

Section Q

of TELEPHONE EQUIPMENT & SUPPLIES CATALOG

ISSUED SEPTEMBER, 1969

SUPERSEDES SECTION Q
DATED OCTOBER, 1963

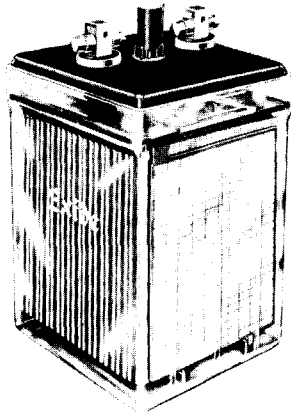
POWER EQUIPMENT

	Page		Page
Assemblies, Transfer	11	Lorain	
Bat-Tap Transfer Assemblies	11	Carrier Supply Units	10
Voltage Reducers.....	11	Chargers.....	9, 10
Batteries, Storage, C & D	4	Collect and Return Units,	
Storage, Exide.....	2	Coin.....	8
Storage, Gould.....	3, 4	Converters, D.C. to D.C.....	11
Battery Chargers, Lorain	9, 10	Converters, Ringing.....	5
Chargers, Warren.....	13-16	Converters, Sub-Cycle.....	5
Eliminators, Warren.....	13	Generators.....	8
C & D Batteries	4	Howlers.....	11
Carrier Supply Units	10	Power Units.....	6, 7, 12
Chargers, Battery, Lorain	9	Rectifiers.....	9, 10
Battery, Warren.....	13	Reducers, Voltage.....	11
Flotrol.....	9	Sub-Cycle Generators.....	8
Coin Collect and Return Units	8	Supply Units, Carrier.....	10
Collect and Return Units, Coin	8	Supply Units, Power.....	6, 7, 12
Converters, D.C. to D.C.	11	Test Load Units.....	11
Ringling.....	5	Transfer Assemblies, Bat-Tap.....	11
Sub-Cycle.....	5	Multi-Frequency	
D.C. to D.C. Converters	11	Sub-Cycle Generators.....	8
Eliminators, Battery, Warren	13	PBX System Power Supply	
Exide Batteries	2	Units.....	6, 7
Float Rectifiers, Transistor	13-16	Packs, Power, Transistor	13
Floats, Hydrometer	2	Power Packs, Transistor	13
Flotrol Chargers	9, 10	Units, Lorain.....	6, 7, 12
Rectifiers.....	9, 10	Rectifiers, Lorain	9, 10
Generators, Ringing, Lorain	8	Warren.....	14-16
Ringling, Warren.....	12	Reducers, Voltage	11
Gould Batteries	3, 4	Return and Collect Units, Coin	8
Howlers, Lorain	11	Ringling Converters	5
Hydrometer Floats	2	Generators, Lorain.....	8
Syringes.....	2	Generators, Warren.....	12
Inverters, Single-Phase	11	Ringling and Talking Power	
Load Units, Test	11	Units.....	7, 12
		Storage Batteries, C & D	4
		Batteries, Exide.....	2
		Batteries, Gould.....	3, 4
		Sub-Cycle Converters	5
		Ringling Generators.....	8
		Sub-Cycles, Multi-Frequency	8
		Supply Units, Carrier	10
		Units, Power.....	6, 7, 12
		Switchboard Power Units	6, 7
		Syringes, Hydrometer	2
		Talking Power Units	6
		Talking and Ringing Power	
		Units.....	7, 12
		Test Load Units	11
		Transfer Assemblies, Bat-Tap	11
		Transistor Float Rectifiers	14-16
		Power Packs.....	13
		Ringling Generators.....	12
		Sub-Cycle.....	8
		Transistor Type Carrier Supply	
		Units.....	10
		Units, Coin Collect and Return	8
		Power, Lorain.....	6, 7, 12
		Supply, Carrier.....	10
		Supply, Power.....	6, 7, 12
		Test Load.....	11
		Voltage Reducers	11
		Warren Chargers, Battery	13-16
		Eliminators, Battery.....	13
		Generators, Ringing.....	12
		Power Packs, Transistor.....	13
		Rectifiers.....	14-16

AUTOMATIC ELECTRIC COMPANY

NORTHLAKE, ILLINOIS 60164 / TELEPHONE (312) 562-7100

Copyright © 1969, by Automatic Electric Company • Printed in U.S.A. • Catalog 11,000



Type ETA-17

Exide Batteries

Exide Tytex (Pasted-Plate) with Silvium

Exide Tytex cells have positive plate grids containing Silvium—a patented alloy that inhibits grid corrosion thus lengthening battery life.

Types ETA and FTA are assembled in heat-resistant, shock-absorbing polystyrene containers with polystyrene covers. All cells have burned seal ring construction.

Separators are microporous. Retainers are Vitrex. The cover is permanently sealed to the jar to form a leak-proof bond.

Type	A.H. Cap. (8-Hr.)	Length Inches	Width Inches	Height Inches	*Weight Pounds	Price Each
†2-ETA-5	180	6 $\frac{7}{8}$	10 $\frac{1}{8}$	18 $\frac{1}{4}$	97	\$104.30
‡3-ETA-5	180	10 $\frac{1}{4}$	10 $\frac{1}{8}$	18 $\frac{1}{4}$	142	\$139.55
ETA-7	240	4 $\frac{11}{32}$	10 $\frac{1}{8}$	18 $\frac{1}{4}$	63	\$57.25
ETA-9	320	5 $\frac{3}{32}$	10 $\frac{1}{8}$	18 $\frac{1}{4}$	78	\$70.00
ETA-11	420	6 $\frac{7}{8}$	10 $\frac{1}{8}$	18 $\frac{1}{4}$	101	\$94.70
ETA-15	560	8 $\frac{9}{32}$	10 $\frac{1}{8}$	18 $\frac{1}{4}$	130	\$113.55

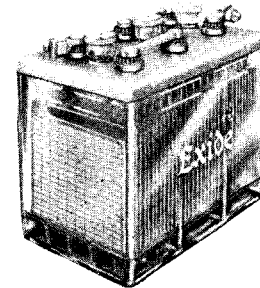
Type	A.H. Cap. (8-Hr.)	Length Inches	Width Inches	Height Inches	*Weight Pounds	Price Each
ETA-17	660	10 $\frac{1}{4}$	10 $\frac{1}{8}$	18 $\frac{1}{4}$	150	\$135.30
FTA-11	840	7 $\frac{1}{2}$	14 $\frac{1}{2}$	23	196	\$179.40
FTA-15	1120	7 $\frac{1}{2}$	14 $\frac{1}{2}$	23	228	\$211.50
FTA-17	1320	9	14 $\frac{1}{2}$	23	267	\$241.05
FTA-21	1680	10 $\frac{21}{32}$	14 $\frac{1}{2}$	23	339	\$270.80

Larger Multi-Cell Types

These types are assembled in 2 and 3 cell units in plastic containers with plastic covers. The cover is permanently sealed to the container to form an acid-tight bond. Each unit is equipped with two sets of pilot balls to indicate approximate state of charge.

An outstanding feature of these batteries is the built-in explosion control device.

Batteries come equipped with plastic vent caps and filling funnels.



Type 3-PLX13

§Type	A.H. Cap. (8-Hr.)	Length Inches	Width Inches	Height Inches	*Weight Pounds	Price Each
2-PLX-7	50	4 $\frac{15}{32}$	7 $\frac{5}{16}$	10 $\frac{3}{16}$	32	\$31.45
3-PLX-7	50	6 $\frac{7}{16}$	7 $\frac{5}{16}$	10 $\frac{3}{16}$	44	\$44.65

§Type	A.H. Cap. (8-Hr.)	Length Inches	Width Inches	Height Inches	*Weight Pounds	Price Each
2-PLX-13	100	7 $\frac{3}{4}$	7 $\frac{5}{16}$	10 $\frac{3}{16}$	54	\$40.70
3-PLX-13	100	11 $\frac{3}{8}$	7 $\frac{5}{16}$	10 $\frac{3}{16}$	76	\$60.15

*Packed for less than carload lot. §Available as PWA without pilot ball indicators. †Two-cell units. ‡Three-cell units.

Portable Hydrometer Syringes



V-2-S Hydrometer Syringes

Type	Description	Wt. Oz.	Price Each
10217	For Cell Types ETA, FTA, EHGS, FHGS	12	\$3.10

Q-2

S-1-B Hydrometer Syringes

Cat. No.	Type	Description	Wt. Oz.	Price Each
S-582251	44877	For Unit Type PLX	12	\$2.10

Hydrometer Floats Only

Type	For Use with Hydrometer	Wt. Oz.	Price Each
10246	10217	2	\$0.95
24295	44877	2	.85

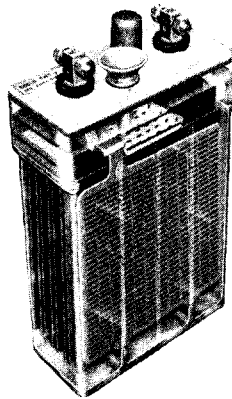
Vent Plug Hydrometer Syringes and Vent Plug Thermometers are available on order.

Prices are subject to change without notice.

