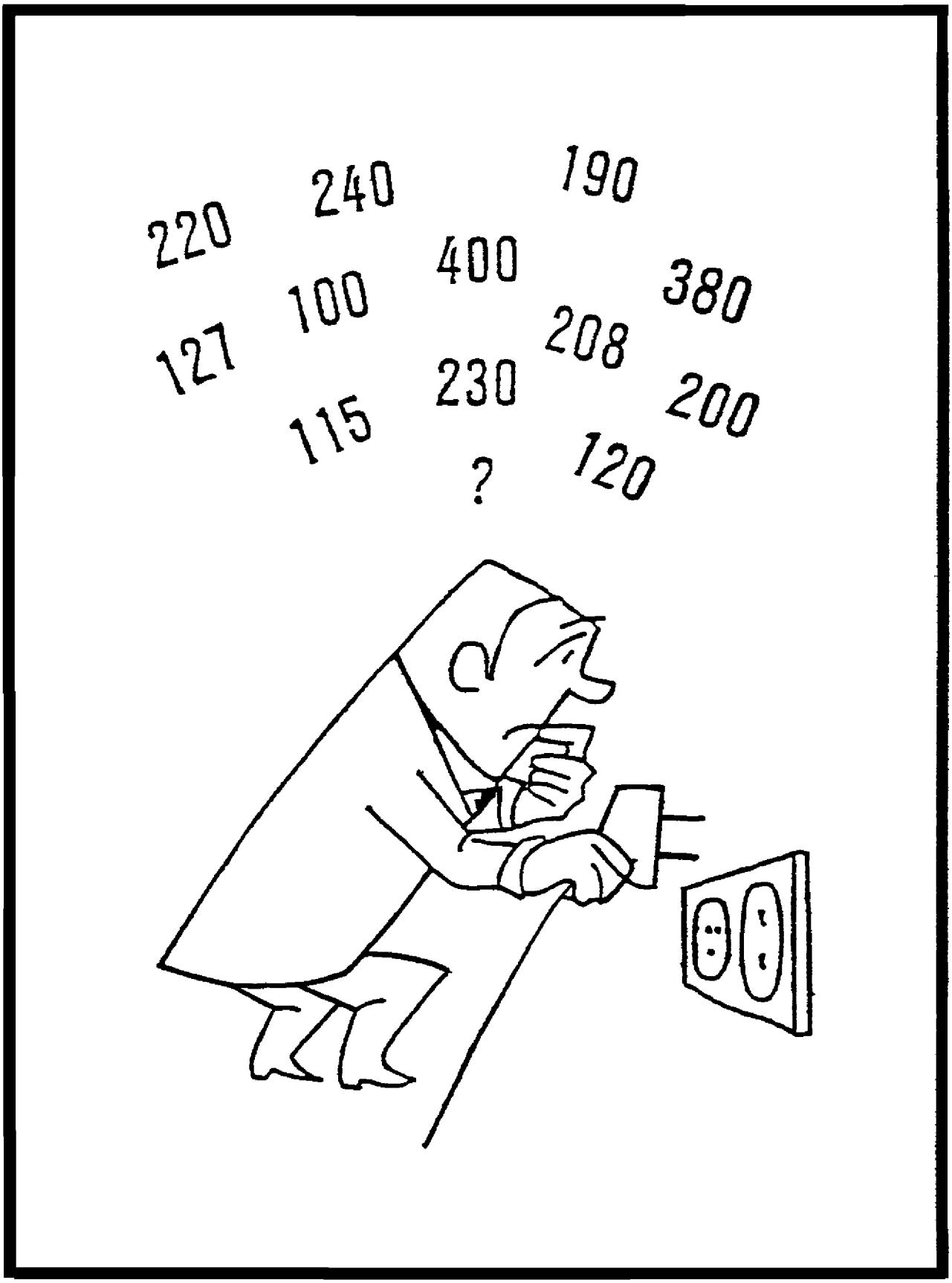
FOREWORD

This publication lists the characteristics of electric current available and the type of attachment plugs used in principal cities throughout developing countries.

The information contained in the booklet is based on a report published in 1984 by the U.S. Department of Commerce on electric current characteristics abroad. The data, however, have been updated with the assistance of the UNDP field offices as well as from other sources.


220
240
190
400
380
127
100
208
230
200
115
?
120

INTRODUCTION

The characteristics of electric current type (alternating or direct current), number of phases, frequency (cycles per second), and voltages found in major cities of developing countries are listed in this report. In addition, the number of wires to a commercial or residential installation are given where available.

The current characteristics and other data furnished relate mainly to domestic and commercial service. It does not include special commercial installations involving relatively hight voltage requirement nor does it refer to special industrial installations.

Adherance to the locally prevailing current characteristics is important to avoid additional expenses. A transformer may be obtained locally to correct the voltage if required; however, if the operation of an equipment will require exact timing or speed and if the frequency (hertz) of the local electricity supply is other than that for which the equipment has been designed, it is necessary that a model designed especially for the local frequency be used. Auxiliary equipment to change frequency is too bulky and expensive for the average commecial installation.

