect method).

WEBFREX3ES provides various measurements and data processing features to assist the battery electrode production.

This General Specifications (GS) describes equipment, functional specifications, networks, and configurations for WEBFREX3ES system.

■ Equipment

WEBFREX3ES consists of the sensor that measure the sheet weight, a frame on which the sensor is mounted, a measurement manager station, and a measurement operator station.

● Frame and sensor

The sheet weight is measured by the dedicated sensor and the frame with which the sensor is equipped and that scan sheets from edge to edge. The obtained measurement data is sent to a measurement manager station via a dedicated network for measurement data ESnet-M.

- **Frame**

  WG41F11C: Compact O frame

A space-saving O-frame is available. One sensor can be installed on this frame. Up to five frames can be connected to one system.

A frame processor controls the frame operations with high accuracy and high speed.

For information on the external dimensions and other specifications, refer to “WG41F11C Compact O Frame (GS 14M04B10-20E-Z1).”

- **Sensor**

  WG41B1C: Beta-ray sensor (source: ^{85}Kr)

A beta-ray transmission method sensor is available. It accurately measures any sheet materials and coat materials.

For information on the measurement ranges and other specifications, refer to “WG41B1C Beta-ray Sensor (GS 14M04C10-20E-Z1).”

● Measurement manager station

WG41U1B: Measurement Manager Station

The measurement manager station consists a measurement unit, multi-frame synchronous processor, and system contact I/O terminal block. It is a board type device and can be housed in 19-inch racks.

- **Measurement unit**

The measurement unit creates profiles from raw signals measured by the sensor and uses indirect method to produce coat weight data from profile data of uncoated sheets and of coated sheets.

One system requires one measurement unit regardless of the number of frames and sensors.

- **Multi-frame synchronous processor**

The multi-frame synchronous processor is a unit specifically designed to perform synchronous control to determine coat weight data by measuring the same point of uncoated sheets as that of coated sheets.

It is connected to the frames via a dedicated network for synchronous control ESnet-S.

The multi-frame synchronous processor is required for the multi-frame system.

- **System contact I/O terminal block**

This terminal block is used to connect contact output signals that indicate the occurrence of an alarm or a failure and contact input signals that show the issuance of operation commands to the frame.

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GS 14M04A10-20E-Z1

3rd Edition Oct. 29,2012

● Measurement operator station

The measurement operator station allows displaying thickness profiles, coat weight profiles and other measurement data, issuing SCAN, RETIRE and other operation commands to the frame, setting parameters for frames and sensors, monitoring alarms and other operations.

Windows PC workstation on which dedicated software is installed serve as a measurement operator station.

One main measurement operator station and one sub measurement operator station can be connected to one system.

Recommended PC specifications are as follows:

OS: Microsoft Windows 7 Professional Service Pack 1 (64-bit edition)
CPU: Intel Xeon W3530 (2.80 GHz)
Memory: 6 GB
HDD: 250 GB RAID1
Optical drive: DVD-ROM

● Network devices

ESnet-M and ESnet-S are both the Ethernet based networks.

Use general-purpose products for the devices described below:

ESnet-M cable: An Ethernet cable that meets 100BASE-TX specifications and has a length of up to 100 m.
HUB: A switching hub for ESnet-M. Up to nine ports of the hub will be used.
ESnet-S cable: An Ethernet cable that meets 10BASE-T specifications and has a length of up to 100 m.
HUB: A switching hub for ESnet-S. Up to six ports of the hub will be used.

■ System specifications

● Minimum system configuration

The minimum system configuration consists of the following equipment:

Frame: One
Sensor: One
Measurement manager station: One
Measurement operator station: One

● Maximum system configuration

The maximum system configuration consists of the following equipment:

Frame: Five
Sensor: Five
Measurement manager station: One
Measurement operator station:
  Main: One
  Sub: One
Profile stack server: One

■ Measurement and operation monitoring functions and software

● Measurement and operation monitoring functions

Install the following software into the equipment in the system to implement the measurement function of WEBFREX3ES:

WG41ESS01: Basic Operation Software
WG41ESM01: Basic Operation Software Medium (DVD-R)
WG41ESS11: Frame Processor Software
WG41ESM11: Frame Processor Software Medium (DVD-R)

- **Frame operations**

The following operation commands are issued to frames and sensors mounted on them:

SCAN: SCAN measurement
RETIRE: Stops measurement at the off sheet position
AUTCAL: Sensor calibration
SETPOS: Single point measurement

- **Measurement calculation**

Determines coat weights and thicknesses. Select one engineering unit for each system.

