

# General Specifications

WG41F11C  
Compact O Frame

WEBFLEX<sup>TM</sup>3ES

GS 14M04B10-20E-Z1

[Style: S1]

## ■ Overview

The WG41F11C Compact O frame is a space-saving frame designed for coating lines of battery electrode sheets. This space-saving frame performs high-speed scanning by using our unique drive mechanism to precisely measure the quality of high value-added sheets.

This frame consists of its main body, a linear servo drive system, a frame processor, and a sensor head package.

### ● Minimum scan time of 3 seconds (\*1)

A completely new designed traverse mechanism adopting the linear servo drive system accomplishes scanning at 3 seconds.

Yokogawa's linear servo motor using the magnetic bias method generates the high power thrust and performs smooth acceleration and deceleration to achieve ideal speed control and precise positioning.

\*1: Refer to Figure "Minimum Scan Time and Measurement Width."

### ● Accurate coat weight measurement with synchronous measurement system

Improved communication speed between frames has enhanced the accuracy of a proven synchronous measurement system.

The system measures actual coat weight without being affected by variations of base sheets.

### ● Dedicated high-performance processor

A dedicated high-performance processor provides high-speed scanning.

### ● High resolution measurement of 1 mm in cross-machine direction

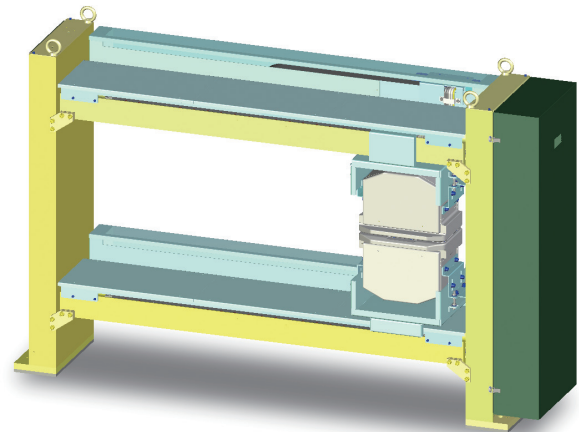
This frame performs high resolution measurement even on high speed coating lines.

### ● Compact and space-saving

The size of WG41F11C is smaller in both the cross-machine and height directions than that of our conventional frames, allowing the Compact O frame to be placed in narrow spaces.

### ● Clean environmentally friendly

This frame has clean environmentally friendly specifications, such as a cable track. The cable track prevents dust collecting on the sheet surface.



### ● Sensor suitable for high-speed production lines

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

WG41B1C: Beta-ray sensor (non heat-up type)

## ■ Technical points - FAST & FLEXIBLE -

### ● FAST - faster measurement -

Accurately measuring and controlling coat weights of battery electrode sheets is very important because the coat weight of the sheets largely influences the performance and cost of batteries. In addition, coat weight data are valued in order to trace the quality and performance of batteries in the inspection process and after delivery. For this reason, thickness gauge systems are expected to measure and save coat weight data per cells. Our new drive mechanism allows the Compact O frame to perform high-speed scanning with the minimum one-way scan time of 3 seconds (\*1), thereby allowing more precise measurement than that carried out by conventional frames.

\*1: Refer to Figure "Minimum Scan Time and Measurement Width."

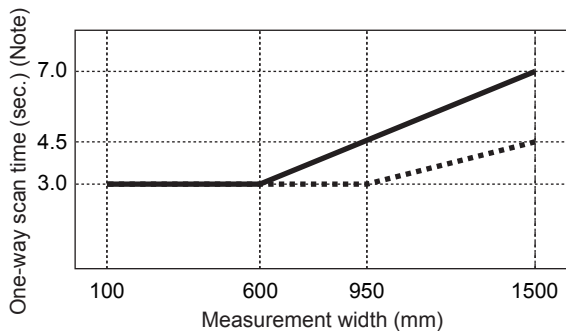
### ● FLEXIBLE - installable in restricted spaces -

Lines for battery electrode sheets are compact in size. This has forced these kinds of lines to be adapted in order to ensure installation spaces for conventional frames for thickness gauge systems. The simplified drive mechanism of the Compact O frame allows the frame to be placed in space-saving designed lines for battery electrode sheets.