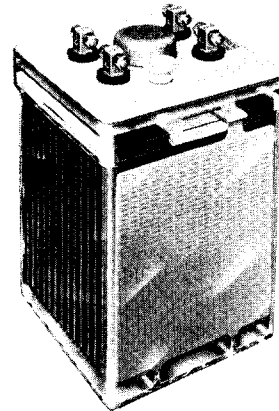
Gould Kathanode Plastic Jar Batteries

**Explosion-Protected Construction—Antimony Types—
ETA, FTA and FTAS**

Capacities—120 to 1800 Ampere Hours



ETA-9



FTA-29

Transparent plastic jars.
Plastic covers.
Porous vents.
Durapor rubber separators.
Glass mats and perforated plastic retainers.
Bolted type terminal posts.
Specific Gravity of Electrolyte: fully charged—1.215 at 77°F.
except FTAS— 1.220.

Electrolyte above plates: Type ETA, $2\frac{3}{4}$ inches; Types
FTA and FTAS, $2\frac{5}{8}$ inches.
Sediment space, $1\frac{1}{2}$ inches.
High and low level lines on jar.
Positive plates are suspended from sidewalls of jar.
Negative plates are supported on ribs in bottom of jar.
Lead plated copper strip intercell connectors.

Type of Cell	Cells per Unit	A.H. Cap. (8-Hr.)	OVERALL DIMENSIONS INCHES			Elec- trolyte Gal. per Cell	Fin- ish Rate Amp.	APPROX. WT., LBS. PER UNIT		Price Each
			Lgth.	Width	Ht.			Net	Pelle- tized	
2-ETA-5	2	120	7	$10\frac{1}{2}$	18	1.4	6	87	95	\$ 76.80
3-ETA-5	3	120	$10\frac{3}{16}$	$10\frac{1}{2}$	18	1.4	6	132	140	102.95
2-ETA-7	2	180	7	$10\frac{1}{2}$	18	1.3	9	99	107	99.65
3-ETA-7	3	180	$10\frac{3}{16}$	$10\frac{1}{2}$	18	1.2	9	155	163	137.50
ETA-9	1	240	$5\frac{1}{8}$	$10\frac{7}{8}$	18	1.8	12	69	72	54.55
ETA-11	1	300	6	$10\frac{7}{8}$	18	2.1	15	81	85	66.45
ETA-13	1	360	$7\frac{3}{4}$	$10\frac{7}{8}$	18	2.9	18	97	106	79.80
ETA-15	1	420	$7\frac{3}{4}$	$10\frac{7}{8}$	18	2.8	21	106	115	90.80
ETA-17	1	480	$9\frac{1}{2}$	$10\frac{7}{8}$	18	3.6	24	130	139	97.80
ETA-19	1	540	$9\frac{1}{2}$	$10\frac{7}{8}$	18	3.5	27	139	148	108.75
ETA-21	1	600	$11\frac{1}{4}$	$10\frac{7}{8}$	18	4.2	30	150	161	117.60
ETA-23	1	660	$11\frac{1}{4}$	$10\frac{7}{8}$	18	4.1	33	159	170	129.85
FTA-13	...	720	$7\frac{3}{16}$	$14\frac{1}{8}$	$22\frac{1}{8}$	4.0	36	177	190	156.80
FTA-15	...	840	$7\frac{3}{16}$	$14\frac{1}{8}$	$22\frac{1}{8}$	3.9	42	193	206	169.55
FTA-17	...	960	$8\frac{15}{16}$	$14\frac{1}{8}$	$22\frac{1}{8}$	5.5	48	223	235	184.75
FTA-19	...	1080	$8\frac{15}{16}$	$14\frac{1}{8}$	$22\frac{1}{8}$	5.4	54	239	251	199.85
FTA-21	...	1200	$10\frac{11}{16}$	$14\frac{1}{8}$	$22\frac{1}{8}$	6.6	60	276	288	213.95
FTA-23	...	1320	$10\frac{11}{16}$	$14\frac{1}{8}$	$22\frac{1}{8}$	6.5	66	293	305	227.85
FTA-27	...	1560	$13\frac{5}{16}$	$14\frac{1}{8}$	$22\frac{1}{8}$	8.3	78	352	370	246.45
FTA-29	...	1680	$13\frac{5}{16}$	$14\frac{1}{8}$	$22\frac{1}{8}$	8.2	84	360	378	255.90
FTAS-29	...	1800	$13\frac{3}{16}$	$14\frac{1}{8}$	$22\frac{1}{8}$	8.2	90	360	378	272.60

Prices are subject to change without notice.

Q-3

Gould Plastic Jar Batteries

Antimony Type—DS

Capacities—50 to 100 Ampere Hours

Charge Indicator Balls: built-in.

Separators: Porous rubber and perforated retainer.

Terminals: bolted type.

Specific Gravity of Electrolyte: fully charged, 1.215 at 77°F.

Intercell Connectors: lead.

Interunit Connectors: lead tape.

Type of Cell	Cells per Unit	Ampere Hour Capacity 8 Hr. Rate of Discharge	OVERALL DIMENSIONS			Electrolyte Gallons per Cell	APPROXIMATE Wt., LBS. —PER UNIT—		Price Each
			Length	Width	Height		Net	Packed	
2DS5	2	50	4 $\frac{1}{8}$	6 $\frac{7}{8}$	10 $\frac{3}{8}$	.29	24	29	\$35.75
3DS5	3	50	6	6 $\frac{7}{8}$	10 $\frac{3}{8}$	.29	36	40	47.85
2DS9	2	100	7	6 $\frac{7}{8}$	10 $\frac{3}{8}$	.50	42	48	46.35
3DS9	3	100	10 $\frac{3}{8}$	6 $\frac{7}{8}$	10 $\frac{3}{8}$	.50	63	69	65.45

C & D Batteries

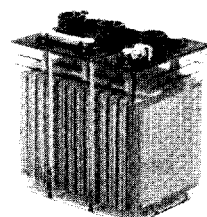
Lead Antimony Grid

Types DT, KT, LT—50 to 2016 Ampere Hours

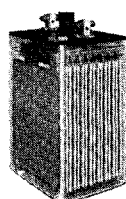
Positive plate thickness, .266". Specific gravity of fully charged electrolyte, 1.200 to 1.220 at 77°F. Features include dual insulation, thick fiberglass mat, rubber separators, high heat resistant clear thermoplastic containers and cell covers.

DT type is equipped with Saftee vent to reduce explosion hazard. Vent need not be removed to add water or make hydrometer readings. Cells shipped assembled, sealed and charged, complete with standard accessories. Racks available. Complete information on request.

C&D batteries listed below are built to telephone industry standards.



3DT-100



KT-720



LT-1680

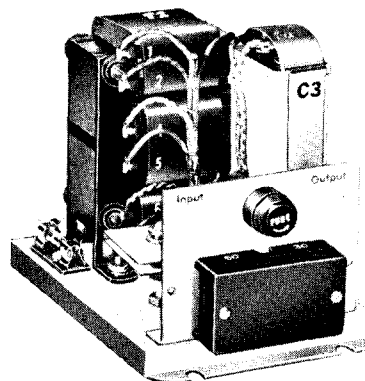
Type of Cell	A.H. Cap. (8-Hr.)	Cells per unit	Plates per Cell	OVERALL DIMENSIONS			Wt. Lbs. Dom. Packed	Price
				Length	Width	Height		
2DT-50	50	2	5	3 $\frac{19}{32}$	7 $\frac{3}{8}$	10 $\frac{5}{16}$	26	\$ 30.50
3DT-50	50	3	5	5 $\frac{9}{32}$	7 $\frac{3}{8}$	10 $\frac{5}{16}$	38	44.00
2DT-75	75	2	7	6 $\frac{3}{8}$	7 $\frac{3}{8}$	10 $\frac{5}{16}$	40	40.00
3DT-75	75	3	7	9 $\frac{15}{32}$	7 $\frac{3}{8}$	10 $\frac{5}{16}$	58	57.00
2DT-100	100	2	9	6 $\frac{3}{8}$	7 $\frac{3}{8}$	10 $\frac{5}{16}$	44	42.00
3DT-100	100	3	9	9 $\frac{15}{32}$	7 $\frac{3}{8}$	10 $\frac{5}{16}$	65	59.50
2DT-120	120	2	11	7 $\frac{1}{2}$	7 $\frac{1}{16}$	10 $\frac{1}{4}$	55	71.00
3DT-120	120	3	11	11 $\frac{1}{8}$	7 $\frac{1}{16}$	10 $\frac{1}{4}$	79	98.00
DT-150	150	1	13	6 $\frac{3}{8}$	7 $\frac{3}{8}$	10 $\frac{3}{4}$	44	40.00
DT-175	175	1	15	6 $\frac{3}{8}$	7 $\frac{3}{8}$	10 $\frac{3}{4}$	46	42.50
DT-200	200	1	17	6 $\frac{3}{8}$	7 $\frac{3}{8}$	10 $\frac{3}{4}$	48	45.00
2KT-180	180	2	5	5 $\frac{19}{32}$	10 $\frac{7}{16}$	18 $\frac{7}{32}$	104	106.00
3KT-180	180	3	5	8 $\frac{17}{32}$	10 $\frac{7}{16}$	18 $\frac{7}{32}$	150	131.00
KT-270	270	1	7	3 $\frac{5}{8}$	10 $\frac{7}{16}$	18 $\frac{7}{32}$	74	58.00
KT-300	300	1	7	4 $\frac{5}{8}$	10 $\frac{7}{16}$	18 $\frac{7}{32}$	85	68.00
KT-360	360	1	9	4 $\frac{5}{8}$	10 $\frac{7}{16}$	18 $\frac{7}{32}$	95	78.50
KT-450	450	1	11	5 $\frac{19}{32}$	10 $\frac{7}{16}$	18 $\frac{7}{32}$	112	88.50
KT-480	480	1	11	6 $\frac{19}{32}$	10 $\frac{7}{16}$	18 $\frac{7}{32}$	122	95.50
KT-540	540	1	13	6 $\frac{19}{32}$	10 $\frac{7}{16}$	18 $\frac{7}{32}$	131	105.50
KT-660	660	1	15	8 $\frac{17}{32}$	10 $\frac{7}{16}$	18 $\frac{7}{32}$	158	128.50
KT-720	720	1	17	8 $\frac{17}{32}$	10 $\frac{7}{16}$	18 $\frac{7}{32}$	165	153.50
LT-840	840	1	11	7 $\frac{5}{8}$	14 $\frac{1}{8}$	22 $\frac{5}{8}$	213	166.50
LT-1008	1008	1	13	7 $\frac{5}{8}$	14 $\frac{1}{8}$	22 $\frac{5}{8}$	230	194.50
LT-1176	1176	1	15	7 $\frac{5}{8}$	14 $\frac{1}{8}$	22 $\frac{5}{8}$	247	211.50
LT-1344	1344	1	17	8 $\frac{7}{8}$	14 $\frac{1}{8}$	22 $\frac{5}{8}$	281	225.00
LT-1680	1680	1	21	10 $\frac{5}{8}$	14 $\frac{1}{8}$	22 $\frac{5}{8}$	343	256.00
LT-1848	1848	1	23	13 $\frac{3}{16}$	14 $\frac{1}{8}$	22 $\frac{11}{16}$	385	274.50
LT-2016	2016	1	25	13 $\frac{3}{16}$	14 $\frac{1}{8}$	22 $\frac{11}{16}$	402	293.50