Among the nominal voltages indicated in this report, the lower voltages shown are used primarily for lighting and smaller equipment, while the higher voltages are used primarily for air conditioners, heating, and other large equipment.

Please note that the information presented here should not be taken as final in the case of industrial or highly specialized commercial installations. It is recommended that for special equipment, required for commercial, scientific or industrial use, the current characteristics for the area of installation be obtained from the end user.

KEY TO TERMS USED IN THIS PUBLICATION

Type of Current. -a.c. indicates alternating current and d.c., direct current.

Frequency. -Shown in number of hertz (cycles per second). Even if voltages are similar, a 60 hertz (60Hz) clock or phonograph will not work properly on 50 hertz (50Hz) current.

Number of Phases. -1 and 3 are the conventional phases which may be available.

Nominal Voltages. -Direct current nominal voltages, for example are: 110/220 and 120/240. The lower voltage is always 1/2 of the higher voltage. On a direct current installation, the lower voltage requires 2 wires while the higher ones requires 3 wires.

Alternating current nominal voltage: Alternating current is normally distributed either through 3 phase, wye ("star") or delta ("triangle"), 4-wires secondary distribution system. In the wye or star distribution system the nominal voltage example are: 102/208, 127/220, 220/380, and 230/400. The higher voltage is 1.732 (the square root of 3) times the lower voltage. In a delta or triangle system, 110/220 and 230/460 are examples of a nominal voltages. The higher voltage is always double the lower voltage.

The higher voltage is obtained by using 2 or 3 phase wires and the neutral wire while the lower voltage between the neutral wire and one phase wire. The higher voltage may be single or 3 phase while the lower voltage is always single phase and used primarily for lighting and for small appliances.

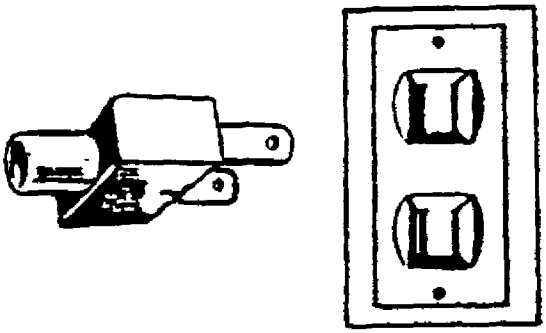
In this report the term nominal voltage is used to denote the reported voltage in use in the majority of residential and commercial establishments in the city or area named.

Type of attachment plug utilized. -Attachment plugs used throughout the world come in various forms, dimensions and configurations too numerous to delineate in this report. This report does, however, attempt to point out the basic and most commonly used types of plugs by country.

The most basic forms include the American system 2 flat parallel blades, the European type with 2 or 3 round pins, i.e. circular blades, and the British spare pin type. Adapters may be purchased to change from one type to the other. The availability of theses adapters is shown for each country immediately after the key to the type of plug used.

Number of wires to the consumer. -The number of wires which may be utilized by the consumer is shown. Normally, a single phase, 220/380 volt system or 127/220 one will have two wires if only the lower voltage is available (one phase wire and the neutral). It will have three wires if both the higher and lower voltages are available (two phase wires and the neutral) and where three phase motors will be utilized, four wires will be available for the higher voltage (the three phase wires and the neutral wire).