Basis weight calculation: Performs various compensations and unit conversion by using sensor signals to compute calibrate values.
Measured values: Basis weight (g/m^2 and mg/cm^2)
Thickness (μm and mm)
Coat weight (g/m^2 and mg/cm^2) (*1)
Number of profile data points: 1,500 (Max.)
Profile data pitch (mm): Selectable from 1.0, 2.0, 2.5, 3.0, 4.0, 5.0, or 10.0 mm

*1: Calculated from a difference in measured values between an uncoated sheet and a coated sheet, or determined by using the base material thickness.

● Engineering

EG45WEB60: Engineering for Basic Operation Software

■ Optional functions

● Profile Stack Server

The Profile Stack Server stores various measured data, such as weight profile, zone positions and zone averages to facilitate quality and productivity of the process. Install this function onto a Windows PC that satisfies that satisfy the following specifications and that can run SQL Server 2008 R2.

OS: Microsoft Windows 7 Professional Service Pack 1 (64-bit edition)
CPU: Intel Xeon W3530 (2.80 GHz)
Memory: 4 GB
HDD: 20 GB (for OS) + 4 GB × number of profiles to be stored
Optical drive: DVD-ROM
WG41ESS80: Profile Stack Server Software
WG41ESM80: Profile Stack Server Software Medium (DVD-R)
EG45WEB60-/S: Engineering for Basic Operation Software/Profile Stack Server

Note that Profile Stack Server must be installed on the different computer that serves as a measurement operator station.

● 3D Profile window

The 3D Profile window has display and analysis functions that allow profile data stored in the profile stack server to be shown in 3D to visually recognize the product quality. This window can be installed into a stack server PC or measurement operator station.

WG41ESS81: 3D Profile Software
WG41ESM81: 3D Profile Software Medium (DVD-R)

● Network for optional functions

When a profile stack server PC is connected to the network, prepare a firewall router or a switching hub, and then connect the measurement operator station to the profile stack server PC via the router or the hub over the stack server network.

Add a communication port to the measurement operator station when the apparatus in WEBFREX3ES is connected to other networks, such as factory networks. When WEBFREX3ES includes the stack server network, connect the equipment with the network external to WEBFREX3ES through a firewall router or a switching hub over the stack server network.

■ Model and suffix codes

The following table shows the model and suffix codes of the measurement manager station. For information on the model and suffix codes of the frames and sensors, refer to the appropriate GS.

