

# ARE CHARGER SPECIFICATIONS

## 1. GENERAL

Units are designed to recharge/float charge a battery and power dc loads. Operation as a battery eliminator is accomplished without modification.

All 60 Hz units are UL listed.

## 2. OUTPUT RATINGS

### 2.1 Current

Model	Rated Current (Amps)	DC Breaker Rating	Rec. Cable Size
ARE24AC6E	6	10	14
ARE24AC12E	12	20	10
ARE48AC3E	3	10	14
ARE48AC6E	6	10	14
ARE48AC12E	12	20	10
ARE130AC3F	3	10	14
ARE130AC6F	6	10	14
ARE130AC12F	12	20	10
ARE103CE12F	12	20	10
ARE130AC16F	16	20	10
ARE130AC25F	25	40	8
ARE130CE25F	25	40	8
ARE130AC35F	35	50	8
ARE130CE35F	35	50	8
ARE130CE50F	50	70	4

TABLE 1

### 2.2 Voltage

Float and equalize voltage levels are continuously adjustable (no taps) over the nominal voltage range.

Model	Float Range	Equalize Range	Float Setting	Equalize Setting
24V	24-28.2	FL-30	26.4	28
48V	48-56.4	FL-60	52.8	56
130V	120-138	FL-150	132.0	140

TABLE 2

### 2.3 Regulations Static

Output voltage is maintained within ½ percent of set point from no load to full load with ac input variations of -12% to +10% of the nominal ac input voltage and from 57 to 63 Hz. Refer to Section 2.2.

#### Dynamic

Maximum voltage does not exceed five percent of the initial steady state voltage for sudden load changes between 20 and 100 percent of full load rating. Recover takes less than 200 milliseconds with all transient behavior disappearing within 500 milliseconds. Turn-on incorporates walk-in or soft start feature, which allows output current to gradually increase over a ten-second interval without overshoot.

### 2.4 Electrical Noise

Filtering, 24- and 48-volt models: Less than 30 mV rms with electrical noise less than 22 dBrc when connected to a battery with an eight-hour capacity rating of four times the charger full load current rating. Battery eliminator levels are less than 30 mVrms with electrical noise less than 32 dBrc.

Filtering, 130-volt models: Less than 30 mVrms when connected to a battery. Battery eliminator filtering is less than 100 mVrms; typical 66 mV.

### 2.5 TIF (24- and 48- volt models)

The telephone influence/interference factor, under rated conditions, normally does not exceed 50.

## 3. INPUT RATINGS

### 3.1 Voltage

Single-phase, 120, 208, 240 or 480 Vac nominal with variations as per ANSI standard ranges as shown:

Nominal Voltage	Minimum Voltage	Maximum Voltage
120	106	132
208	184	228
240	212	264
480	424	528

TABLE 3

### 3.2 Frequency

Nominal 60 Hz ± five percent (57 to 63 Hz).

### 3.3 Typical Input Data

Model	AC Current	AC Breaker	Refusing
ARE24AC6E	2/1.1/1	5	5/5/5
ARE24AC12E	4/2.3/2	5	10/5/5
ARE48AC3E	2.1.1/1	5	5/5/5
ARE48AC6E	4/2.3/2	5	10/5/5
ARE48AC12E	7/4/3.5	10	15/10/10
ARE130AC3F	5/3/2.5	5	10/5/5
ARE130AC6F	8.5/5/4	10	15/10/10
ARE130AC12F	18/10/9	15	25/20/20
ARE103CE12F	10/8.8/4.4	20/20/10	20/20/1
ARE130AC16F	22/13/11	15	30/20/20
ARE130AC25F	35/20/17	50/30/25	50/30/25
ARE130CE25F	20/17/8.5	30/25/15	30/25/15
ARE130AC35F	50/29/25	70/40/35	70/40/30
ARE130CE35F	29/25/12.5	40/35/20	40/35/20
ARE130CE50F	40/25/17.5	60/50/25	60/50/25

TABLE 4

\*For 120/208/240 Vac nominal respectively, (AC models)

\*\*For 208/240/480 Vac nominal respectively, (CE models)

Breaker opens one side of the line for 120 Vac (poles paralleled) and both sides of the line for 208/240 Vac.

Interrupting capacity, 5000 amps at 250 Vac, Backup for fusing required.