NOTE: Electrolyte weighs approximately 10 pounds per gallon.

Lorain Biased Core Sub-Cycle Converters



Type BC20X



Type BC30X

Converters use metallic rectifiers to bias the core of saturable inductances.

Self-starting and operate without moving parts.

They are characterized by instant starting with low inrush current, protection on overload, reserve capacity, regulated

output ringing voltage, d-c. path for superimposed ringing and, of course, by ever-important fixed frequency output.

There are two types: 20-cycle and 30-cycle; all operable from 105-125-volt, 60-cycle supply.

20-Cycle Output

Type	No Load Volts	F.L. Watts	Size Inches	Price Each
BC20X	90	3.5	5 $\frac{1}{4}$ x8 $\frac{5}{8}$ x8 $\frac{7}{8}$	\$ 76.00
BC20M19	88,101	8.5	*7	230.00
BC20SR	88,101,110	25	*10 $\frac{1}{2}$	378.00
BC20CR	88,101,110	50	*10 $\frac{1}{2}$	448.00

30-Cycle Output

Type	No Load Volts	F.L. Watts	Size Inches	Price Each
BC30X	110	5	5x4 $\frac{1}{8}$ x6 $\frac{3}{4}$	\$44.00

*Space on 19-inch relay rack.

Lorain 20-Cycle and 30-Cycle D-C. Operated Transistorized Sub-Cycle Ringing Generators

Circuits in all models listed below include transistors which operate from office battery to generate required frequency.

The output wave shape is approximately sinusoidal and the output voltage is regulated.

With 24 or 48-volt office battery input they provide stable frequency output.

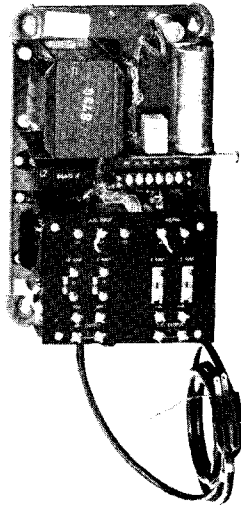
Type	D-C Input Volts	OUTPUT			Overall Dimensions Inches	Ship Wt. Lbs.	Price Each
		Freq.	F. L. Watts	N. L. Volts			
TA20M	24	20 Cy.	7.5	100	8x8 $\frac{7}{8}$ x 5 $\frac{1}{4}$	17	\$207.00
TA20M19	24	20 Cy.	7.5	100	19x3 $\frac{13}{16}$ x 4 $\frac{7}{8}$	16	230.00
TA20S19	24	20 Cy.	25	90/110	19x5 $\frac{1}{4}$ x 6 $\frac{5}{8}$	31	285.00
TB20M	48	20 Cy.	7.5	100	8x8 $\frac{7}{8}$ x 5 $\frac{1}{4}$	17	189.00
TB20M23	48	20 Cy.	7.5	100	23x3 $\frac{7}{8}$ x 4 $\frac{7}{8}$	20	210.00
TB20R	48	20 Cy.	15	85/95/110	23x3 $\frac{1}{2}$ x10 $\frac{7}{8}$	27	297.00
TB20SA	48	20 Cy.	25	70-160	19x7 x 7 $\frac{3}{16}$	32	221.00
TB20SR	48	20 Cy.	25	70-160	19x7 x 7 $\frac{3}{16}$	36	301.00
TB20S23	48	20 Cy.	25	90/110	23x5 $\frac{1}{4}$ x 5	35	247.00
TB20CA	48	20 Cy.	50	70-160	19x7 x 7 $\frac{3}{16}$	40	359.00
TB20CR	48	20 Cy.	50	70-160	19x7 x 7 $\frac{3}{16}$	44	394.00
TB20C23	48	20 Cy.	50	90/110	23x6 $\frac{13}{16}$ x 6 $\frac{3}{8}$	48	359.00
TB30R	48	30 Cy.	15	95/110/125	23x3 $\frac{1}{2}$ x10 $\frac{7}{8}$	30	297.00
TB30SR	48	30 Cy.	25	70-160	19x7 x 7 $\frac{3}{16}$	36	321.00
TB30CA	48	30 Cy.	50	70-160	19x7 x 7 $\frac{3}{16}$	40	386.00
TB30CR	48	30 Cy.	50	70-160	19x7 x 7 $\frac{3}{16}$	44	438.00

Prices are subject to change without notice.

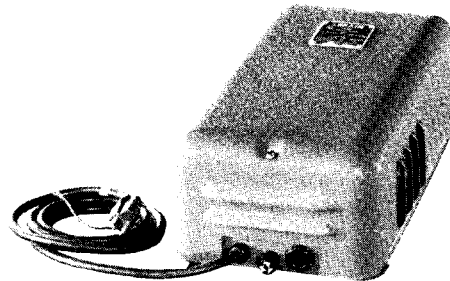
Q-5

Lorain T Power Units

T for Talking—Most Models also have a Supply for Signaling
For PBXs and Small Switchboards



Type T2A



Type T10

- NOTES: 1. Types T4-19, T7, T7R, T8, T10R, RT5-19A, RT5-19B, RT5-19-50, RT3J, RT10, T7TA, T8T, T8TA and T10T are baked synthetic gray enamel finish; all remaining types are gray-green wrinkle finished.
2. Types RT3B50 and RT5-19-50 operate with 50-cycle input. Types T3, T3R, T4, T4-19, T5B, T5BR, T6, T6R, T7, T7R and T8 operate with either 50 or 60-cycle input. All other units operate on 60-cycle only.
3. Transistorized models having the suffix "T" operate on d-c., 48 volt input.

Ordering No.	Type	D-C. Talking Output	Signaling A-C. and D-C.	Cabinet Size Inches	Ship. Wt. Lbs.	Price Each
S-418011	T1B	1.0 Amp. 21 V.	{ 8.0 Amp. 10 V. 60 Cy. — 0.5 Amp. 20 V. 60 Cy. — 2.0 Amp. 23 V. D-C. }	8 $\frac{7}{8}$ x13 $\frac{7}{8}$ x5 $\frac{1}{4}$	15	\$ 75.00
S-418012	T2B	4.0 Amp. 24 or 34 V.	{ 10 Amp. 10 V. 60 Cy. — 0.5 Amp. 20 V. 60 Cy. }	8 $\frac{3}{4}$ x13 $\frac{7}{8}$ x5 $\frac{1}{4}$	27	123.00
	*T2C	4.0 Amp. 24 or 34 V.	{ 10 Amp. 10 V. 60 Cy. — 0.5 Amp. 20 V. 60 Cy. }	8 $\frac{3}{8}$ x13 $\frac{7}{8}$ x5 $\frac{1}{4}$	27	125.00
	T3	0.5 Amp. 24 V.	4.0 Amp. 6-10-18-24 V. 60 Cy.	8 x 8 $\frac{7}{8}$ x5 $\frac{1}{4}$	19	71.00
	†T3R	0.5 Amp. 24 V.	4.0 Amp. 6-10-18-24 V. 60 Cy.	8 x 8 $\frac{7}{8}$ x5 $\frac{1}{4}$	19	81.00
	T4	1.0 Amp. 48 V.	1.5 Amp. 10 or 20 V. 60 Cy.	8 $\frac{3}{8}$ x13 $\frac{7}{8}$ x5 $\frac{1}{4}$	27	130.00
	T4-19	1.0 Amp. 48 V.	1.5 Amp. 10 or 20 V. 60 Cy.	6 $\frac{15}{16}$ x19x6	33	155.00
	T5B	1.5 Amp. 12 V.	4.0 Amp. 6-10-18-24 V. 60 Cy.	8 x 8 $\frac{7}{8}$ x5 $\frac{1}{4}$	17	81.00
	†T5BR	1.5 Amp. 12 V.	4.0 Amp. 6-10-18-24 V. 60 Cy.	8 x 8 $\frac{7}{8}$ x5 $\frac{1}{4}$	18	100.00
	T6	1.0 Amp. 6 V.	4.0 Amp. 6-10-18-24 V. 60 Cy.	8 x 8 $\frac{7}{8}$ x5 $\frac{1}{4}$	17	73.00
	†T6R	1.0 Amp. 6 V.	4.0 Amp. 6-10-18-24 V. 60 Cy.	8 x 8 $\frac{7}{8}$ x5 $\frac{1}{4}$	18	90.00
	T7	.....	.25 Amp. ± 120 V. D-C.	8 $\frac{3}{8}$ x12 $\frac{1}{4}$ x5 $\frac{1}{4}$	20	163.00
	†T7R	.....	.25 Amp. ± 120 V. D-C.	8 $\frac{3}{8}$ x12 $\frac{1}{4}$ x5 $\frac{1}{4}$	21	189.00
	‡T7TA	.....	.25 Amp. ± 110, 120, 130V D-C	19 x 3 $\frac{1}{2}$ x8	18	237.00
	T8	.....	.25 Amp. ± 45 V. D-C.	8 $\frac{3}{8}$ x12 $\frac{1}{4}$ x5 $\frac{1}{4}$	18	109.00
	T8T	.....	.25 Amp. 35-40-45-50 V.	19 x 3 $\frac{1}{2}$ x8 $\frac{1}{2}$	19	280.00
	†T8TA	.....	.50 Amp. ± 65, 75V D-C	19 x 3 $\frac{1}{2}$ x8	20	350.00
	†T10R	.....	.25 Amp. 120 V. D-C.	8 $\frac{3}{8}$ x12 $\frac{1}{4}$ x5 $\frac{1}{4}$	17	127.00
	‡T10TA	.....	.50 Amp. 110, 120, 130V D-C	19 x 3 $\frac{1}{2}$ x8	16	215.00
	T16A	0.3 Amp. 9V	1 Apm. 10V A-C	4 $\frac{1}{2}$ x 4 $\frac{1}{2}$ x2	4	33.00

