

Switchgear, Switchboard Apparatus, Relays, and Industrial Controls: 2004

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SUMMARY OF FINDINGS

During 2004, the total value of shipments of switchgear and switchboard apparatus was \$6.4 billion, up 30 million from 2003. The 2003 shipments include power circuit breakers, valued at \$559 million, an increase of

10 percent from 2003; low voltage panelboards, valued at \$2.3 billion, a slight increase from 2003; fuses and fuse equipment, valued at \$417.6 million, an increase of 28 percent from 2003; molded case circuit breakers, valued at \$869 million, a decrease of 25 percent from 2003; duct, valued at \$199 million, a decrease of 1 percent from the 2003 value of \$197 million; and switchgear, valued at \$2 billion, a 5-percent increase from 2003. During 2004, the total value of shipments of relays and industrial controls was \$6.9 billion, a slight increase from the revised value of \$6.8 billion in 2003. The 2004 shipments include general-purpose relays, valued at \$599.5 million, an increase of 8.0 percent from the revised value of \$554 million in 2003; specific-purpose industrial controls, valued at \$2.8 billion, up slightly from 2003; general-purpose industrial controls decreased slightly to \$3.4 billion; and motor controller accessories valued at \$392 million, a decrease of 3 percent from the revised value of \$402 million in 2003.

For general CIR information, explanation of general terms and historical note, see the appendix.

Address inquiries concerning these data to Investment Goods Industries Branch, Manufacturing and Construction Division (MCD), Washington, DC 20233-6900, or call Jesse Dawson, 301-763-4746.

For mail or fax copies of this publication, please contact the Information Services Center, MCD, Washington, DC 20233-6900, or call 301-763-4673.

U S C E N S U S B U R E A U

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Table 1. Value of Shipments of Switchgear, Switchboard Apparatus, Relays, and Industrial Controls: 2000 to 2004
 [Millions of dollars]

Product code	Product description	2004	2003	2002	2001	2000
3353131100	Power circuit breakers.....	559.1	508.5	600.5	623.6	630.4
3353133100	Low voltage panelboards.....	2,315.1	2,232.2	2,158.7	2,482.1	2,834.2
3353135100	Fuses and fuse equipment.....	417.6	325.1	363.7	388.2	601.8
3353137100	Molded case circuit breakers.....	868.8	1,164.4	1,248.0	1,286.1	1,553.4
3353139100	Duct, 1,000 volts and under.....	199.2	197.1	205.5	253.6	308.8
335313A100	Switchgear (except ducts).....	2,003.1	1,902.6	1,928.1	2,192.8	2,103.9
3353141100	Relays, general purpose.....	599.5	554.1	554.9	651.0	795.6
3353143100	Specific-purpose industrial controls.....	2,872.0	2,665.5	2,690.3	3,030.1	3,198.5
3353146100	General-purpose industrial controls.....	3,445.6	3,597.8	3,557.0	3,762.8	4,598.9
3353147100	Motor controller accessories and parts for industrial controls.....	392.2	402.1	447.2	515.6	565.7