Two-pole breaker for 208/240/480 Vac respectively, interrupting capacity, 14000 amp at 480 Vac standard, other interrupting ratings available.

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### 3.4 Efficiency and Power Factor

Typical, all models are nominal ac line.

Load %	Efficiency %	Power Factor %
No Load	0	60
25	80	96
50	87	98
75	88	96
100	87	92

TABLE 5

## 4. ENVIRONMENTAL RATINGS

### 4.1 Storage

One year at temperatures from -40F to +185F (-40C to 85C).

### 4.2 Operation

Continuous at temperatures from 32F to 122 F (0C to 50C) in humidity from 0 to 95 percent, non-condensing, and

at altitudes not exceeding 3300 feet, derated to 40C up to 10,000 feet.

### 4.3 Acoustical (audible) Noise

Audible noise does not exceed 65 dB weighting at any point five feet from any vertical surface.

### 4.4 Head dissipation

Btu/hr at float voltage, full load current, nominal AC line.

Model	Btu/hr
ARE24AC6E	65
ARE24AC12E	130
ARE48AC3E	65
ARE48AC6E	130
ARE48AC12E	260
ARE130AC3F	165
ARE130AC6F	325
ARE130AC12F	650
ARE103CE12F	650
ARE130AC16F	870
ARE130AC25F	1355
ARE130CE25F	1355
ARE130AC35F	1900
ARE130CE35F	1900
ARE130CE50F	2710

TABLE 6

### 4.5 Ventilation

Unit should be located so ventilating openings are not obstructed an air entering the cabinet does not exceed 122F (50C). Cooling is natural convection.

### 4.6 Vibration

In its shipping container, the rectifier will withstand vibrations normally encountered in shipping without physical damage or degradation of performance.

### 4.7 Shock

In its shipping container, the rectifier will withstand the shock involved when one edge of the container is dropped six inches while the opposite edge is resting on the ground or a full drop of two inches on any surface without physical damage or degradation of performance.

## 5. RELIABILITY

### 5.1 MTBF and MTTR

Mean time between failures is 103,800 hours. Mean time to repair is 30 minutes, excluding power magnetics.

## 6. STANDARD FEATURES

### 6.1 Input Protection

Dual-pole protection, magnetic or thermal magnetic circuit breaker, with shunt trip (see TABLE 4 for ratings).

### 6.2 Transformer Circuit

Controlled ferroresonant with 180C (Class H) insulation. Dual wound primary (120/208/480) tap with isolated secondary.

### 6.3 Rectifier Circuit

Full wave (single-phase center tap) consisting of silicon power diodes.

### 6.4 Filter Circuit

Capacitive input filter consisting of inductor and electrolytic computer grade capacitors (No PCB materials). Capacitors are of various values: 24 = 48 Vdc, 48 = 75 Vdc, 130 = 200 Vdc.

### 6.5 Output Protection

Dual-pole, thermal-magnetic circuit breaker in the output. A high voltage shutdown circuit senses, rinsing charger voltage and operates the shunt trip coil on the ac breaker.

Current limit: Self-limiting action of the ferroresonant transformer combines with the electronic control circuit to hold down to the short circuit on the output terminals. Factory set at 110 percent of full load rated current; it is adjustable down to 50 percent.

### 6.6 Alarms and Indicators

Amber pilot light, ac power failure alarm relay, and two form C contacts rated at 2 A, 28 Vdc; 2 A, 120 Vac. See section 10 for additional alarms.

## 7. Controls

### 7.1 Float/Equalizer Switch

Two position rocker switch integral to control board. Accessible from front but recessed.

### 7.2 Float and Equalizer Adjustments

Single-turn, precision potentiometers are integral to control board. Accessible from but recessed.

### 7.3 Current Limit Adjustment

Twenty-turns, precision potentiometer integral to the control board, adjustable 50-110 percent.

## 8. SENSING

Reference voltage for regulation is obtained internal to the charger.