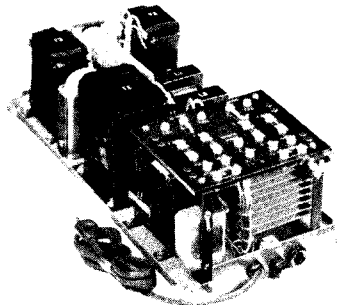
*With common ground, 2-prong plug. †With built-in change of source relay.

‡Operates from 48-volt office battery, transistorized circuitry.

Lorain RT Power Pack Units

R for Ringing, T for Talking and with Output for Signaling

For PBX and Small Switchboards



Type RT2B



Type RT3B

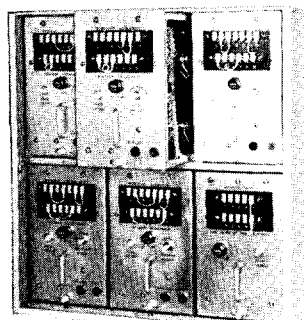
Ordering No.	Type	Ringing Output	Talking D-C. Supply	Signaling A-C. and D-C.	Cabinet Size Inches	Ship. Wt. Lbs.	Price Each
S-418001	RT1B	{50 MA. 90 V. 20 Cy.	1.0 Amp. 21 V.	8.0 Amp. 10 V. 60 Cy. -0.5 Amp. 20 V. 60 Cy. -2.0 Amp. 23 V. D-C.	8 $\frac{5}{8}$ x13 $\frac{7}{8}$ x5 $\frac{1}{4}$	28	\$140.00
S-418002	RT2B	{50 MA. 90 V. 20 Cy.	4.0 Amp. 24 or 34 V.	10 Amp. 10 V. 60 Cy. -0.5 Amp. 20 V. 60 Cy.	8 $\frac{5}{8}$ x17 $\frac{5}{8}$ x5 $\frac{1}{4}$	40	171.00
	RT2G	{50 MA. 75 V. 20 Cy.	4.0 Amp. 24 V.	0.5 Amp. 20 V. 60 Cy. 10 Amp. 10 V. 60 Cy.	8 $\frac{5}{8}$ x17 $\frac{7}{8}$ x5 $\frac{1}{4}$	40	161.00
S-418003	RT3B	{50 MA. 110 V. 30 Cy.	1.0 Amp. 21 V.	8.0 Amp. 10 V. 60 Cy. 0.5 Amp. 20 V. 60 Cy. -2.0 Amp. 23 V. D-C.	8 $\frac{5}{8}$ x12 $\frac{1}{4}$ x5 $\frac{1}{4}$	19	101.00
	RT3B50	{50 MA. 110 V. 25 Cy.	1.0 Amp. 21 V.	8.0 Amp. 10 V. 50 Cy. -0.5 Amp. 20 V. 50 Cy. 2.0 Amp. 23 V. D-C.	8 $\frac{5}{8}$ x12 $\frac{1}{4}$ x5 $\frac{1}{4}$	20	128.00
S-418034	RT3J	{50 MA. 110 V. 30 Cy.	0.9 Amp. 24 V.	1.4 Amp. 18 V. 60 Cy. 2.8 Amp. 10 V. 60 Cy. 0.6 Amp. 24 V. D-C.	9 $\frac{1}{2}$ x7 $\frac{1}{8}$ x4 $\frac{11}{16}$	12	82.80
	RT3K	{50 MA. 110 V. 30 Cy.	0.9 Amp. 24 V.	1.4 Amp. 18 V. 60 Cy. 2.8 Amp. 10 V. 60 Cy. 0.6 Amp. 24 V. D-C.	9 $\frac{1}{2}$ x7 $\frac{1}{8}$ x4 $\frac{11}{16}$	14	87.80
S-418004	RT4B	{50 MA. 110 V. 30 Cy.	4.0 Amp. 24 or 34 V.	10 Amp. 10 V. 60 Cy. -0.5 Amp. 20 V. 60 Cy.	8 $\frac{5}{8}$ x17 $\frac{5}{8}$ x5 $\frac{1}{4}$	31	155.00
	RT4G	{50 MA. 100 V. 30 Cy.	4.0 Amp. 24 V.	0.5 Amp. 20 V. 60 Cy. 10 Amp. 10 V. 60 Cy.	8 $\frac{5}{8}$ x17 $\frac{7}{8}$ x5 $\frac{1}{4}$	40	136.00
S-418005	RT5	{50 MA. 110 V. 30 Cy.	1.0 Amp. } 48 V. }	1.5 Amp. 10 or 20 V. 60 Cy.	8 $\frac{5}{8}$ x17 $\frac{5}{8}$ x5 $\frac{1}{4}$	35	145.00
	RT5-19A	{50 MA. 110 V. 30 Cy.	1.0 Amp. } 48 V. }	1.0 Amp. 48 V. D-C.	7x19x6	35	193.00
	RT5-19B	{50 MA. 100 V. 30 Cy.	1.0 Amp. 48 V.	3 Amp. 48 V. D-C. 1.5 Amp. 10 or 20 V. 60 Cy.	7x19x6 $\frac{1}{4}$	40	235.00
	RT5-19-50	{50 MA. 75 V. 25 Cy.	1.0 Amp. } 48 V. }	1.0 Amp. 48 V. D-C.	7x19x6	37	216.00
	RT6	{20 MA. 110 V. 30 Cy.	0.4 Amp. } 21 V. }	1.5 Amp. 10 or 20 V. 60 Cy.	8x8 $\frac{7}{8}$ x5 $\frac{1}{4}$	13	78.00
S-418007	RT7	{50 MA. 90 V. 20 Cy.	1.0 Amp. } 48 V. }	1.5 Amp. 10 or 20 V. 60 Cy.	8 $\frac{5}{8}$ x17 $\frac{5}{8}$ x5 $\frac{1}{4}$	37	176.00
	§RT7A	{50 MA. 90 V. 20 Cy. A-C.	1.0 Amp. } 48 V. }	1.5 Amp. 10 or 20 V. 60 Cy. A-C.	8 $\frac{5}{8}$ x17 $\frac{5}{8}$ x5 $\frac{1}{4}$	37	192.00
	RT10	{50 MA. 110 V. 30 Cy.	0.9 Amp. 24 V. 10 Amp. 48 V.	1.4 Amp. 18 V. 60 Cy. 3 Amp. 10 V. 60 Cy. 0.6 Amp. 24 V. D-C.	9 $\frac{1}{16}$ x15 $\frac{1}{2}$ x7 $\frac{15}{16}$	29	161.00

*With common ground, voltage adjustment, 2-prong plug. §Same as RT7 but includes superimposed ring back tone. ¶In 19-inch RR.

Prices are subject to change without notice.

Q-7

Lorain Transistor Multi-Frequency Sub-Cycle Generators



Type T25R

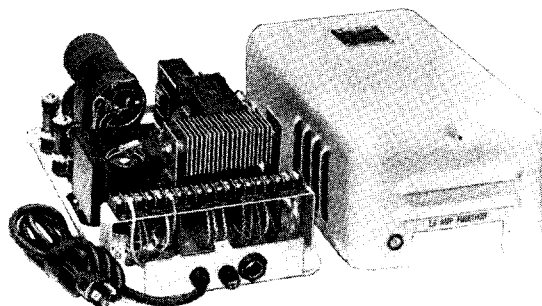
ing two or more Sub-Cycle generators.