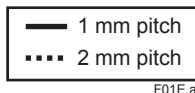
## ■ Specifications

### ● Frame

Shape/structure: O-frame/U-beam structure  
 Frame length: 1,960 mm or 2,660 mm  
 Beam width (machine direction): 430 mm  
 Measurement system: Sensor scanning system  
 Measurement width: 800 mm or less or 1,500 mm or less  
 Measurement points: 800 points or less or 1,500 points or less  
 Measurement pitch: 1.0, 2.0, 2.5, 3.0, 4.0, 5.0, or 10.0 mm  
 Installable sensor type:  
 WG41B1C: Beta-ray sensor (non heat-up type) (source: <sup>85</sup>Kr)  
 Number of sensors to be mounted: One  
 Sensor head speed: 3 to 30 m/min. (variable)  
 In RETIRE operation: 6 m/min. (fixed)  
 In LOCAL mode: 3 m/min. (fixed)  
 Sensor head drive system: Servo drive system  
 Method of splitting the sensor heads: Manual  
 Operation switches: LOCAL and COMPUTER mode switches, and JOG FORWARD, JOG BACKWARD, SCAN, and RETIRE command switches  
 Frame processor: Yokogawa FA-M3V  
 Size of sensor head package:  
 Machine direction: 240 mm  
 Cross-machine direction: 320 mm  
 Frame height: 1,180 mm (does not include the lifting hardware)  
 Pass line height: 650 mm  
 Sensor head angle: 0° ±10°  
 Measurement range: Refer to "WG41B1C Beta-ray Sensor Specifications (GS 14M04C10-20E-Z1)."



Note: Includes a time when the sensor head stops at the sheet edge.



Minimum Scan Time and Measurement Width

Surface finishing:  
 None: SUS  
 Beam cover and carriage arm  
 Paint finish: Color to be painted (the Munsell color code is for reference).  
 Sensor head package: Alumite finish or lamp black (Munsell 0.8Y2.5/0.4)  
 Frame main body: Frosty white (Munsell 2.5Y8.4/1.2)  
 End column cover: Pale sea moss green (Munsell 7.8Y5.0/2.1)  
 Connections of cables and pipes:  
 Connection terminal for power supply wiring: M5 screw  
 Connection terminal for ground wiring: M8 screw  
 Connection terminal for external contact I/O wiring: M3.5 screw  
 Fitting part for clean dry air inlet pipe: Rc 1/2 (female)  
 Fitting part for electrical wiring protection tube: Nominal diameter 36 mm  
 Measurement bus wiring inlet: Nominal diameter 36 mm  
 Power supply wiring inlet: Nominal diameter 22 mm  
 Environment:  
 Ambient temperature:  
 Sensor: 0 to 50 °C  
 F- and B-end columns: 0 to 45 °C  
 Ambient humidity: 20 to 90 %RH (non-condensing)  
 Utilities:  
 Electrical power: Reference voltage (V) ±10 %AC, 50/60 Hz ±2 Hz, high-frequency component is 5 % or less  
 Reference voltage: 100 VAC  
 Power consumption: 0.8 kVA  
 Grounding: 100 Ω or less, separate grounding  
 Air purge:  
 Cleaned air: An air with a dew point of 0 °C or less at a supply pressure and cleaned through a filter of 0.01 μm or less  
 Temperature: 0 to 35 °C  
 Dust quantity: 0.02 mg/N•m<sup>3</sup> or less  
 Supply pressure: 392 to 686 kPa  
 Air consumption: 8 N•m<sup>3</sup>/h