## 9. METERING

Flush-mounted dc voltmeter and ammeter, pivot and jewel movement, 3.5 inch case, 2.9 inch scale,  $\pm 2$  percent of full scale accuracy. Ranges are as shown below:

Model	Voltmeter Range (Vdc)	Ammeter Range (A)
ARE24AC6E	0-50	0-10
ARE24AC12E	0-50	0-20
ARE48AC3E	0-80	0-5
ARE48AC6E	0-80	0-10
ARE48AC12E	0-80	0-20
ARE130AC3F	0-200	0-5
ARE130AC6F	0-200	0-10
ARE130AC12F	0-200	0-20
ARE130CE12F	0-200	0-20
ARE130AC16F	0-200	0-20
ARE130AC25F	0-200	0-50
ARE130CE25F	0-200	0-50
ARE130AC35F	0-200	0-50
ARE130CE35F	0-200	0-50
ARE130CE50F	0-200	0-70

TABLE 7

### 9.1 Internal Wiring

Power circuits: Appropriately sized, neoprene-jacketed copper cable rated at 600V, 90C. UL listed.

Control circuits: #18AWG, color-coded PVC, insulated, copper hook-up wire rated at 600V, 90C. UL listed.

Terminals: Wire terminations are made with ring tongue or Faston Type lugs and solders connections where necessary.

## 10. ACCESSORIES

### 10.1 High DC Voltage Alarm

Contact Type	Contact Rating	Light	Adj. Range	Factory Setting
2 Form C	2A, 28 Vdc or 120 Vac	N/A	±20% of 2.2 Vpc	2.41 Vdc
1 Form C		Red		

TABLE 8A

### 10.2 Low Voltage Alarm

Contact Type	Contact Rating	Light	Adj. Range	Factory Setting
2 Form C	2A, 28 Vdc or 120 Vac	N/A	±20% of 2.2 Vpc	2.00 Vdc
1 Form C		Red		

TABLE 8B

The alarm board has two Form C contacts available for both high and low voltage if the alarm light is not used.

#### 10.3 High Voltage Alarm with Adjustable Time Delay

A single-channel, high voltage alarm with adjustable delay of 1 to 180 seconds is available with two Form C contacts rated at 2A 28 Vdc, 120 Vac. The adjustment range is +20 percent of 2.2 Vpc, with a 2.41 Vpc factory setting. If the alarm light is used, only one Form C contact is provided. The alarm light is red.

#### 10.4 Low Voltage Alarm with Adjustable Time Delay

A single-channel, low voltage alarm with adjustable time delay of 1 to 180 seconds is available with two Form C contacts with a contact rating of 2 amperes, 28 Vdc, 120 Vac with an adjustment range of +20 percent of 2.2 Vpc, and a factory setting of 2.00 Vpc. If the alarm light is used, one Form C contact is provided. The alarm light is red.

#### 10.5 No Charge Alarm and Load Share

A no charge alarm and load sharing option is available with two Form C contacts rated at 1 ampere, 28 Vdc (or 120 Vac). The adjustment range is 0 to 50 percent.

If the alarm light is used, one Form C contact is provided. The alarm light is red.

#### 10.6 Ground Detection Alarm Relay

Ground detection alarm relays and lights are available with two Form C contacts, positive ground the negative ground has one Form C contact. The alarm light is green.

#### 10.7 Ground Detection Lights

Ground detection lights, ground detection lights with switch, ground detection lights with switch and lamp test are all available. The lights are green.

#### 10.8 Equalize Timer

0-72 hours; mounted internally. Once set, the time cycle is manually activated using the float/equalize switch.

#### 10.9 Lightning Protective Device

Surge suppression device which provides transient protection at the ac input to the rectifier.

#### 10.10 50 Hz Model

Models available for 200/220/240 Vac. Consult applications.

#### 10.11 Blocking Diodes

Prevents reverse current drain when unit is connected to a battery. Current drain without blocking diodes is less than 150 mA.

#### 10.12 Loading Share

Load sharing allows two chargers of the same output voltage to share the load in proportion to their output ratings within +5 percent of the rating of the largest unit over 10 to 100 percent of their combined ranges.

## 11. MISCELLANEOUS

#### 11.1 Data Nameplate

The nameplate is permanently attached to the rectifier with the following information: rated input voltage, rated input current, frequency, number of phases, rated output voltage, rated full load current, model number, serial number, specification number and maximum operating temperature.

## 12. REFERENCES

Instruction manual: RS-759  
 Product Catalog: 10-320  
 Applicable industry standards:  
 NEMA PE5-Utility Chargers  
 NEC – National Electrical Code