Consist of five-plug-in-frequency generators and one-plug-in-common equipment chassis.

Type	Output Watts	Frequencies	Approx. Ship. Wt., Lbs.	Price Each
T25R	25	All 5 Frequencies as Specified	149	\$1490.00
T50R	50	All 5 Frequencies as Specified	218	2220.00
T100	100	All 5 Frequencies as Specified	250	2835.00

Efficiently produces up to five different ringing frequencies by use of dependable transistor circuits powered by 48-volt central office battery. An individual transistor Sub-Cycle can readily be adjusted to provide a decimonic, a harmonic or a synchrononic ringing series. Increased ringing power can be obtained by parallel-

Lorain Coin Collect and Return Units



Type T7R

Designed to fulfill usual requirements of pay systems used in telephone industry; ideal permanent replacements for dry cell batteries ordinarily used for this service.

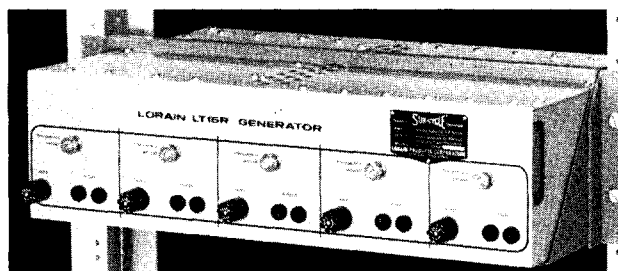
Both polarities are loaded.

Type	INPUT		WATTS		D-C		Price Each
	Volts	Cycles	No Load	Full Load	Volts	Amperes	
||RB3L	48	D-C.	†2.1	†18	120/120	3	\$684.00
T7	111-123	50/60	35	120	120/120	0.25	163.00
*T7R	111-123	50/60	35	120	120/120	0.25	189.00
T7TA	48	D-C.	†0.2	†1.8	120/120	0.25	237.00
*T10R	111-123	50/60	10	45	120	0.25	127.00
||T10TA	48	D-C.	9	75	120	.5	215.00

*Circuit includes charge of source relay. †Amperes.

||Transistorized.

Lorain Type LT15 Sub-Cycle Ringing Generators



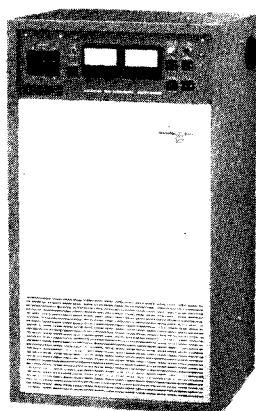
This transistorized d-c. operated sub-cycle provides sine wave output of 5 or 4 frequencies—harmonic, decimonic or synchrononic as specified. Frequency changes can be made in the field. The unit is designed to meet the budget of the smallest exchange, is provided with paralleling circuitry for expansion of facilities and occupies 5¼ inches of vertical rack space in a 19-inch relay rack.

FREQUENCY PATTERNS IN CYCLES PER SECOND Other patterns available upon request

Type	Output Watts	Generator Position					Approx. Ship. Wt. Lbs.	Price Each
		1	2	3	4	5		
LT15R	15	16, 16⅔ or 20	25 or 30	33⅓, 40 or 42	50 or 54	60, 66 or 66⅔	56	\$742.00
LT15RA		.....	25 or 30	33⅓, 40 or 42	50 or 54	60, 66 or 66⅔	50	690.00
LT15RB		16, 16⅔ or 20	.....	33⅓, 40 or 42	50 or 54	60, 66 or 66⅔	50	690.00
LT15RC		16, 16⅔ or 20	25 or 30	33⅓, 40 or 42	50 or 54	.....	51	690.00
LT15RD		16, 16⅔ or 20	20	33⅓, 40 or 42	50 or 54	60, 66 or 66⅔	56	796.00
LT15RE		16, 16⅔ or 20	25 or 30	.....	50 or 54	60, 66 or 66⅔	50	690.00
LT15RF		16, 16⅔ or 20	25 or 30	25 or 30	16, 16⅔ or 20	.....	51	714.00

Q-8

Prices are subject to change without notice.



Lorain Flotrol Single Phase Rectifiers

with Thyristors

These units feature the compactness of solid state circuits plus increased efficiency and power factor.

All models operate from 115/230V., 50/60 cy. AC source. Output meters, current limiter circuits, equalized voltage and extended reference provisions are standard features. Optional mounting hardware and other accessories available.

48-Volt Flotrol Rectifiers[▲]

Model	50/60 Cy. Input Volts	Cell Range	OUTPUT Amperes	OVERALL DIMENSIONS	Ship. Wt. Lbs.	Price
M6F50	115/230	23-25	6	19"/23"▲▲x12¼"x13"	92	\$ 598.00
M12F50	115/230	23-25	12	19"/23"▲▲x12¼"x13"	116	851.00
M18F50	115/230	23-25	18	19"/23"▲▲x12¼"x13"	152	939.00
M25F50	115/230	23-25	25	19"/23"▲▲x19¼"x12"	170	1191.00
M30F50	115/230	23-26	30	19"/23"▲▲x19¼"x12"	200	1298.00
M37F50	115/230	23-26	37	19"/23"▲▲x19¼"x12"	270	1413.00
M50F50	115/230	23-26	50	23"x26¼"x15"	320	1739.00
M75F50	115/230	23-26	75	23"x36¾"x15"	420	2173.00
M100F50	115/230	23-26	100	23"x36¾"x15"	500	2204.00

▲Models filtered to less than 32 dbm, (C-message weighting). Output voltage regulation is $\pm 1\frac{1}{2}\%$, no load to full load, with $\pm 10\%$ input voltage variation, and 47-63 cycles input frequency variation.

▲▲Reversible mounting angle for either 19" or 23" rack.

End Cell Rectifiers

Model	Input Volts	Cells	OUTPUT Amperes	OVERALL DIMENSIONS	Ship. Wt. Lbs.	Price
M75F7	115/230 (60 Cy.)	1-3	75	19"x19¼"x12"	152	\$ 876.00
M200F7	115/230 (50/60 Cy.)	1-3	200	23"x26¼"x15"	410	1924.00

Model M75F7: Filtering reduces noise to less than 100 mv. across battery. Output voltage maintained within $\pm 2\%$, no load to full load, with $\pm 10\%$ input voltage variation, and 57-63 Cy. input frequency variation.

Model M200F7: Filtering reduces noise to less than 32dbm with C-message weighting. Output voltage maintained within $\pm 1\%$, no load to full load, with $\pm 10\%$ input voltage variation and 47-63 cycles.

Lorain Flotrol Single Phase Silicon Rectifiers

Silicon Diodes-Transistor Reference

50-Volt Flotrol Chargers

A charge failure alarm is available as an accessory on all models.

Type	Input Volts	OUTPUT Into Cells	Amps.	Mount- ing	Ship. Wt. Lbs.	Price Each	Type	Input Volts	OUTPUT Into Cells	Amps.	Mount- ing	Ship. Wt. Lbs.	Price Each
†* F12A50	115	23, 24, 25	12	19" RR	141	\$ 814.00	†* F25B50	230	23, 24, 25	25	19" RR	212	\$1128.00
†* F12B50	230	23, 24, 25	12	19" RR	141	824.00	†* F30A50	115	23, 24, 25	30	23" RR	298	1555.00
†* F18A50	115	23, 24, 25	18	19" RR	193	876.00	†* F30B50	230	23, 24, 25	30	23" RR	298	1555.00
†* F18B50	230	23, 24, 25	18	19" RR	193	886.00	†* F50A50	115	23, 24, 25	50	23" RR	482	2006.00
†* F25A50	115	23, 24, 25	25	19" RR	212	1154.00	†* F50B50	230	23, 24, 25	50	23" RR	482	2006.00

*Remote control relay available as an accessory.

†End cell switch standard.

‡A floor mounting stand is available as an accessory.

§Remote control relay standard.

Prices are subject to change without notice.

Q-9

Lorain Flotrol Three Phase Rectifiers

with Thyristors

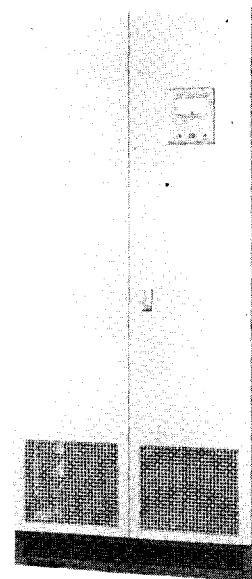
Units maintain output voltage within $\pm 1\frac{1}{2}\%$, from no load to full load, with $\pm 10\%$ input voltage variation and 57-63 cycles input frequency variation. Output filtered to less than 32 dbm, with C-message weighting.

Standard features include: remote sensing leads, output current limiter, output meters, paralleling and load sharing, high voltage shutdown, equalized voltage and power failure alarm circuit.

Optional mounting hardware, accessories available.