Table 2. Shipments of Switchgear, Switchboard Apparatus, Relays, and Industrial Controls: 2004 and 2003
 [Quantity in number of units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2004			2003			
			Quantity		Value	Quantity		Value	
335313	Switchgear and switchboard apparatus.....	(NA)	(X)		6,362,974	(X)		6,329,892	
3353131	Power circuit breakers, all voltages.....	33	(X)	a/	559,135	(X)	a/	508,511	
3353131101	Power circuit breakers (sold separately) for use in metal-clad switchgear, oil and oilless, over 1,000 volts, (number of breakers).....	11	5,885	b/	43,993	6,299		41,218	
3353131103	All other power circuit breakers (sold separately).....	25	(S)	a/	484,299	(S)		443,154	
3353131129	Parts for all power circuit breakers.....	18	(X)	c/	30,843	(X)	a/	24,139	
3353133	Low voltage panelboards, distribution boards, and other switching and interrupting devices, 1,000 volts and below.....	108	(X)	a/	2,315,093	(X)	b/	2,232,188	
3353133201	Panelboards, including enclosing cabinets: Fusible, including combination switch fuse.....	40	(S)		121,233	(S)		107,707	
3353133104	Circuit breaker.....	52	(S)		660,516	(S)		635,423	
3353133207	Distribution switchboards: Fusible.....	28	27,137	b/	103,873	r/	27,577	r/	110,073
3353133211	Circuit breaker.....	38	205,580	a/	449,917	c/ r/	181,766	a/	394,879
3353133213	Other, including theater switchboards.....	6	3,108		3,334	(D)		(D)	
	Switches (except switches commonly known as snap, toggle, and rotary switches and switch devices intended primarily to be used with electric motor controls):								
	Knife switches, enclosed:								
3353133216	Heavy duty.....	8	1,084,346		139,684	1,263,352		153,867	
3353133219	General duty.....	3	540,748	a/	44,834	879,373		53,121	
3353133222	Enclosed fusible, service entrance, and branch circuit cutouts.....	6	514,091	b/	4,687	(D)		(D)	
3353133225	Circuit breaker type.....	11	(S)		288,865	(S)		295,330	
3353133228	Load centers:								
	Grouped metering panels (combinations of two or more meters and related switching units with overcurrent protection associated with each meter, including accessory components, excluding single socket load combinations).....	14	(S)		59,076	(D)		(D)	
3353133231	Other switches, excluding snap, bolted, toggle, push, etc., including open knife switches, motor contact, motor disconnect, meter service equipment other than metermounting, and test devices.....	19	(X)	b/	110,497	(X)	b/	105,700	
3353133234	Other low voltage switchgear apparatus.....	22	(X)	b/	328,577	(X)	r/	317,090	
3353135	Fuses and fuse equipment, under 2,300 volts (except power distribution cutouts).....	16	(X)		417,632	(X)		325,096	
3353135101	Nonrenewable plug fuses.....	5	(X)		(D)	(X)		(D)	
3353135104	Nonrenewable cartridge fuses.....	6	(X)		(D)	(X)		(D)	
3353135107	Renewable plug and cartridge fuses, including renewable links.....	2	(X)		(D)	(X)		(D)	
3353135111	Other fuses and open fuse material, including cutouts, clips, bases, etc.	13	(X)		(D)	(X)	r/	151,582	
3353137	Molded case circuit breakers, 1,000 volts and under.....	33	(X)	a/	868,771	(X)	b/	1,164,363	
	Industrial type, assembled as complete units in supporting and enclosing housing of insulating materials, with or without accessories or attachments:								
3353137101	With ground fault detection capability.....	14	375,009		42,478	337,416	b/	47,698	
3353137104	Without ground fault detection capability.....	20	18,763,082		263,712	33,181,067		415,241	
	Residential or light duty type, (primarily) for load center application, assembled as complete units in supporting and enclosing housing of insulating materials:								
3353137107	With ground fault detection capability.....	4	(D)		(D)	(D)		(D)	
3353137111	Without ground fault detection capability.....	4	(D)		(D)	(D)		(D)	
3353137113	Individually enclosed industrial type, excluding panelboards and busway plugs.....	10	(S)		(D)	(D)		(D)	

