



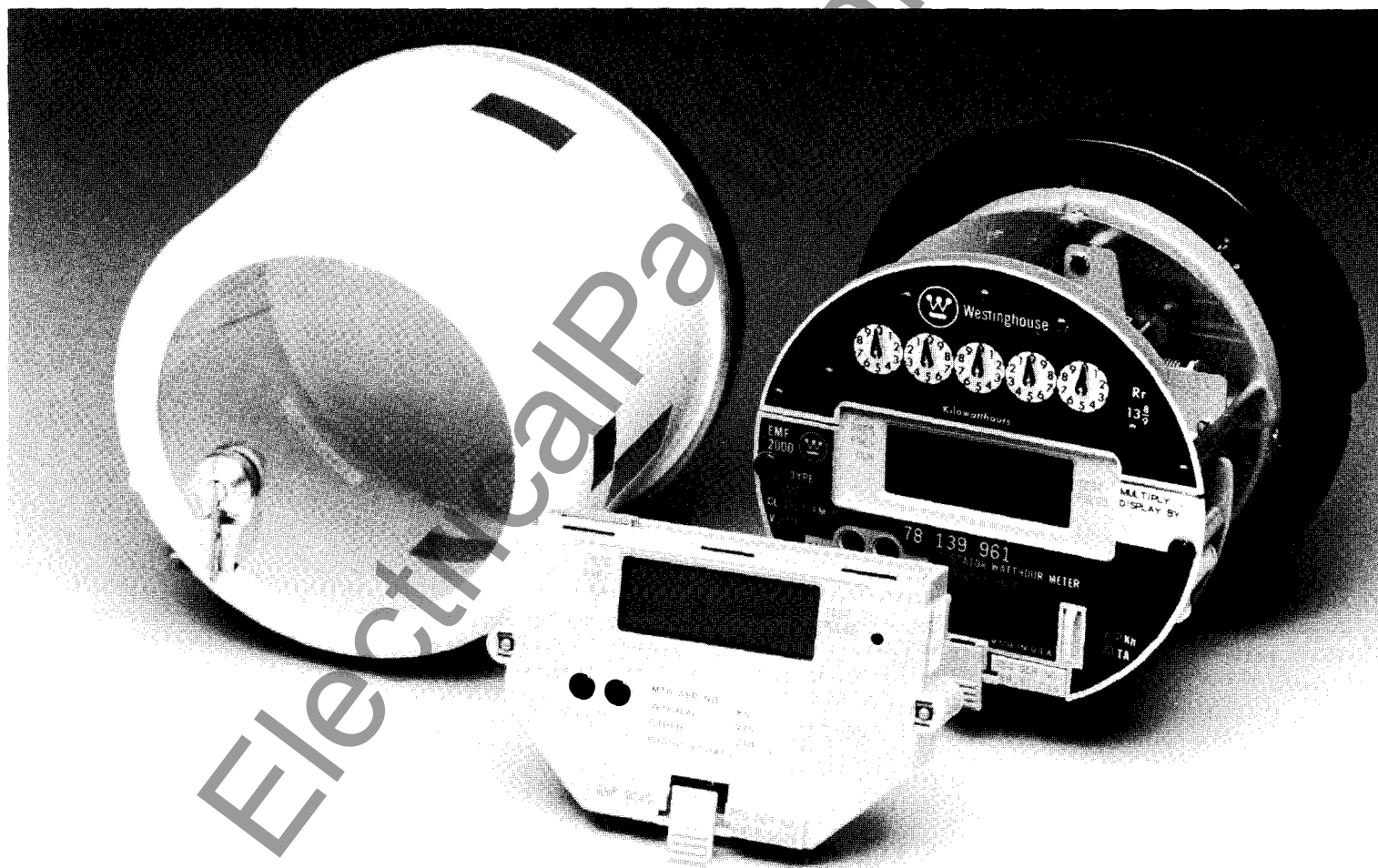
Westinghouse Electric Corporation
Measurements and Control Division
Raleigh, North Carolina, U.S.A. 27611

Product Bulletin
42-210

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New Information
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EMF-2110 Demand Modules





Description

The EMF-2110 demand module is part of the EMF-2000 electronic register family. These modules may be inserted into a common EMF-2000 chassis for demand metering applications.

The modules are designed to be quickly disassembled and reassembled for register reconfiguration or board replacement. They consist of three parts:

- A printed circuit board and holder
- A front cover – which holds the display, and
- A back cover – which contains a plug-in connector for the power supply and pulse initiator communications lines.