Model	3 ϕ , 60 cy. Input Volts	Cells	OUTPUT Amperes	OVERALL DIMENSIONS	Ship. Wt. Lbs.	Price
M25D50	230	23-26	25	19"x23"x19 $\frac{1}{4}$ "x14 $\frac{1}{2}$ "	190	\$1760.00
M50D50	230	23-26	50	19"x23"x19 $\frac{1}{4}$ "x14 $\frac{1}{2}$ "	200	1833.00
M75D50	230	23-24	75	23"x26 $\frac{1}{4}$ "x15"	360	2460.00
M100D50	230	23-24	100	23"x26 $\frac{1}{4}$ "x15"	430	2550.00
M150D50	230	23-24	150	23"x36 $\frac{3}{4}$ "x15"	580	3480.00
M200D50	230	23-24	200	23"x36 $\frac{3}{4}$ "x15"	620	3980.00
M400D50	230	23-24	400	24"x72"x27"	1180	5800.00
M800D50	230	23-24	800	36"x84"x32 $\frac{3}{4}$ "	2490	8260.00

Models M400D50 and M800D50 are floor mounted cabinets; all other models are available with larger rack mounting brackets or floor stands.

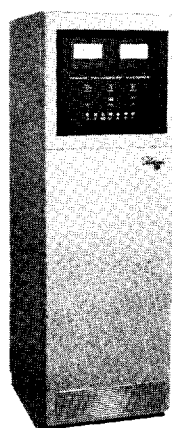


Lorain Flotrol Three Phase Silicon Rectifiers

Provided with conservatively rated, reliable silicon diodes. Transistor control gives regulation of $\pm 1\frac{1}{2}\%$ from no load to full load with input variations of $\pm 10\%$ and ± 3 cycles. Taps for operation on 210, 230, or 250-volts. Equipped with voltmeter, ammeter, paralleling features, input

and output protection, inherent overload protection. Provision for output voltage adjustment including a normal-equalize switch. Equipped with d-c. remote control relay.

Charge failure alarms available.



50-Volt Flotrol Chargers

An end cell switch is standard on all models.

Type	Input Volts	AMPERES		Mount- ing	Ship. Wt. Lbs.	Price Each
		Input	Output			
† F25D50	230	6.1	25	23" RR	242	\$1610.00
† F50D50	230	10.6	50	23" RR	355	2015.00
† F75D50	230	16.2	75	23" RR	430	2637.00
† F100D50	230	20.3	100	23" RR	528	2966.00
F200D50	230	42.4	200	Floor	1327	4430.00
F400D50	230	77	400	Floor	1662	5800.00

†A floor mounting stand is available as an option.

Lorain Carrier Supply Units

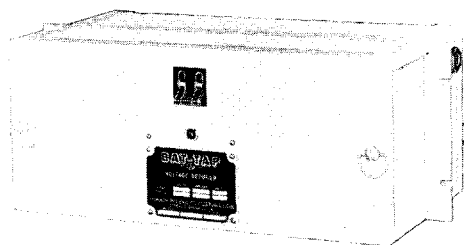
Transistor Type

These units utilize transistorized circuits and are designed for extended trouble-free and maintenance-free service. They

do not employ vibrators and do not rely on line power since they operate from office batteries.

Type	Input D-C. Volts	D-C. OUTPUT		Price Each	Type	Input D-C. Volts	D-C. OUTPUT		Price Each
		Volts	Amperes				Volts	Amperes	
CST1	48	130	2.0	\$577.00	CST5	48	130	5.0	\$991.00
CST2	48	130	0.15	243.00	CST6	48	130	1.0	503.00
CST3	48	130	5.0	744.00					

Lorain Bat-Tap Voltage Reducers and Increases



Type QB15A2

A Bat-Tap Voltage Reducer lowers battery voltage without using resistors or CEMF cells which cause loss of power. A Bat-Tap Voltage Incr. raises battery voltage without adding cells or charger capacity. All equipment listed below is for mounting in a 19-inch relay rack. Adapters are used for other relay racks.

Type	Input Volts	Output Volts	Output Amperes	Price Each
QB15A	48	24	15	\$464.00
*QB15A2	48	24	15	508.00
†QB15A3	48	24	15	422.00
QA7B	24	52	7	363.00
QB15A8	48	24	15	546.00

*Includes protective output diode for paralleling and output failure alarm relay and lamp.

†Same as QB15A2 but with ammeter.

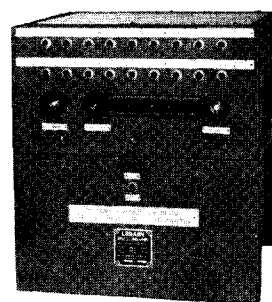
Lorain D-C. to D-C. Converters

Have output circuits isolated from the input circuits.

Type	Input Volts	Output Volts	Output Amperes	Price Each
RB2B	48	48	2	\$306.00
RB2G	48	48/65	2	268.00
RB2G2	52.8	60	2	295.00
RB3L	48	±120	3	684.00
RB5A	48	24	5	340.00
RH2B	130	48	2	408.00
RH5H	130	130	5	861.00
RH10B	130	48	10	892.00
SA2H	24	130	2	589.00
SA5H	24	130	5	990.00
SA15A	24	24	15	1040.00
SB2A1	48	10/24	0.5/2	473.00
SB2G1	48	60/70	1/0.75	480.00
SB2G2	52.8	60	2	408.00
SB5E	48	6	5	466.00
SB5M	48	12	5	396.00
SB5MB	48	10	5	396.00
SB15A	48	24	15	813.00

Prices are subject to change without notice.

Lorain Test Load Units

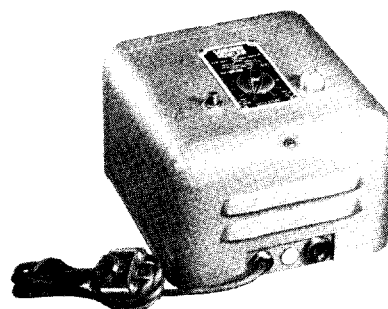


Type Y1

Used to simulate a predetermined operating load for equipment testing and adjusting purposes. Virtually any practical load up to 7,500 watts (at 25, 50 and 130 volts) may be produced to meet testing and adjustment conditions.

Type	Rating Amperes	Volts	Dimensions Inches	Ship. Wt. Lbs.	Price Each
Y1	{150 300}	{50 25}	14 1/8 x 14 1/8 x 16	55	\$530.00

Lorain Howlers



Serves as the ideal method of getting a misplaced receiver on the hook without making a service call. The signal tone produced by the Lorain Howler is distinctive, attention demanding and yet safe.

Model Type	Dimensions Inches	Ship. Wt. Lbs.	Price Each
B	8x8 7/8x6 1/2	10	\$169.00

Lorain WBA Series Single-Phase Inverters

For applications where a low-cost, dependable, solid-state inverter is required. Approximate sine wave output with less than 15% harmonic distortion. All models designed for 19" or 23" relay rack or wall mounting.

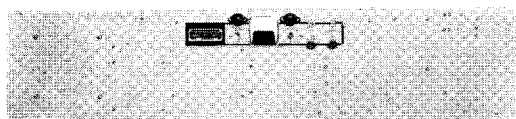
Accessories and Options Available: Output failure alarm assembly, output meter assembly, transfer circuit assemblies, optional mounting hardware.

118-volt, 60-cycle, Single-phase Output

Output Power VA	Type	48V DC Input	Price Each
125	WBA121B1		\$396.00
250	WBA251B1		467.00
500	WBA501B1		551.00
1,000	WBA102B1		848.00

Lorain Ringing and Talking Supply Units

Compact, reliable units adapted for use with branch exchanges to supply talking power and ringing power. Most units include a low tone output. Some also supply 60-cycle signaling voltage.

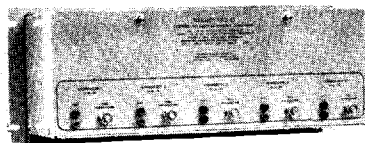


Type	Input Volts A.C.	Talking D.C. Volts/ Amps.	Signalling 60-Cycle Volts/ Amps.	Ringing Cycles/ Watts	Tone 600/120 Cycles Milliwatts	Remarks	Price Each
3B2	115	48/3	.....	20/7.5	100	Battery eliminator. Adaptable for use as charger..	\$488.00
6A1	115	24/6	10/15, 20/1	20/7.5	...	Battery eliminator.....	645.00
6A2	115	22.5/4	10/15, 20/1	20/7.5	...	Battery eliminator.....	468.00
6B8	115	50/6	.....	20/7.5**	25	Battery eliminator. Adaptable for use as charger..	548.00
9B2	115	50/9	.....	30/5**	25	Battery eliminator.....	643.00
9B3	115	50/9	.....	20/7.5**	25	Battery eliminator—charger.....	832.00
9B4	115	50/9	.....	20/7.5**	25	Battery eliminator.....	643.00
12A1	115	24/12	10/30, 20/2	20/7.5**	...	Battery eliminator.....	583.00
12A2	115	24/12	10/30, 20/4	.....	...	Battery eliminator.....	320.00
12B1	115	50/12	.....	20/7.5**	25	Battery eliminator—charger.....	721.00
*12B3	115	50/12; 130/1	10/1 10VDC/2A	20/7.5**	25	Battery eliminator—charger.....	1246.00
20B1	115	50/20	.....	20/15	100	Battery eliminator—charger.....	1026.00
20B2	115	50/20	.....	.....	...	Battery eliminator—charger.....	913.00
30B1	115	50/30	.....	20/15	100	Battery eliminator—charger.....	1259.00
30B2	115	50/30	.....	.....	...	Battery eliminator—charger.....	1146.00
30B3	230	50/30	.....	20/15	100	Battery eliminator—charger.....	1285.00

*Includes an interrupter

**With superimposed ringback tone.

Warren Controlled-Rectifier Sinewave Ringing Generators



Battery-powered, multi-frequency ringing generators which employ silicon-controlled-rectifier output circuits for utmost reliability. Small and compact, yet with every component completely accessible, this modern ringing generator cannot be harmed by overloads, shorts, or d-c or a-c potentials or surges up to 100 volts.