TYPES OF ELECTRIC PLUGS IN DOMESTIC AND COMMERCIAL USE



TYPE

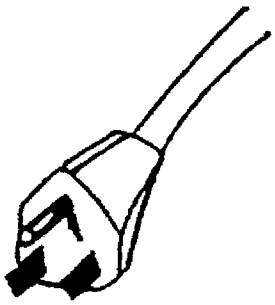
A

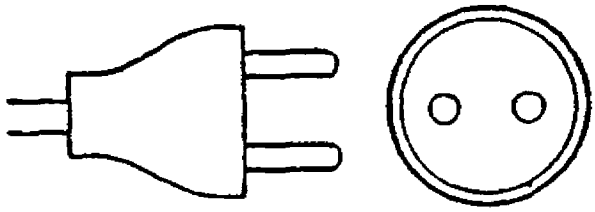
FLAT BLADE ATTACHMENT PLUG

TYPE

B

FLAT BLADES WITH ROUND GROUNDING PIN





TYPE

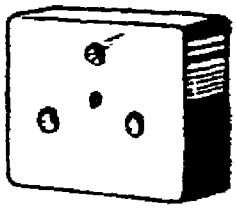
C

ROUND PIN ATTACHMENT PLUG

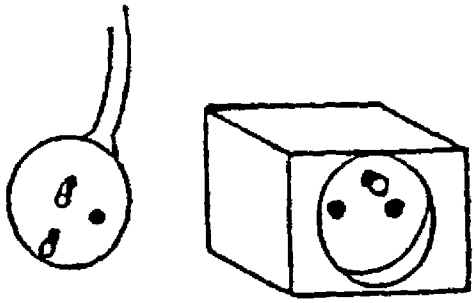
TYPE

D

ROUND PINS WITH GROUND



TYPES OF ELECTRIC PLUGS
IN DOMESTIC AND COMMERCIAL USE



TYPE

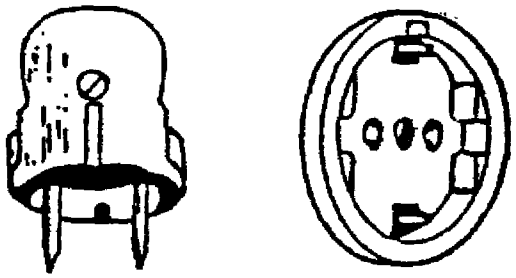
E

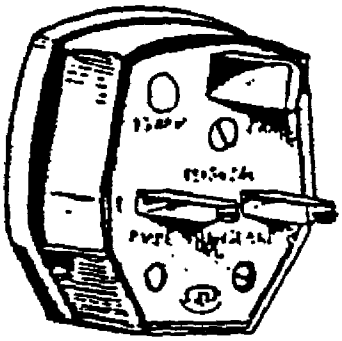
ROUND PIN PLUG AND RECEPTACLE
WITH MALE GROUNDING PIN

TYPE

F

"SCHUKO" PLUG AND RECEPTACLE
WITH SIDE GROUNDING CONTACTS



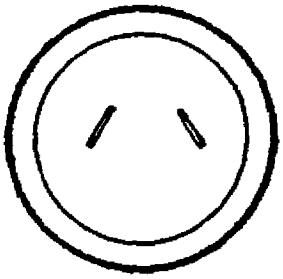


TYPE

G

RECTANGULAR BLADE PLUG

TYPES OF ELECTRIC PLUGS IN DOMESTIC AND COMMERCIAL USE



TYPE

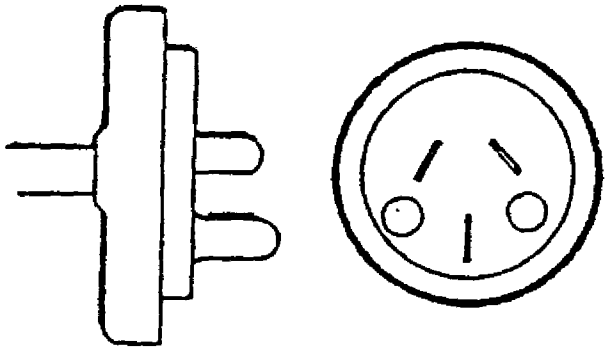
H

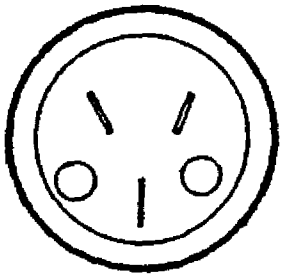
OBLIQUE FLAT BLADES

TYPE

I

OBLIQUE FLAT BLADES
WITH GROUND





TYPE

J

OBLIQUE FLAT BLADES
WITH GROUND

TYPES OF ELECTRIC PLUGS BY COUNTRY

COUNTRY	PLUG TYPE SHOWN ON PAGES 6 & 7	ADAPTERS READILY AVAILABLE
Afghanistan	D	Yes
Albania	C	---
Algeria	C and D	No
Angola	C	---
Antiqua & Barbuda	A,B and G	Yes
Argentina	C and G	---
Bahamas	A and B	Yes
Bahrain	D and G	Yes
Bangladesh	C and D	No
Barbados	A and B	---
Belize	A and B	---
Benin	D	---
Bermuda	A,B,G and I	No
Bhutan	B	---
Bolivia	A,B,C and F	---
Botswana	D and G	Yes
Brazil	A,B,C,D,E,F,G,H,I,J	Yes
British Virgin Is.	A,C and D	---
Brunei	A,C and D	---
Bulgaria	C and F	No
Burkina Faso	C	---
Burma	D and G	---
Burundi	C,E and F	No
Cameroon	C and E	---
Cape Verde	C and F	No
Cayman Islands	A and B	---
Central African Rep.	C	---
Chad	D,E and F	No
Chile	C	Yes
China, Peop. Rep.	C and J	No
Colombia	A and C	Yes

COUNTRY	PLUG TYPE SHOWN ON PAGES 6 & 7	ADAPTERS READILY AVAILABLE
Comoros	B and C	—
Congo, Rep. of	C	—
Cook Islands	E and F	—
Costa Rica	A,D,I and J	Yes
Cuba	E and F	—
Cyprus	G	Yes
Czechoslovakia	E	No
Djibouti	C and E	No
Dominica	G	—
Dominican Rep.	A and J	No
Ecuador	A and C	—
Egypt	C	No
El Salvador	A,B,G,I and J	No
Equatorial Guinea	C	No
Ethiopia	C,D and F	—
Fiji	I	Yes
French Polynesia	B and C	—
Gabon	C and E	—
Gambia	G	Yes
Ghana	C,D, and G	No
Greece	C,D, and F	No
Grenada	C,D, and G	Yes
Guatemala	A and I	—
Guinea	C and E	No
Guinea-Bissau	C,D and F	No
Guyana	A,B,C,D, and G	Yes
Haiti	A,B,I, and J	—
Honduras	A and B	—
Hong Kong	D	No
Hungary	F	—
India	C and D	—
Indonesia	C,E, and F	Yes