### ● Transformer

Surface finishing: Paint finish  
 Color: Frosty white (Ref.: Munsell 2.5Y8.4/1.2) (The Munsell color code is for reference.)  
 Connections of cables:  
 Connection terminal for power supply wiring: M5 screw  
 Connection terminal for ground wiring: M5 screw  
 Cable inlet: Cable gland for cables of ø10 to 14 mm  
 Environment:  
 Ambient temperature: 0 to 40 °C  
 Ambient humidity: 45 to 85 %RH (non-condensing)  
 Utilities:  
 Electrical power: Reference voltage (V) ±10 %AC, 50/60 Hz ±2 Hz, high-frequency component is 5 % or less  
 Reference voltage: 110, 115, and 120 VAC  
 Power consumption: 0.8 kVA (including the Frame)  
 Grounding: 100 Ω or less, separate grounding

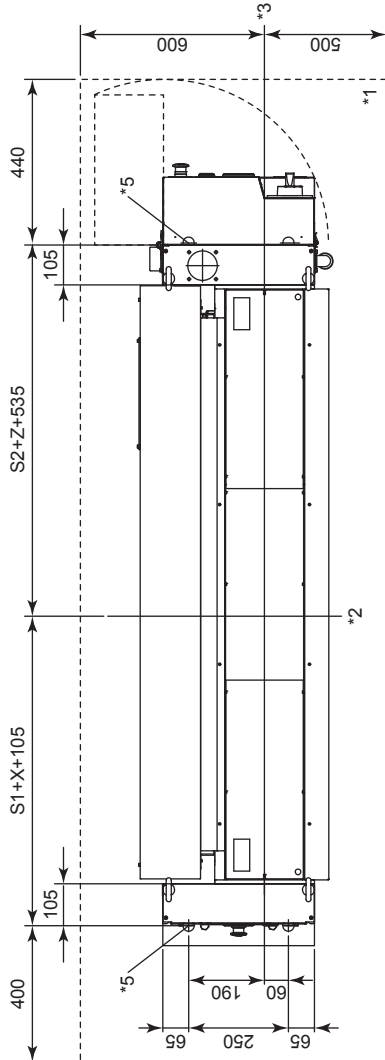
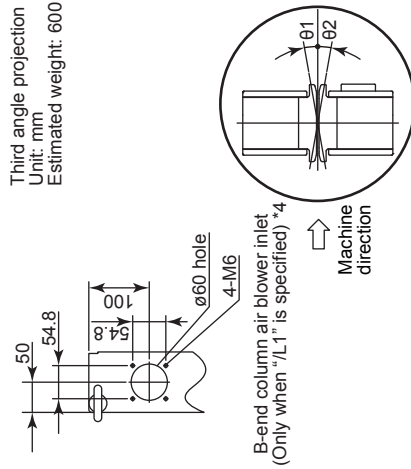
## ■ Model and suffix codes