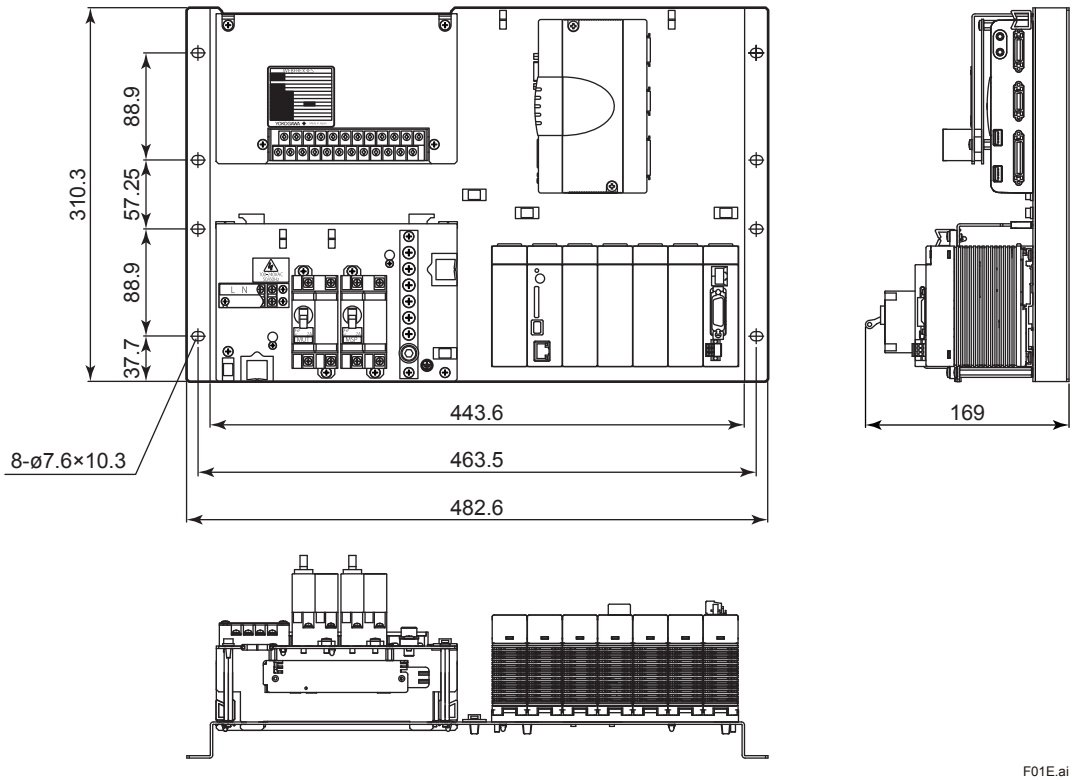
Model	Suffix Codes	Optional Codes	Specifications
WG41U1B	----------	----------	Measurement Manager Station
Auxiliary	-0	----------	Always -0
Power Supply Voltage	-B1	----------	100 to 240 VAC system
Measurement Unit	-A1	----------	with Measurement Unit (*1)
Mounting Kit for MSP	-NN	----------	without Mounting Kit for MSP (*2)
	-A1	----------	with Mounting Kit for MSP (*3)
		/D1	External Sheet Speed Analog Input for Synchronized SCAN (*4)
		/D2	External Sheet Speed Pulse Input for Synchronized SCAN (*5)

Note: One system contact I/O terminal block is included.
Note: Can be housed in 19-inch racks. A dedicated mounting box for the measurement manager station is not supplied.
*1: One measurement unit is included.
*2: The multi-frame synchronous processor is not required for the single-frame system.
*3: Be sure to specify this code for the multiple-frame system. Separately order the multi-frame synchronous processor. Sheet speed signals are required for synchronous control. Be sure to select the optional code "/D1" or "/D2."
*4: Required when sheet speed analog signals (4 to 20 mA) are input to the multi-frame synchronous processor.
*5: Required when sheet speed pulse signals (24 VDC, 0 to 20 kHz, and pulse width is 10 µs or more) are input to the multi-frame synchronous processor.

■ Outline drawing

The following figure is the outline drawing of the measurement manager station. For the outline drawings of the frames, refer to the appropriate GS.

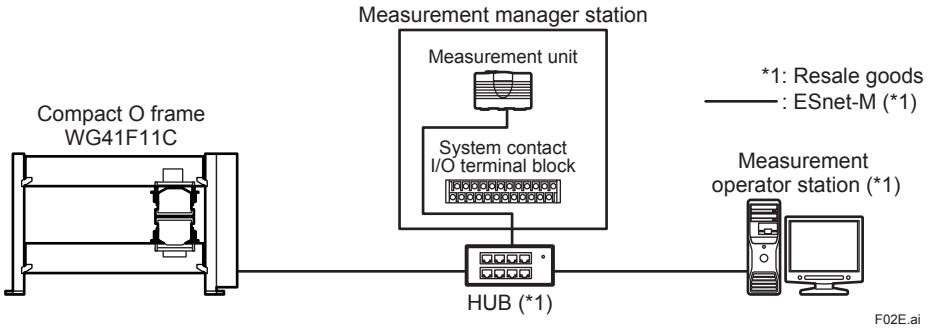
Third angle projection
Unit: mm
Estimated weight: 7 kg