Features

EMF-2110 module features include:

- Liquid crystal display
- Programmable display of 15 selectable quantities
- Standard power supply — available for 50 or 60 Hertz on 120, 208, 240, 277 and 480 Vac applications
- Independently programmable display identifiers and display sequence
- Normal mode and test mode – independently programmable as to display quantities
- Programmable decimal point.
- Test mode that will retain billing data during tests with no loss of any data or change of interval time
- End-of-interval countdown
- Programmable “over class” indication
- Retrofittable to D4 and D5 series single-phase and polyphase meters, except switchboard types
- Programmable threshold level
- Previous billing period demand and kWh
- Programmable demand forgiveness
- Alternate scroll
- Programmable leading zeros
- Electronic detent

Optional Features

The optional features of the EMF-2110 include:

- Remote operation
- Mechanical detents
- Conventional mechanical kWh register
- Key lock demand reset
- Output relays
 - end-of-interval signal
 - load control or customer demand threshold alerts
 - pulse initiator

Output Relay Options

Output relay options are available on the display PC board. The board supports one KYZ Output relay and either a Load Control (LC) relay or an End-of-Interval (EOI) relay. A separate PC board is available for high voltage applications for KYZ, LC and EOI applications.

Output relays on the optional board terminate into a 12-pin connector. High voltage applications require the 12-pin connector for use with hard contact relays such as mercury-wetted switches. Low voltage applications require the 7-pin connector for use with solid state switches. A mating connector for the 7- or 12-pin connector is provided for the signal cable. The following are the available optional functions:

1. Load control
2. KYZ pulse initiator (output contact closures are proportional to meter disk speed)
3. End of interval (EOI)

Wires from the outputs are routed through a hole in the meter base for customer connections. A Westinghouse contact protection circuit is applied to the output connections to suppress contact arcing for loads up to 0.1 AMP. If additional contact protection is required, you may apply parallel protection circuits.

Either the high or low voltage KYZ output relay when supplied on the options PC board, can be provided with divide-by capability of 1 to 255.

Maximum loads that can be connected to output contacts are as follows:

1. For Relay Outputs (High voltage):
 - a. KYZ Output – Mercury-wetted (100VA)
 - b. EOI Output – Mercury-wetted (100VA)
 - c. LC Output – reed switch (1800VA)
2. For Solid State Outputs (Low voltage)
 - a. 3-wire KYZ (2VA)
 - b. 2-wire EOI (10VA)
 - c. 2-wire LC (10VA)

Special Features

The following are special features of the EMF-2110:

- Shop test interval
- Rolling demand
- Programmable display scroll time
- End-of-interval countdown from 10 seconds prior to the end of the interval

Liquid Crystal Display

The liquid crystal display (LCD) features easy-to-read numbers and identifiers. It is designed for operation at extended temperature ranges.

Annunciator bullets are also provided to indicate when the register is displaying certain billing quantities, is in the test mode and/or when pulses are being received.

Data Collection and Storage

EMF-2110 modules are available with up to 15 displayed quantities. These include:

• Indicating Demand

When measuring indicating demand the EMF-2110 maintains a record of the maxi-

mum power (kW) required by a customer during the present billing period. Prior billing period kW may be obtained if required. During each interval, demand is compared to the maximum recorded demand. If the new kW usage exceeds that recorded in a prior demand interval, the old reading will be replaced with the new higher reading.

At the end of the billing period, the indicating demand is reset through the cover with the reset button and the kW demand digits return to zero.

• Cumulative Demand

Cumulative demand is similar to indicating demand except that present kW demand value is added to previous kW demand value each time the reset button is pushed. When the demand reset button is pushed, the new cumulative total is displayed.

• Continuous Cumulative Demand

Continuous cumulative demand is similar to cumulative demand except maximum kW demand values are added to cumulative total each time previous indicating maximum is exceeded. Thus, kW demand values are added at each new peak instead of at reset time.

• kWh

The EMF-2110 maintains a record of total energy measured for the present and previous billing periods. It also keeps a cumulative record of energy used since the register was initialized.

• Time Remaining in Interval

The minutes and seconds of time remaining in the preset demand interval is displayed.

• End-of-Interval

A numerical countdown starting 10 seconds prior to the end of the interval is displayed.

• Ke

The EMF-2110 maintains a record of the value of watt-hours per input pulse to the register.

• Kh

The EMF-2110 maintains a record of the value of watthours per disk revolution.

• Pulses per disk revolution (P/R)

The number of pulses per disk revolution programmed into the register.

• Cumulative pulse count

A cumulative pulse count since the last demand reset.

• kW Overload

When the kW overload indication exceeds a programmable value, the right-most digit of the kW reading is replaced with an F.



- **kW Threshold**

The programmable value that, when exceeded, closes the load control relay for direct control or consumer alert.

- **Interval Length**

Two types of intervals are available: block intervals of 5, 15, 30, or 60 minutes; or rolled intervals of 1 into 5, 3 into 15, 5 into 15, 5 into 20, 15 into 30, 10 into 60 or 12 into 60 minutes. Rolled intervals are displayed with the subinterval followed by the block interval.

- **Number of Demand Resets**

A cumulative count of the number of demand resets for the register is maintained.

Demand Intervals

All common demand intervals are available including: 5, 15, 30 and 60 minutes. In addition, the software includes a rolling demand option.