COUNTRY	PLUG TYPE SHOWN ON PAGES 6 & 7	ADAPTERS READILY AVAILABLE
Iran	B,C, and D	—
Iraq	C,D, and G	No
Ivory Coast	C	—
Jamaica	A and B	—
Jordan	C,F and J	Yes
Kampuchea, Dem.	A and B	—
Kenya	D and G	—
Kiribati	------	—
Korea, D. P. R.	A and F	Yes
Korea, Republic of	A and F	No
Kuwait	C,D and G	Yes
Lao, Peop. Dem. R.	A and C	Yes
Lebanon	C	—
Lesotho	C	No
Liberia	A and G	No
Libyan Arab Jama.	D	—
Madagascar	C an E	No
Malawi	G	—
Malaysia	G	Yes
Maldives	D	—
Mali	C and E	—
Malta	G	No
Mauritania	C	—
Mauritius	C,D, and G	—
Mexico	A	—
Mongolia	C	—
Montserrat	A,B, and G	Yes
Morocco	C,D,E, and F	—
Mozambique	C and F	—
Nauru	E	—
Nepal	D	Yes
Netherlands Antill	A,B,C,D and F	Yes
New Caledonia	A	Yes

COUNTRY	PLUG TYPE SHOWN ON PAGES 6 & 7	ADAPTERS READILY AVAILABLE
Nicaragua	A	—
Niger	C	No
Nigeria	D and G	—
Niue	E	—
Oman	D and G	Yes
Pakistan	C and D	No
Panama	A and B	—
Papua New Guinea	H and I	No
Paraguay	C	No
Peru	A	—
Philippines	A,B,C,D and J	Yes
Poland	C,E, and F	No
Portugal	C and D	—
Qatar	D and G	Yes
Romania	C and F	—
Rwanda	C and J	No
St. Kitts-Nevis	D and G	—
St. Lucia	G	—
St. Vincent	G	—
Samoa	D	—
Sao Tome & Principe	C	—
Saudi Arabia	A,B,C,D,E,F,G,H,I,J	No
Senegal	C and F	No
Seychelles	D and G	No
Sierra Leone	D and G	—
Singapore	C and G	Yes
Solomon Islands	B,C, and D	—
Somalia	C and D	Yes
Sri Lanka	D	No
Sudan	C,F, and G	No
Suriname	C and F	Yes
Swaziland	D	—
Syria	C	Yes

COUNTRY	PLUG TYPE SHOWN ON PAGES 6 & 7	ADAPTERS READILY AVAILABLE
Tanzania, U. R.	D and G	—
Thailand	A and C	No
Togo	C and E	—
Tokelau	E	—
Tonga	D and I	Yes
Trinidad & Tobago	A,B,D,G, and I	Yes
Trust Terr. P. Is.	A and D	—
Tunisia	C	—
Turkey	C,E, and F	—
Turks & Caicos Is.	C and D	—
Tuvalu	C and D	—
Uganda	G	—
United Arab Emir.	D and G	Yes
Uruguay	C and I	Yes
Venezuela	I and J	—
Viet Nam	A and B	No
Yemen, P. D. Rep.	A and D	—
Yemen, Arab. Rep.	C and D	—
Yugoslavia	C and F	—
Zaire	E	Yes
Zambia	G	—
Zimbabwe	D and G	No

ELECTRIC CURRENT CHARACTERISTICS

COUNTRY AND CITY	TYPE AND FREQUENCY OF CURRENT	NUMBER OF PHASES	NOMINAL VOLTAGE	NUMBER OF WIRES
AFGHANISTAN				
Charikar	a.c. 60	1,3	220/380	2,4
Farah	a.c. 50	1,3	220/380	2,4
Ghazni	a.c. 50	1,3	220/380	2,4
Gulbahar	a.c. 50	1,3	220/380	2,4
Herat	a.c. 50	1,3	220/380	2,4
Jalalabad	a.c. 50	1,3	220/380	2,4
Kabul	a.c. 50	1,3	220/380	2,4
Kandahar	a.c. 50	1,3	220/380	2,4
Kunduz	a.c. 50	1,3	220/380	2,4
Maimana	a.c. 50	1,3	220/380	2,4
Mazar-i-Sharif	a.c. 50	1,3	220/380	2,4
Paghman	a.c. 50	1,3	220/380	2,4
Pul-i-Khumri	a.c. 50	1,3	220/380	2,4
ALBANIA				
Tirana	a.c. 50	1,3	220/360	2,3,4
ALGERIA				
Algiers	a.c. 50	1,3	127/220	2,4
			220/380	2,4
Constantine	a.c. 50	1,3	127/220	2,4
			220/380	2,4
El Harrach	a.c. 50	1,3	127/220	2,4
			220/380	2,4
Ghardaia	a.c. 50	1,3	127/220	2,4
			220/380	2,4
Ighil Izane	a.c. 50	1,3	127/220	2,4
			220/380	2,4
Kherba	a.c. 50	1,3	127/220	2,4
			220/380	2,4
Mascara	a.c. 50	1,3	127/220	2,4
			220/380	2,4