A Start-Stop relay is always included.

15-Watt Models

Type	Frequencies	INPUT D.C. Volts	D.C. Amp.	OUTPUT Voltage Range	DIMEN IN. W.X.H.X.D.	Approx. Shp. Wt. Lbs.	Price Each
5CRR15	Any 5 Freq. Comb.	50	3.5	80-160	{ 19, 23 or 30 x7x14 }	85	\$735.00
1CRR15	Any One Freq.	50	0.7	80-160	{ 19, 23 or 30 x3½x9¼ }	35	195.00

25-Watt Models

Type	Frequencies	INPUT D.C. Volts	D.C. Amp.	OUTPUT Voltage Range	DIMEN IN. W.X.H.X.D.	Approx. Shp. Wt. Lbs.	Price Each
5CRR25	Any 5 Freq. Comb.	50	5.0	82-162	{ 19, 23 or 30 x7x15 }	88	1260.00
4CRR25	Any 4 Freq. Comb.	50	5.0	82-162	{ 19, 23 or 30 x7x15 }	82	1040.00
1CRR25	Any One Freq.	50	1.1	82-162	{ 19, 23 or 30 x5¼x9¼ }	38	216.00

50-Watt Models

Type	Frequencies	INPUT D.C. Volts	D.C. Amp.	OUTPUT Voltage Range	DIMEN IN. W.X.H.X.D.	Approx. Shp. Wt. Lbs.	Price Each
5CRR50	Any 5 Freq. Comb.	50	7.0	80-160	{ 19, 23 or 30 x21x15 }	180	1890.00
4CRR50	Any 4 Freq. Comb.	50	7.0	80-160	{ 19, 23 or 30 x21x15 }	165	1596.00
1CRR50	Any One Freq.	50	2.0	80-160	{ 19, 23 or 30 x5¼x9¼ }	63	326.00

Options: Spare parts kit, stop/start relay.

To order Warren Controlled Rectifier Ringing Generators, specify by Type No. developed as follows:

1. Number of frequencies: 5, 4 or 1.
2. Series designator:
CRR for ringers.
3. Capacity in watts: 15
4. Ringing series suffix: H, S, or D.
5. Rack size: 19, 23 or 30 inches.
6. Desired frequencies.

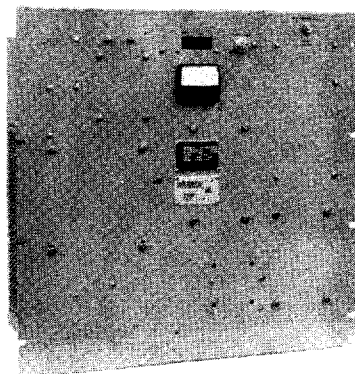
EXAMPLE: A Warren 15-Watt Controlled Rectifier Ringing Generator for synchrononic ringing to mount on a 19-inch rack would have the Type No.:

5CRR-15S-19-16, 30, 42, 54, 66

In specifying frequencies of the generators, a standard CRR-15 can be adjusted within the ranges listed below:

Generator 1	16 to 20 cps.
Generator 2	25 to 30 cps.
Generator 3	33 to 42 cps.
Generator 4	50 to 54 cps.
Generator 5	60 to 67 cps.

Type TPP Warren Transistor Power Packs



The Warren Transistor Power Pack is a complete, transistorized power, ringing and tone supply for PBX, PAX and PABX installations. It combines a battery charger/eliminator with a ringing generator and a dial/busy tone generator in a single compact, economical unit.

Charger/eliminator capacity: 3 to 30 amperes, 48 volts. See table below.

Ringer: input, 50 volts nominal; output, 7.5 watts, 100 volts, 20 cps.

Dial/busy tone generator: input, 50 volts nominal; output, 20 milliwatts, 600 cycles modulated at 120 cycles.

Line load regulation (used as battery charger): $\pm 1\%$ from 0 to 100% load, 30 millivolt ripple.

Current limit is set at 125% of rated capacity.

Line load regulation (used as battery eliminator): $\pm 2\%$ from 0 to 100% load, 30 millivolt ripple.

Size: width, 23 inches; depth, $8\frac{1}{2}$ inches; height, $22\frac{1}{2}$ inches.

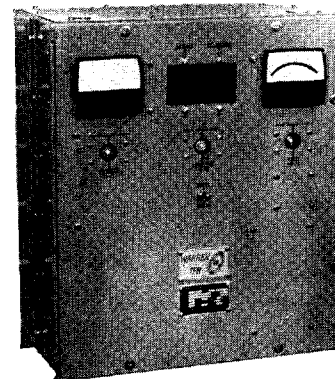
Type	INPUT		OUTPUT		Cells	Ship. Wt. Lbs.	Price Each
	Volts	Amp.	Volts	Amp.			
48TPP6	115	6.5	48-53	6	23, 24	125	\$580.00
48TPP12	115	12.3	48-53	12	23, 24	207	730.00
48TPP20	115	20.0	48-53	20	23, 24	235	990.00
48TPP30	115	29.6	48-53	30	23, 24	250	1240.00

OPTIONS: 1. Voltmeter.

2. W148A DPDT Failure Alarm Relay.

When ordering, specify Type, whether battery charger or eliminator is desired (if battery charger, specify number of cells; if eliminator, add suffix "E" to the Type and voltage setting). Ammeter and the AC/DC failure alarm relay are available as optional accessories. A voltmeter is standard equipment.

Type TFR-E Warren Battery Eliminators



Available for 24 or 48-volt, single or three-phase operation. They may also be used as battery chargers.

All battery eliminators listed have a line/load regulation of $\pm 1\%$ and are available for either relay rack, wall, shelf, or floor mounting as indicated.

48-Volt—Single-Phase

Type	Input Volts	OUTPUT		*Type of Mounting	Size Inches	Ship. Wt. Lbs.	Price Each
		Volts	Amp.				
G48TFR3SE	115	48-	56	3 R-W-S	19x13x20	130	\$431.00
G48TFR6SE	115	48-	56	6 R-W-S	19x13x20	155	588.00
G48TFR9SE	115	48-	56	9 R-W-S	19x13x20	200	672.00
D48TFR12SE	115 or 230†	48-	56	12 R-W-S	19x13x20	230	882.00
D48TFR16SE	115 or 230	48-	56	16 R-W-S	19x13x20	265	924.00
D48TFR20SE	115 or 230	48-	56	20 R-W-S	19x13x20	285	987.00
D48TFR25SE	115 or 230	48-	56	25 R-W-S	19x13x20	300	1218.00
D48TFR30SE	115 or 230	48-	56	30 R-W-S	19x13x20	310	1350.00
D48TFR36SE	115 or 230	48-	56	36 R-W-S	19x13x20	340	1428.00
D48TFR50SE	115 or 230	48-	56	50 R-W-S	19x13x20	380	1806.00

48-Volt—Three-Phase

A48TFR25T	230	48-	58	25 R-F	23x15x45	445	\$1680.00
A48TFR37T	230	48-	58	37 R-F	23x15x45½	515	1710.00
A48TFR50T	230	48-	58	50 R-F	23x15x45½	580	1830.00
A48TFR75T	230	48-	58	75 R-F	23x15x45½	705	2360.00
A48TFR100T	230	48-	58	100 R-F	23x15x45½	825	2520.00

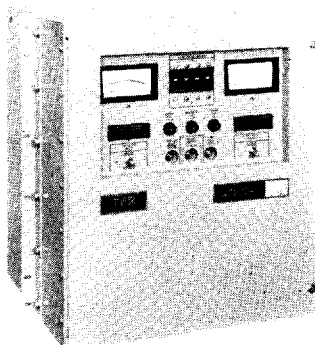
*R—Rack, W—Wall, S—Shelf, F—Floor.

Adaptor for wider racks, or stand for floor mounting, is supplied at no charge when specified.

†230-volt input is optional. Must be specified.

Prices are subject to change without notice.

Type TFR Warren Transistor Float Rectifiers



Type D48TFR50S

The Warren Transistor Float Rectifier is a solid-state, constant-voltage, fully automatic battery charger specifically designed for telephone, microwave, and general communication applications. Silicon diodes are used for rectification. A transistor-magnetic amplifier control circuit provides d.c. output regulation of $\pm 1/2\%$ from 0 to 100% load. D.C. output is filtered to reduce ripple to 30 millivolts or less, except on 130-volt models where the ripple is 100 millivolts or less.

Has no moving parts, and no aging adjustments are ever required. Freedom from maintenance results in a lower annual cost.

All models include as standard equipment a 2% d.c. ammeter, 1% d.c. voltmeter (1.2% at working voltage), two-pole a.c. circuit breaker, d.c. breaker or d.c. fuse, toggle switch to change from float to equalize, separate rheostats for float and equalize voltage adjustments, and terminals for remote sensing.

All models may be operated in parallel with other TFR's or with constant-voltage rectifiers of other manufacture without modification. However, if equal or proportional load sharing is required, then the load sharing option must be specified.

Cabinet is constructed of heavy gage sheet steel with telephone gray baked enamel finish. Convenient hinged front cover. Mounting: R—Relay Rack, W—Wall, S—Shelf, F—Floor.