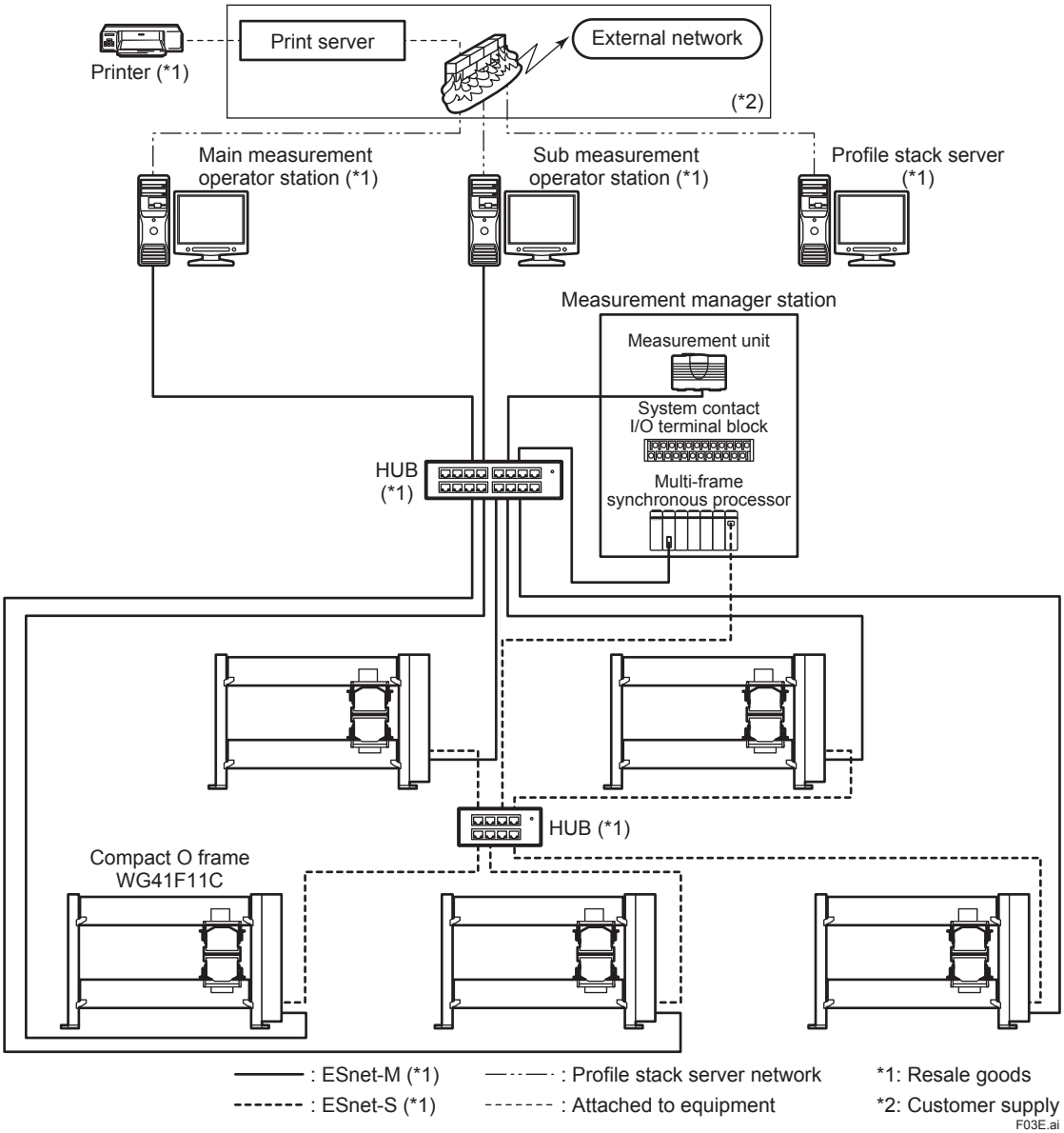
Outline Drawing of Measurement Manager Station

■ System configuration

● Example of minimum system configuration



● Example of maximum system configuration



■ Regulatory Compliance

Safety Standards

[IEC61010-1] (WG41U1B)

[NFPA79] (WG41F11C, for 100, 110, 115, and 120 VAC power supply)

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