ELECTRIC CURRENT CHARACTERISTICS

COUNTRY AND CITY	TYPE AND FREQUENCY OF CURRENT	NUMBER OF PHASES	NOMINAL VOLTAGE	NUMBER OF WIRES
ALGERIA – *Continued*				
Mohammadia	a.c. 50	1,3	127/220	2,4
			220/380	2,4
Mostaganem	a.c. 50	1,3	127/220	2,4
			220/380	2,4
Oran	a.c. 50	1,3	127/220	2,4
			220/380	2,4
Saida	a.c. 50	1,3	127/220	2,4
			220/380	2,4
Sayada	a.c. 50	1,3	127/220	2,4
			220/380	2,4
Setif	a.c. 50	1,3	127/220	2,4
			220/380	2,4
Sidi-Bel-Abbes	a.c. 50	1,3	127/220	2,4
			220/380	2,4
Skikda	a.c. 50	1,3	127,220	2,4
			220/380	2,4
Tiaret	a.c. 50	1,3	127/220	2,4
			220/380	2,4
ANGOLA				
Luanda	a.c. 50	1,3	220/380	2,4
ANTIGUA				
St. John's	a.c. 60	1,3	230/400	2,3,4
ARGENTINA				
Azul	a.c. 50	1,3	220/380	2,4
Bahia Blanca	a.c. 50	1,3	220/380	2,4
Buenos Aires	a.c. 50	1,3	220/380	2,4
	d.c.		220/440	2,3
Catamarca	a.c. 50	1,3	220/380	2,4
Chivilcoy	a.c. 50	1,3	220/380	2,4
	d.c.		220/440	2,3
Comodore Rivadavia	a.c. 50	1,3	220/380	2,4
Concordia	a.c. 50	1,3	220/380	2,4
Córdoba	a.c. 50	1,3	220/380	2,4

ELECTRIC CURRENT CHARACTERISTICS

COUNTRY AND CITY	TYPE AND FREQUENCY OF CURRENT	NUMBER OF PHASES	NOMINAL VOLTAGE	NUMBER OF WIRES
ARGENTINA – *Continued*				
Corrientes	a.c. 50	1,3	220/380	2,4
	d.c.		220/440	2,3
Dolores	a.c. 50	1,3	220/380	2,4
Formosa	a.c. 50	1,3	220/380	2,4
Jujuy	a.c. 50	1,3	220/380	2,4
	d.c.		220/240	2,3
Junin	a.c. 50	1,3	220/380	2,4
	d.c.		220/440	2,3
La Plata	a.c. 50	1,3	220/380	2,4
Luján	a.c. 50	1,3	220/380	2,4
Mar del Plata	a.c. 50	1,3	220/380	2,4
	d.c.		220/440	2,3
Mendoza	a.c. 50	1,3	220/380	2,4
	d.c		220/440	2,3
Mercedes (B.A.)	a.c. 50	1,3	220/380	2,4
Necochea	a.c. 50	1,3	220/380	2,4
	d.c.		220/440	2,3
Paraná	a.c. 50	1,3	220/380	2,4
	d.c.		220/440	2,3
Posadas	a.c. 50	1,3	220/380	2,4
	d.c.		220/440	2,3
Resistencia	a.c. 50	1,3	220/380	2,4
	d.c.		220/440	2,3
Rio Cuarto	a.c. 50	1,3	220/380	2,4
	d.c.		220/440	2,3
Rosario	a.c. 50	1,3	220/380	2,4
	d.c.		220/440	2,3
Salta	a.c. 50	1,3	220/380	2,4
	d.c.		220/440	2,3
San Juan	a.c. 50	1,3	220/380	2,4
	d.c.		220/440	2,3
San Nicolas	a.c. 50	1,3	220/380	2,4
Santa Fé	a.c. 50	1,3	220/380	2,4
	d.c.		220/440	2,3
Santiago del Estero	a.c. 50	1,3	220/380	2,4

ELECTRIC CURRENT CHARACTERISTICS

COUNTRY AND CITY	TYPE AND FREQUENCY OF CURRENT	NUMBER OF PHASES	NOMINAL VOLTAGE	NUMBER OF WIRES
ARGENTINA – *Continued*				
Tandil	a.c. 50	1,3	220/380	2,4
Tres Arroyos	a.c. 50	1,3	220/380	2,4
	d.c.		220/440	2,3
Tucumán	a.c. 50	1,3	220/380	2,4
Zárate	a.c. 50	1,3	220/380	2,4
BAHAMAS				
Bimini	a.c. 60	1,3	120/240 120/208	2,3,4
Cat Cay	a.c. 60	1,3	120/240 120/208	2,3,4
Governors Harbor	a.c. 60	1,3	120/240 120/208	2,3,4
Green Turtle Cay	a.c. 60	1,3	120/240 120/208	2,3,4
Harbor Island	a.c. 60	1,3	120/240 120/208	2,3,4
Hatchet Bay	a.c. 60	1,3	120/240 120/208	2,3,4
Inagua	a.c. 60	1,3	120/240 120/208	2,3,4
Nassau	a.c. 60	1,3	120/240 120/208	2,3,4
Spanish Wells	a.c. 60	1,3	120/240 120/208	2,3,4
BAHRAIN				
Manama	a.c. 50	1,3	230/400	2,3,4
Awali	a.c. 60	1,3	230/400	2,3,4
All other locations	a.c. 50	1,3	230/400	2,3,4
BANGLADESH				
Chittagong	a.c. 50	1,3	220/380	3,4
Comilla	a.c. 50	1,3	220/380	3,4
Cox's Bazar	a.c. 50	1,3	220/380	3,4