Model	Suffix Codes	Optional Codes	Specifications
<b>WG41F11C</b>	-----	-----	Compact O Frame
Frame Length	<b>-C19</b>	-----	Frame Length 1,960 mm and Maximum Measurement Width 800 mm (*1)
	<b>-C26</b>	-----	Frame Length 2,660 mm and Maximum Measurement Width 1,500 mm (*2)
Sheet Flow Direction	<b>-R</b>	-----	Sheet flows from right handed side when viewed from B (Machine Drive) side (*3)
	<b>-L</b>	-----	Sheet flows from left handed side when viewed from B (Machine Drive) side (*3)
Sensor Head Angle	<b>-NN</b>	-----	No Tilt (*4)
	<b>-A1</b>	-----	Tilted (*4)
Sensor Type	<b>-B1N</b>	-----	Beta-ray Sensor (Non Heat-up Type) (*5)
Drive Unit	<b>-S</b>	-----	Servo Drive System
Communication Spec.	<b>-S1</b>	-----	Frame Processor
Auxiliary	<b>-NN</b>	-----	Always NN
Power Supply Voltage	<b>-A1</b>	-----	100 VAC ± 10 %, 50 Hz ±2 Hz/60 Hz ±2 Hz
	<b>-A2</b>	-----	110 VAC ± 10 %, 50 Hz ±2 Hz/60 Hz ±2 Hz (*6)
	<b>-A3</b>	-----	115 VAC ± 10 %, 50 Hz ±2 Hz/60 Hz ±2 Hz (*6)
	<b>-A4</b>	-----	120 VAC ± 10 %, 50 Hz ±2 Hz/60 Hz ±2 Hz (*6)
	<b>/B</b>		External DI and External DO (Relay Output) (*7)
	<b>/D1</b>		Sheet Speed Analog Input for Synchronized SCAN (*8)
	<b>/D2</b>		Sheet Speed Pulse Input for Synchronized SCAN (*9)
	<b>/L1</b>		B-end Column Air Blow (*10)
	<b>/T</b>		Painted Finish of Sensor Case (Color: Lamp Black) (*11)
	<b>/R</b>		Export (*12)
	<b>/U</b>		Grease gun (*13)