While cumulative demand and continuous cumulative demand only display the sum of indicating demands, rolling demand can compute and display demand on a sliding scale. For rolling demand, the demand interval is divided into subintervals. Demand is calculated for the interval at the end of each subinterval. For example, for a 15 minute interval and 5 minute subintervals, demand is recalculated every 5 minutes over the previous 15 minute period. Based on this principle, indicating demand would be the maximum demand in any of the consecutive subintervals totaling 15 minutes. That is, 3 consecutive 5 minute periods would add to 15 minutes, which is the maximum for the billing period. The same principle applies for other billed intervals.

Other displayed quantities include:

- Present month kWh
- Previous month kWh
- Time remaining in interval

Programming

The EMF-2110 can be programmed with an IBM PC (or compatible) and the Westinghouse designed, user-friendly software. Battery powered laptops also may be used for field programming or diagnostics. A single programming cable – which plugs into a standard parallel printer port – mates with the programming connector on the right side of the module.

Once the desired program is chosen – or selected from available program files – a push of a button transfers the program to the register. Another program checks the register to assure that it is properly programmed.

If you need different features and functions, the flexible EMF-2000 register may be quickly reconfigured with other modules to accommodate these applications.

For ordering information about the EMF-2110 register, see Product Bulletin 42-210A.

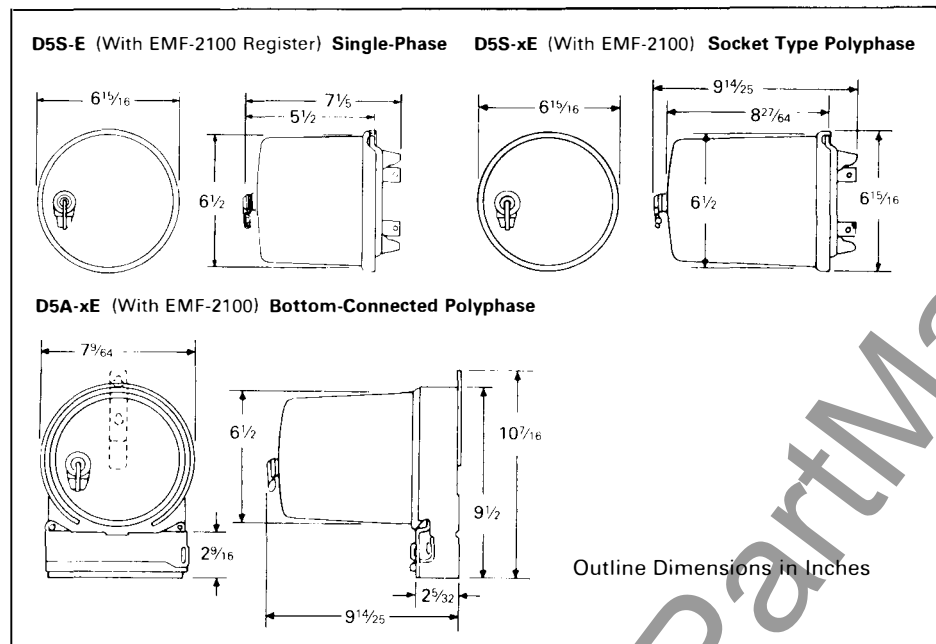


Specifications

Temperature (Outdoor) – 40° to 50°C (– 40° to 122°F)
Relative Humidity 0 to 100% non-condensing

EMF-2100 Demand Meters

Dimensions are for reference only and are based on
1 PC board module and glass cover.



Shipping Weights and Carton Dimensions (Approximate – based on 1 PC board module and glass cover)

Type	No. in Carton	Weight Lbs.					Shipping Carton Dimensions, Inches
		Domestic		Export			
		Net	Shipping	Net	Legal	Gross	
Single Phase							
D5S-E	1	6	7	6	7	8	9½ x 9½ x 11½
D5S-E	4	24	26	24	26	28	16 x 16 x 11½
Polyphase							
D5S-2E	1	6½	7	6½	7	8	9½ x 9½ x 11½
D5S-2E	4	26	29	26	29	31	16½ x 16½ x 15
D5A-2E	1	8½	9½	8½	9½	10½	11 x 11 x 12
D5S-3E	1	10	12	10	11	12	12 x 10½ x 12¼
D5S-3E	4	40	43¼	40	42½	43½	16½ x 16½ x 10⅝
D5A-3E	1	12	14	12	13	14	12 x 10½ x 12¼
D5S-5E	1	9	10	9	10	11	9½ x 9½ x 11½
D5S-5E	4	36	39	36	39	41	16½ x 16½ x 15
D5S-7E	1	9	11	9	10	11	12 x 10½ x 12¼
D5S-7E	4	36	39½	36	38½	39½	16½ x 16½ x 10⅝
D5A-7E	1	10¼	12¼	10¼	11¼	12¼	12 x 10½ x 12¼
D5S-8E	1	9	10	9	10	11	9½ x 9½ x 11½
D5S-8E	4	36	39	36	39	41	16½ x 16½ x 15
D5A-8E	1	11	12	11	12	13	11 x 11 x 12

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