ELECTRIC CURRENT CHARACTERISTICS

COUNTRY AND CITY	TYPE AND FREQUENCY OF CURRENT	NUMBER OF PHASES	NOMINAL VOLTAGE	NUMBER OF WIRES
BANGLADESH – *Continued*				
Dhaka	a.c. 50	1,3	220/380	3,4
Khulna	a.c. 50	1,3	220/380	3,4
Mymensingh	a.c. 50	1,3	220/380	3,4
Narayanganj	a.c. 50	1,3	220/380	3,4
Rajshahi	a.c. 50	1,3	220/380	3,4
Sylhet	a.c. 50	1,3	220/380	3,4
BARBADOS				
Bridgetown	a.c. 50	1,3	115/230 115/200	3,4
BELIZE				
Belize city	a.c. 60	1,3	110/220 220/440	2,3,4
Balmopan	a.c. 60	1,3	110/220 220/440	2,3,4
Corozal Town	a.c. 60	1,3	110/220 220/440	2,3,4
Orange Walk	a.c. 60	1	110/220	2,3
San Ignacio	a.c. 60	1	110/220	2,3
Stann Creek	a.c. 60	1	110/220	2,3
Punta Gorda	a.c. 60	1,3	110/220 220/440	2,3,4
San Pedro	a.c. 60	1	110/220	2,3
BENIN				
Cotonou	a.c. 50	1,3	220/380	2,4
BERMUDA				
Island Wide	a.c. 60	1,3	120/240	2,3,4
(Incl. Hamilton & St. George)	a.c. 60	1,3	120/208	2,3,4
BHUTAN				
Thimphu	a.c. 50	1,3	220/380	2,3,4

ELECTRIC CURRENT CHARACTERISTICS

COUNTRY AND CITY	TYPE AND FREQUENCY OF CURRENT	NUMBER OF PHASES	NOMINAL VOLTAGE	NUMBER OF WIRES
BOLIVIA				
Calamarca	a.c. 50	1,3	230/400	2,4
Challapata	a.c. 50	1,3	220/380	2,4
Cobija	a.c. 50	1,3	230/400	2,4
Cochabamba	a.c. 50	1,3	220/380	2,4
Guayaramerin	a.c. 50	1,3	230/400	2,4
La Paz	a.c. 50	1,3	115/230	2,3
Oruro	a.c. 50	1,3	110/220	2,3
Potosi	a.c. 50	1,3	220/380	2,4
Riberalta	a.c. 50	1,3	230/400	2,4
Santa Cruz	a.c. 50	1,3	220/380	2,4
Sucre	a.c. 50	1,3	220/380	2,4
Tarija	a.c. 50	1,3	220/380	2,4
Trinidad	a.c. 50	1,3	230/400	2,4
Tupiza	a.c. 50	1,3	220/380	2,4
Uyuni	a.c. 50	1,3	220/380	2,4
Viacha	a.c. 50	1,3	110/220	2,3
Villazón	a.c. 50	1,3	220/380	2,4
BOTSWANA				
Francistown	a.c. 50	1,3	220/380	2,4
Gaborone	a.c. 50	1,3	220/380	2,4
Lobatsi	a.c. 50	1,3	220/380	2,4
Selehi-Pikwe	a.c. 50	1,3	220/380	2,4
BRAZIL				
Alagoinhas	a.c. 60	1,3	127/220	2,3,4
Americana	a.c. 60	1,3	127/220	2,3,4
Anapolis	a.c. 60	1,3	127/220	2,3,4
Aracaju	a.c. 60	1,3	127/220	2,3,4
Aracatuba	a.c. 60	1,3	127/220	2,3,4
Araraquara	a.c. 60	1,3	127/220	2,3,4
Bage	d.c.		220/440	2,3
Baixo Guandu	a.c. 60	1,3	127/220	2,3,4
Barbacena	a.c. 60	1,3	110/220	2,3
Barra Mansa	a.c. 60	1,3	127/220	2,3,4