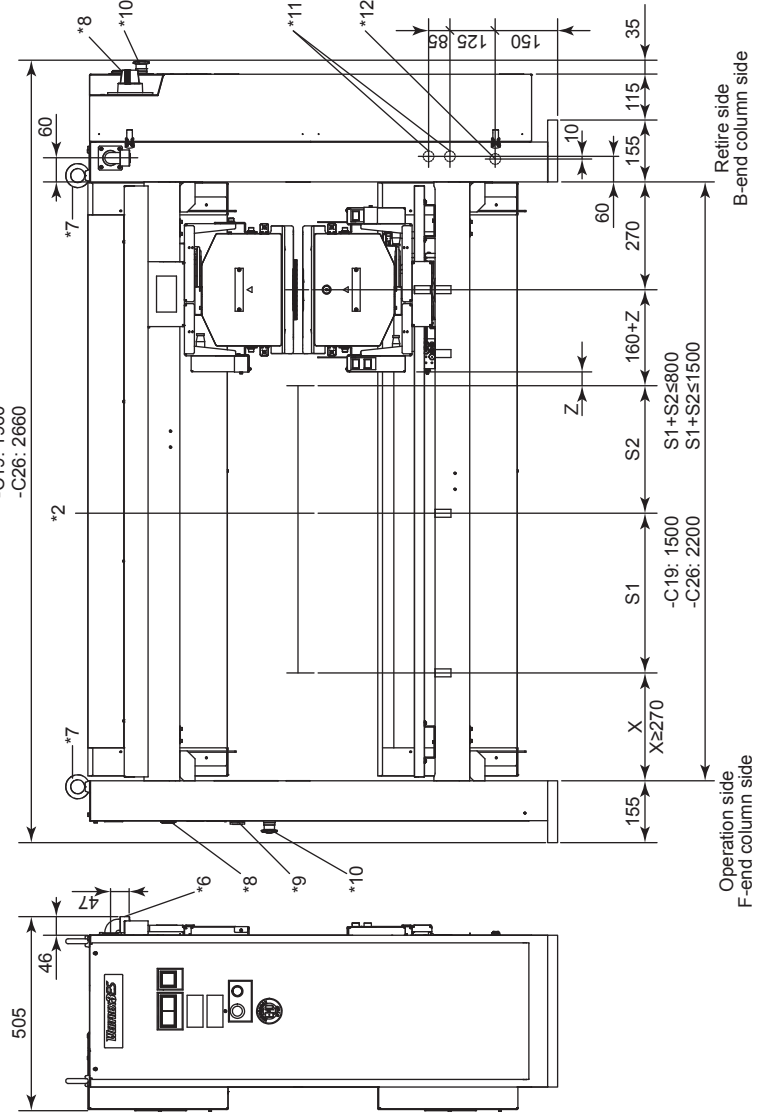
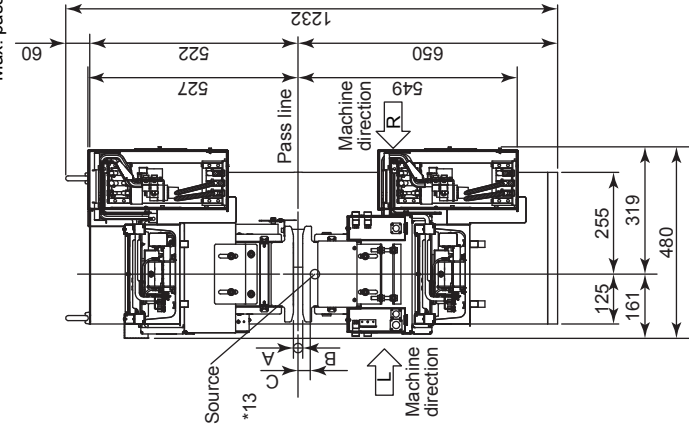
- \*1: Select the frame length.  
The frame length is 1,960 mm, its maximum measurement range is 800 mm, and its stroke is 1,000 mm. The beam covers are attached.
- \*2: Select the frame length.  
The frame length is 2,660 mm, its maximum measurement range is 1,500 mm, and its stroke is 1,700 mm. The beam covers are attached.
- \*3: Specify the sheet flow direction:  
Sheet flows from the right handed side seen from the B-end column: -R  
Sheet flows from the left handed side seen from the B-end column: -L
- \*4: Select the angle of the sensor head.  
0 °: -NN  
10 ° or less: -A1
- \*5: Separately order the sensor itself.  
The sensor case is finished with alumite. Select the optional code "/T" for the sensor case to be painted lamp black.
- \*6: An external power transformer is attached.
- \*7: The terminal blocks for external contact input (non-voltage contact) and for external contact output (relay contact output) are installed on the B-end column.  
Be sure to select this optional code for the terminal block when the sheet break signal is input.
- \*8: Required when the system has no multi-frame synchronous processor and profiles are to be managed on the basis of the sheet length, and when sheet speed analog signals (4 to 20 mA) are input to the frame processor (FA-M3).
- \*9: Specify this code when the system has no multi-frame synchronous processor and profiles are to be managed on the basis of the sheet length, and when sheet speed pulse signals (square wave of 0 to 24 V, 100 Hz or less, and pulse width of 5 ms or more) are input to the frame processor (FA-M3). Be sure to select the optional code "/B" for the terminal block.
- \*10: The air inlet, which is for blowing air into the B-end column, is included on the top of the B-end column.
- \*11: The sensor case is painted lamp black.
- \*12: The plates for export are mounted at the bottom of the both end columns. This frame is packed with the wooden crate and shipped.
- \*13: The grease gun is delivered together as an accessory. A minimum of one grease gun must be specified for each system.