D.C. OUTPUT:

	Lead Acid Batteries	Nickel Cadmium Batteries
Float.....	2.15 to 2.20 volts/cell (normal)	1.4 volts/cell (normal)
Equalize Voltage.....	2.2 to 2.33 volts/cell (normal)	1.45 to 1.55 volts/cell (normal)
Float Voltage Adjustment		
Range.....	2.10 to 2.25 volts/cell	1.4 to 1.45 volts/cell
Float Voltage Regulation....	$\pm 1/2\%$ from 0 to 100% load with $\pm 10\%$ a.c. line variations at normal float voltage settings	
D.C. Current-Limit Setting..	125% of rating, normal	

OPTIONS:

- | | |
|----------------------------------|------------------------------------|
| 1. A.C./D.C. Failure Alarm Relay | 4. 0-24 Hour Equalize Charge Timer |
| 2. Low D.C. Voltage Alarm Relay | 5. Remote Control Relay |
| 3. High D.C. Voltage Alarm Relay | 6. Load Sharing |

In addition, other input voltages and frequencies, other cell selections, and equipment to customer specifications are available on special order basis.

TFR TYPE NOMENCLATURE:

The following example provides an interpretation of the Warren TFR type designations:

D	48	TFR	50	S or T
Series	D.C. Volts	Transistor Float Rectifier	D.C. Amp.	Single Phase (S) Three Phase (T)

Type TFR Warren Transistor Float Rectifiers

Single-Phase Chargers

6-Volt Filtered Models

Type	*A.C. INPUT			D.C. Out- put Amp.	INPUT WIRE SIZE		BRANCH CIRCUIT FUSES		Size Inches	†Cabinet Mounting	Ship. Wt. Lbs.	Price Each
	Volts	115 V.	230 V.		115 V.	230 V.	115 V.	230 V.				
A6TFR50S	115	5	....	50	12	..	10	..	19x12x20	R-W-F	180	\$760.00
A6TFR100S	115	7.2	....	100	12	..	15	..	19x12x20	R-W-F	230	\$910.00

48-Volt Filtered Models

G48TFR3	115	2.9	....	3	14	..	6	..	19x13x20	R-W-S	130	\$410.00
G48TFR6	115	5.9	....	6	14	..	10	..	19x13x20	R-W-S	155	\$600.00
G48TFR9	115	7.8	....	9	12	..	15	..	19x13x20	R-W-S	200	\$640.00
D46TFR12	115/230	10.4	5.2	12	12	14	20	10	19x13x20	R-W-S	230	\$840.00
D48TFR16	115/230	13	6.5	16	12	14	25	15	19x13x20	R-W-S	265	\$880.00
D48TFR20	115/230	18	9	20	10	12	30	15	19x13x20	R-W-S	285	\$940.00
D48TFR25S	115/230	23	11.5	25	8	12	40	20	19x13x20	R-W-S	300	\$1160.00
D48TFR30S	115/230	28	14	30	8	10	50	25	19x13x20	R-W-S	310	\$1286.00
D48TFR36S	115/230	35	17.5	36	6	10	60	30	19x13x20	R-W-S	340	\$1360.00
D48TFR50S	115/230	46	23	50	4	8	80	40	19x13x20	R-W-S	380	\$1720.00
D48TFR75S	115/230	60	35	75	2	6	125	60	23x15x36	R-W-F	575	\$2160.00
D48TFR100S	115/230	90	45	100	0	4	150	75	23x15x36	R-W-F	760	\$2190.00

Three-Phase Chargers

48-Volt Filtered Models

(For Lower Current Ratings, See Type A-TFR Listings)

Type	A.C. INPUT		D.C. Output Amp.	Input Wire Size 115 V.	Branch Circuit Fuses 115 V.	Size Inches	†Cabinet Mounting	Ship. Wt. Lbs.	Price Each
	Volts	Amp.							
A48TFR400T	230 or 460†	80	400	1/0	100	36x24x78	F	2100	\$5700.00
A48TFR800T	230 or 460†	160	800	3/0	300	42x32½x84	F	3590	\$8200.00

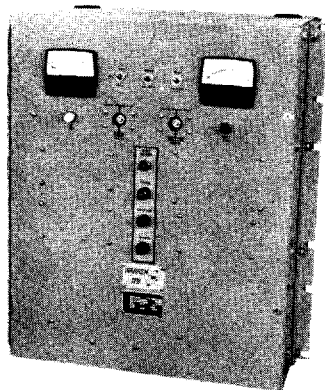
*Single-voltage models: Standard voltage (115), 110/120 taps ±10%; optional voltage (230), 208/230 taps ±10%.
Dual-voltage models: 104-115/208-230 ±10%. Frequency: 60 cps. ±10%. NOTE: Optional voltage must be specified.

†R—Relay rack, W—Wall, S—Shelf, F—Floor.

‡460 volts a.c. is optional, must be specified.

The data below is applicable to both Single-Phase Chargers and Three-Phase Chargers.

48-Volt Output: Cells: Lead Acid Batteries 23, 24, 25.
Nickel Cadmium Batteries 34 thru 37.
Float Volts: 48 to 56.
Equalize Volts: 50 to 59.
Ripple: 30 MV max.



Type A-TFR Warren Transistor Float Rectifiers

A-Series, 48-Volt, Three-Phase, Filtered Models

Employs silicon controlled rectifiers which enable voltage control to be accomplished by small, low-level, transistor-magnetic amplifier circuits. The elimination of high-level magnetic amplifiers, which are inherently noisy and relatively large, makes these chargers smaller, lighter, and the quietest ever. As with all Warren chargers, no aging adjustments are ever required.

Output voltmeter may be connected to charger output, battery, power board, or remote voltage-sensing point.

Complete charger and battery protection. Any blown fuse or rectifier failure trips AC line contactor. Failure of one controlled rectifier will not damage others. Current limiting may be adjusted from 80-120% of charger rating.

Regulation is $\pm 1\frac{1}{2}\%$ from 0 to 100% rated load with input voltage variations of -10% to +15%.

Electrical noise is less than 26 dba, with F1A line weighting, 2B noise measuring set, and charger connected to battery whose ampere-hour rating is four times charger rating in amperes.

STANDARD EQUIPMENT:

1. Ammeter and Voltmeter with mirror scale and knife-edge pointer. Voltmeter is $\pm 1\%$ calibrated to $\pm 1\frac{1}{2}\%$ at working voltage.
2. Separate rheostats for control of Float and Equalize Voltages.
3. AC Line Contactor with thermal overload protection.
4. Terminals for Remote Voltage Sensing.
5. Remote Control Relay.
6. Terminals for Parallel Operation.
7. Terminals for connecting voltmeter to external voltage.
8. Float-Equalize Toggle Switch.
9. Auto-Manual Toggle Switch.
10. Normal-Emergency Cells Toggle Switch.
11. AC ON, Rectifier Failure, and Fuse Alarm Panel Lamps, Rectifier Failure terminals provided for external alarm.
12. Charger, Capacitor, and Sensing Circuit Fuses.
13. DC Fuse and Knife Disconnect Switch.
14. Current Limiting Circuit.
15. Circuit to trip line contactor on fuse or rectifier failure.
16. Equal or proportional load sharing with other Warren three-phase chargers.

OPTIONAL AND SPECIAL-ORDER EQUIPMENT:

1. Charge-Failure Alarm Relay (W348A, DPDT)*
2. Low-Voltage Alarm Relay (WLV48)*
3. High-Voltage Alarm Relay (WHV48)*
4. Stand for Floor Mounting.
5. Load Sharing with chargers of other manufacture.
6. Load Sharing with DC Generator (Diverter pole or equivalent compound generator).
7. Equalize Charge indicator lamp.
8. Special Cell selection.
9. Special input voltage.
10. Special input frequency.

*Any two of these three can be installed at any time without wiring changes.

All three are available on a Special Order Basis.

Type	INPUT (1)		OUTPUT (2)		Cells (3)	Input Wire Size (4)	Branch Circuit Fuses	Mounting (6)	Size Inches	Ship. Wt. Lbs.	Price Each
	Volts	Amp.	Volts	Amp.							
A48TFR25T	230	5.7	48-57	25	23, 24, 25	14	15A	RR, Floor	23x15x26	314	\$1680.00
A48TFR37T	230	8.3	48-57	37	23, 24, 25	12	20A	RR, Floor	23x15x26	348	1710.00
A48TFR50T	230	11.0	48-57	50	23, 24, 25	12	20A	RR, Floor	23x15x26	365	1830.00
A48TFR75T	230	16.0	48-57	75	23, 24, 25	10	30A	RR, Floor	23x15x26	404	2360.00
A48TFR100T	230	21.5	48-57	100	23, 24, 25	8	35A	RR, Floor	23x15x26	470	2520.00
A48TFR200T	230(5)	41.5	48-57	200	23, 24, 25	5	60A	RR, Floor	23x15x36	792	3960.00

NOTES: 1. 208 or 230 volts, +15%, -10%, 60 cps, 3 phase.

2. Rheostat adjustable.

3. Also 23+3, charge by load.

4. For 230-volt, 60-cps, 3-phase power service.

5. This model may be strapped for 416 or 460 volts, +15%, -10%, 60 cps., 3 phase.

6. Brackets for 30-inch rack furnished without charge when specified.

When ordering, specify Type from table above, and in addition specify: input voltage and frequency; number and type (lead antimony, lead calcium) of battery cells; type of mounting (re-lay rack or floor); accessory equipment, if any; special equipment, if any; load sharing particulars, if any.