ELECTRIC CURRENT CHARACTERISTICS

COUNTRY AND CITY	TYPE AND FREQUENCY OF CURRENT	NUMBER OF PHASES	NOMINAL VOLTAGE	NUMBER OF WIRES
BRAZIL – *Continued*				
Barretos	a.c. 60	1,3	127/220	2,3,4
Bauru	a.c. 60	1,3	127/220	2,3,4
Belem	a.c. 60	1,3	127/220	2,3,4
Belo Horizonte	a.c. 60	1,3	127/220	2,3,4
Blumenau	a.c. 60	1,3	220	2,3
Boa Vista (Rio Branco)	a.c. 60	1,3	127/220	2,3,4
Botucatu	a.c. 60	1,3	127/220	2,3,4
Braganca	a.c. 60	1,3	110/220	2,3
Brazilia, D.F.	a.c. 60	1,3	220/380	2,3,4
Cachoeira	a.c. 60	1,3	127/220	2,3,4
Cachoeira do Itapemirim	a.c. 60	1,3	127/220	2,3,4
Campinas	a.c. 60	1,3	127/220	2,3,4
Campos	a.c. 60	1,3	127/220	2,3,4
Caruaru	a.c. 60	1,3	127/220	2,3,4
Caxias do Sul	a.c. 60	1,3	220/380	2,3,4
Cel Fabriciano	a.c. 60	1,3	110/220	2,3
Cidade Industrial	a.c. 60	1,3	127/220	2,3,4
Colatina	a.c. 60	1,3	127/220	2,3,4
Corumba	a.c. 60	1,3	110/220	2,3
Curitiba	a.c. 60	1,3	127/220	2,3,4
Feira de Santana	a.c. 60	1,3	127/220	2,3,4
Florianopolis	a.c. 60	1,3	220/380	2,3,4
	a.c. 50	1,3	220/440	2,3
Fortaleza (Ceara)	a.c. 60	1,3	230/400	2,3,4
Franca (Sao Paulo)	a.c. 60	1,3	127/220	2,3,4
Goiania	a.c. 60	1,3	220/380	2,3,4
Goias	a.c. 60	1,3	220/380	2,3,4
Governador Valadares	a.c. 60	1,3	127/220	2,3,4
Ilheus	a.c. 60	1,3	127/220	2,3,4
Itabuan	a.c. 60	1,3	127/220	2,3,4
Itajai	a.c. 60	1,3	220	2,3
Jequie	a.c. 60	1,3	127/220	2,3,4
Joao Pessoa	a.c. 60	1,3	220	2,3

ELECTRIC CURRENT CHARACTERISTICS

COUNTRY AND CITY	TYPE AND FREQUENCY OF CURRENT	NUMBER OF PHASES	NOMINAL VOLTAGE	NUMBER OF WIRES
BRAZIL — *Continued*				
Joinville	a.c. 60	1,3	220/380	2,3,4
Juiz de Fora	a.c. 60	1,3	127/220	2,3,4
Jundiai	a.c. 60	1,3	110	2,3
Livramento	a.c. 60	1,3	220/380	2,3,4
Londrina	a.c. 60	1,3	127/220	2,3,4
			110/220	2,3
Macapa	a.c. 60	1,3	110/220	2,3
	d.c.		110	2
Maceio	a.c. 60	1,3	220/380	2,3,4
Manaus	a.c. 60	1,3	120/240	2,3
	d.c.		220/440	2,3
Marilia	a.c. 60	1,3	127/220	2,3,4
Mossoro	a.c. 60	1,3	220/380	2,3,4
Natal (Rio Grando Norte)	a.c. 60	1,3	220/380	2,3,4
Niteroi	a.c. 60	1,3	127/220	2,3,4
Olinda	a.c. 60	1,3	127/220	2,3,4
			220/380	
Ouro Preto	a.c. 50	1,3	127/220	2,3,4
Paranagua	a.c. 60	1,3	110/220	2,3
Parnaiba	a.c. 60	1,3	110/220	2,3
Paulista	a.c. 60	1,3	127/220	2,3,4
Pelotas	a.c. 60	1,3	220/380	2,3,4
	d.c.		220/440	2,3
Petropolis	a.c. 60	1,3	127/220	2,3,4
	a.c. 60	1,3	115/220	2,3,4
Piracicaba	a.c. 60	1,3	127/220	2,3,4
Ponta Grossa	a.c. 60	1,3	220	2,3
Porto Alegre	a.c. 60	1,3	127/220	2,3,4
Porto Velho	a.c. 60	1,3	110/220	2,3
	d.c.		110	
Recife	a.c. 60	1,3	127/220	2,3,4
Ribeirao Preto	a.c. 60	1,3	127/220	2,3,4
Rio Branco	a.c. 60	1,3	127/220	2,3,4
Rio de Janeiro	a.c. 60	1,3	127/220	2,3,4