**Outline drawing**

Third angle projection  
Unit: mm  
Estimated weight: 600 kg



When "Tilted (-A1)" is specified  
Max. pass line angle = ±10°



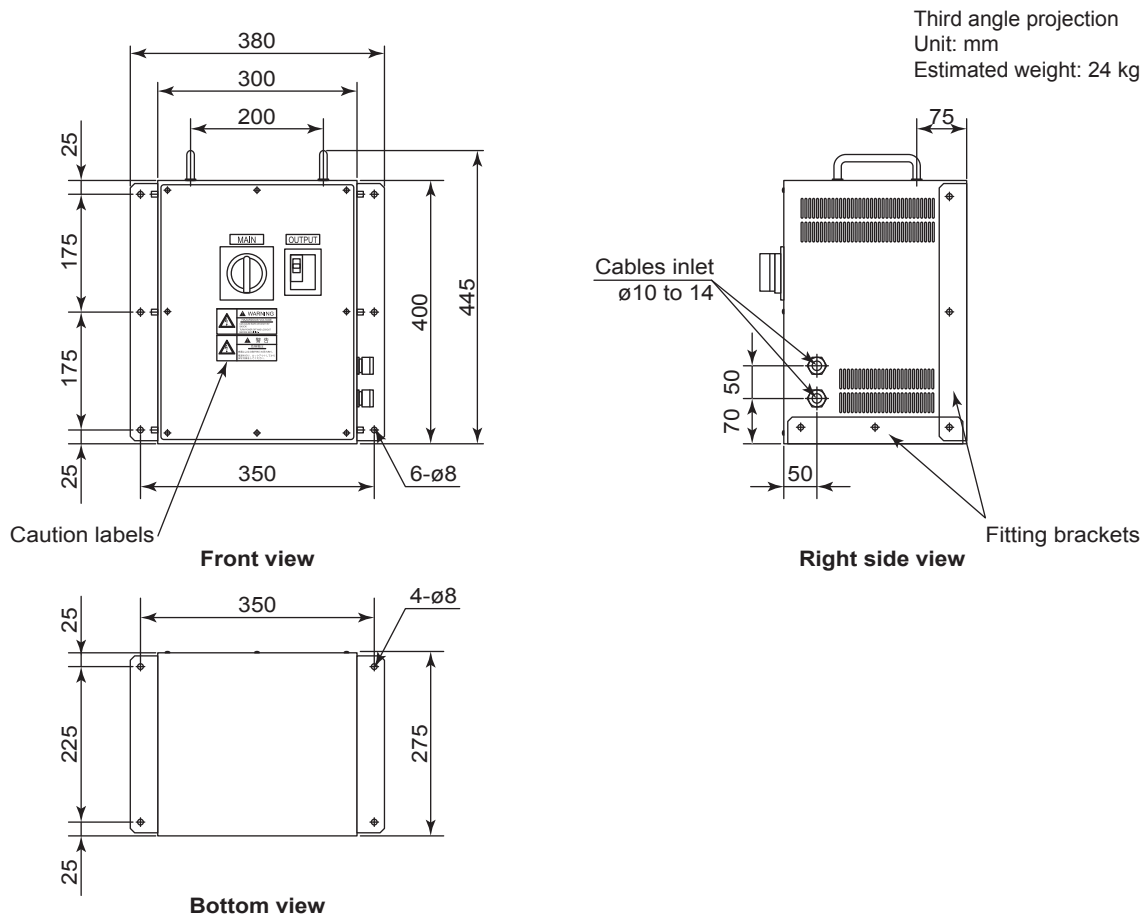
**WG41F11C Compact O Frame**

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- \*1: Maintenance space
- \*2: Machine center
- \*3: Sensor center
- \*4: In this drawing, the cover and the mounting screws attached before shipment are removed.
- \*5: Position of frame mounting screw (2-slot hole  $\varnothing 22 \times 32$ )
- \*6: Power cable inlet
- \*7: Lifting hardware (2-  $\varnothing 35$  hole)
- \*8: Shutter OPEN/CLOSE indicator
- \*9: Operation switch
- \*10: EMO button
- \*11: Signal cable inlet (opposite side)
- \*12: Air line joint (Rc1/2) (opposite side)
- \*13: Dimensions by measurement gap

	Measurement gap	A	B	C
Beta-ray sensor	23 mm	11.5	11.5	27.5
	8 mm	4	4	20

Note: Sheet pass height is 650 mm.  
Customers must adjust the actual level of the frame from the floor with liners.



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**Transformer**

**Regulatory compliance**

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

**Precautions**

Unpacking and installation of the frame must be performed under the direction of Yokogawa's service personnel or under the direction of persons specifically licensed by an Agreement State or the US Nuclear Regulatory Commission.

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