ELECTRIC CURRENT CHARACTERISTICS

COUNTRY AND CITY	TYPE AND FREQUENCY OF CURRENT	NUMBER OF PHASES	NOMINAL VOLTAGE	NUMBER OF WIRES
BRAZIL – *Continued*				
Salvador	a.c. 60	1,3	127/220	2,3,4
Santo André	a.c. 60	1,3	115/230	2,3
Santos	a.c. 60	1,3	127/220	2,3,4
Sao Bernardo do Campo	a.c. 60	1,3	115/230	2,3
Sao Caetano do Sul	a.c. 60	1,3	115/230	2,3
Sao Luis	a.c. 60	1,3	110/220	2,3
Sao Paulo	a.c. 60	1,3	115/230	2,3
Sorocaba	a.c. 60	1,3	127/220	2,3,4
Teresina	a.c. 60	1,3	110/220	2,3
Uberaba	a.c. 60	1,3	127/220	2,3,4
Vitoria	a.c. 60	1,3	127/220	2,3,4
Volta Redonda	a.c. 60	1,3	125/216	2,3,4
BRITISH VIRGIN ISLANDS				
Tortola	a.c. 50	1,3	220/380	2,3,4
BRUNEI				
Brunei	a.c. 50	1,3	220/380	2,3,4
BULGARIA				
Blagoevgrad	a.c. 50	1,3	220/380	2,4
Burgas	a.c. 50	1,3	220/380	2,4
Gabrovo	a.c. 50	1,3	220/380	2,4
Khaskovo	a.c. 50	1,3	220/380	2,4
Kiyustendil	a.c. 50	1,3	220/380	2,4
Kurdzhali	a.c. 50	1,3	220/380	2,4
Lovech	a.c. 50	1,3	220/380	2,4
Mikhaylovgrad	a.c. 50	1,3	220/380	2,4
Pazardzhik	a.c. 50	1,3	220/380	2,4
Pernik	a.c. 50	1,3	220/380	2,4
Pleven	a.c. 50	1,3	220/380	2,4
Plovdiv	a.c. 50	1,3	220/380	2,4
Razgrad	a.c. 50	1,3	220/380	2,4

ELECTRIC CURRENT CHARACTERISTICS

COUNTRY AND CITY	TYPE AND FREQUENCY OF CURRENT	NUMBER OF PHASES	NOMINAL VOLTAGE	NUMBER OF WIRES
BULGARIA – *Continued*				
Ruse	a.c. 50	1,3	220/380	2,4
Shumenski	a.c. 50	1,3	220/380	2,4
Silistra	a.c. 50	1,3	220/380	2,4
Sofia	a.c. 50	1,3	220/380	2,4
Starazagora	a.c. 50	1,3	220/380	2,4
Tolbukhin	a.c. 50	1,3	220/380	2,4
Turgovishte	a.c. 50	1,3	220/380	2,4
Velikoturnovo	a.c. 50	1,3	220/380	2,4
Vidin	a.c. 50	1,3	220/380	2,4
Vratsa	a.c. 50	1,3	220/380	2,4
Yambol	a.c. 50	1,3	220/380	2,4
BURKINA FASO				
Banfora	a.c. 50	1,3	220/380	2,4
Bobo-Dioulasso	a.c. 50	1,3	220/380	2,4
Kaya	a.c. 50	1,3	220/380	2,4
Koudougou	a.c. 50	1,3	220/380	2,4
Ouagadougou	a.c. 50	1,3	220/380	2,4
BURMA				
Mandalay	a.c. 50	1,3	230/400	2,4
Moulmein	a.c. 50	1,3	230/400	2,4
Rangoon	a.c. 50	1,3	230/400	2,4
BURUNDI				
Bujumbura	a.c. 50	1,3	220/380	2,4
Kitega	a.c. 50	1,3	220/380	2,4
CAMEROON, U. REP.				
Buea	a.c. 50	1,3	230/400	2,4
Douala	a.c. 50	1,3	220/380	2,3,4
Garoua	a.c. 50	1,3	220/380	2,3,4
Kribi	a.c. 50	1,3	220/380	2,4
Maroua	a.c. 50	1,3	127/220 220/380	2,4

ELECTRIC CURRENT CHARACTERISTICS

COUNTRY AND CITY	TYPE AND FREQUENCY OF CURRENT	NUMBER OF PHASES	NOMINAL VOLTAGE	NUMBER OF WIRES
CAMEROON, U. R. – *Continued*				
Mbalmayo	a.c. 50	1,3	127/220 220/380	2,4
Nkongsamba	a.c. 50	1,3	127/220 220/380	2,4
Yaoude	a.c. 50	1,3	127/220 220/380	2,4
CAPE VERDE				
Praia	a.c. 50	1,3	220/380	2,3,4
CAYMAN ISLANDS				
Grand Cayman	a.c. 60	1,3	120/240	2,3
CENTRAL AFRICAN REPUBLIC				
Bangui	a.c. 50	1,3	220/380	2,4
CHAD				
Abeche	a.c. 50	1,3	220/380	2,4
Sarh	a.c. 50	1,3	220/380	2,4
N'djamena	a.c. 50	1,3	220/380	2,4
Moundou	a.c. 50	1,3	220/380	2,4
CHILE				
Algarrobo	a.c. 50	1,3	220/380	2,3,4
Ancud	a.c. 50	1,3	220/380	2,3,4
Angol	a.c. 50	1,3	220/380	2,3,4
Antofagasta	a.c. 50	1,3	220/380	2,3,4
Arica	a.c. 50	1,3	220/380	2,3,4
Calama	a.c. 50	1,3	220/380	2,3,4
Caracautin	a.c. 50	1,3	220/380	2,3,4
Castro	a.c. 50	1,3	220/380	2,3,4
Cauquenes	a.c. 50	1,3	220/380	2,3,4
Chanaral	a.c. 50	1,3	220/380	2,3,4
Chillan	a.c. 50	1,3	220/380	2,3,4
Concepcion	a.c. 50	1,3	220/380	2,3,4