Table 2. Shipments of Switchgear, Switchboard Apparatus, Relays, and Industrial Controls: 2004 and 2003
 [Quantity in number of units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2004			2003		
			Quantity		Value	Quantity		Value
	Other molded case circuit breakers:							
3353137117	Marine, Navy, aircraft and aerospace type.....	8	(S)	b/	122,002	(S)	b/	107,509
3353137131	All other types, including automotive and electronic.....	13	(S)	a/	191,518	(S)	a/	218,745
3353139	Duct, including plug-in units and accessories, 1,000 volts and under, consisting of enclosed sectionalized prefabricated bus bars rated 20 amperes or more and associated structures and fittings.....	18	(X)	b/	199,202	(X)	b/	197,123
335313A	Switchgear (except ducts).....	112	(X)	a/	2,003,141	(X)	a/	1,902,611
335313A101	Automatic and manual control panels (generators, transformers, feed-controls, etc.).....	52	(X)	a/	212,827	(X)	a/ r/	218,095
335313A204	Metal-clad switchgear (using power circuit breakers, oil and oilless), all voltages above 1,000 volts, up to and including 38kV, excluding load interrupter switchgear.....	34	(X)	a/	353,978	(X)		345,422
335313A307	Metal-enclosed load interrupter switchgear assemblies, all voltages, including parts.....	34	(X)	a/	215,902	(X)	a/	200,254
335313A311	Metal-enclosed low-voltage power circuit breaker switchgear assemblies 1,000 volts and below, including parts and excluding load interrupter switchgear.....	31	(X)	a/	225,271	(X)		222,398
335313A313	Metal-enclosed bus bars when sold separately, above 1,000 volts, including isolated, segregated, nonsegregated and cable bus bars.....	14	(X)	c/	35,762	(X)	b/	41,609
	Power switching equipment, 2,300 volts and over, including attachments, auxiliaries, bus supports and fittings, and accessories, but excluding power fuses, sold separately. Also includes single-phase circuit reclosers:							
335313A316	Outdoor, excluding structures.....	24	(D)	a/	427,436	(X)	a/	388,584
335313A319	Indoor.....	9	(D)	b/	22,516	(X)	b/	19,766
335313A322	Power fuses and fuse links for 2,300 volts and over, ac service, excluding distribution cutouts	8	(X)		(D)	(X)		(D)
335313A325	Power and ground connectors generally used in substation construction.....	5	(X)		(D)	(X)		(D)
335313A328	Overhead transmission and distribution connectors (clamps, taps, terminals, and splices) 1/.....	3	(X)		(D)	(X)		(D)
335313A331	Transmission and distribution connectors, n.e.c., including underground deadends, hot line taps, stirrups, and repair sleeves, etc. 1/.....	4	(D)		(D)	(X)		(D)
335313A334	Distribution cutouts.....	6	(D)		62,374	(X)		48,052
335313A337	Other switchgear devices, including regulators and miscellaneous switchboard devices (for sale separately) 1/.....	16	(X)	a/	211,124	(X)	a/ r/	197,495
335314	Relays and industrial controls.....	(NA)	(X)		6,917,072	(X)	r/	6,817,403
3353141	General-purpose and other relays.....	97	(X)		599,507	(X)	r/	554,066
3353141101	Industrial-control relays (all voltages), n.e.c.	39	(D)	c/	203,367	(D)	a/	206,540
	General-purpose electromechanical relays:							
	Over 100 MW actuating power and sealed (either hermetically or environmentally):							
3353141104	0 through 2.0 amperes contact rating 2/.....	6	(D)		(D)	(D)		(D)
3353141107	Over 2.0 through 10.0 amperes contact rating 2/.....	15	(D)		(D)	(D)		(D)
3353141111	Over 10.0 amperes contact rating 2/.....	7	(S)		36,721	(S)		42,969
	Over 100 MW actuating power and not sealed:							
3353141113	0 through 10.0 amperes contact rating.....	14	(S)	b/	9,522	(S)	b/	8,831
3353141116	Over 10.0 amperes contact rating 3/.....	10	(S)		12,806	(S)		16,726
3353141119	0 through 100 MW actuating power (both sealed and not sealed) 3/.....	1	(D)		(D)	(D)		(D)
	Miniature printed circuit mounted electro-mechanical relays, excluding reed relays (profile height 1/2-inch max.):							
	Sealed (either hermetically or environmentally): 4/.....	1	(D)		(D)	(D)		(D)

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Product code	Product description	No. of cos.	2004		2003	
			Quantity	Value	Quantity	Value
3353141141	General-purpose solid-state relays, pure solid-state and hybrid solid-state, excluding time delay.....	7	(D)	(D)	(D)	(D)
	High performance military/aerospace/aircraft relays and contactors (generally pertaining to Mil-R5757, 6106, 19523, 25108, and 39016):					
3353141143	Round and square can multipole airframe relays and contactors (both sealed and not sealed) (all sizes).....	2	(D)	(D)	(D)	(D)
	Crystal can types (sealed): 5/.....	2	(D)	(D)	(D)	(D)
3353141155	RF, antenna and coaxial relays (sealed and not sealed), excluding reed relays.....	1	(D)	(D)	(D)	(D)
	Reed relays 6/.....	1	(D)	(D)	(D)	(D)
3353141167	Stepping switches, stepping and impulse relays.....	3	(D)	(D)	(D)	(D)
3353141171	Switchgear and protective relays.....	5	1,413	891	1,392	965
	Timing relays (timers):					
3353141173	Solid-state/EMR combination.....	20	2,722,909	b/ 30,303	2,937,303	b/ 44,738
3353141176	Solid-state-pure.....	13	855,762	a/ 17,585	128,906	b/ 5,078
3353141179	All other timing relays (timers), including pneumatic, motor driven, electronic, etc.	13	242,785	5,701	137,478	4,529
3353141182	All other general-purpose and special-purpose relays, n.e.c.	16	(X)	a/ 90,548	(X)	90,120
3353141185	Parts for general-purpose and special-purpose relays (sold separately).....	6	(X)	a/ 11,349	(X)	a/ 11,991
3353143	Specific-purpose industrial controls.....	191	(X)	a/ 2,872,006	(X)	b/ 2,665,534
3353143301	U.S. Coast Guard, Navy, and Marine auxiliary controls and accessories.....	18	49,623	a/ 165,041	54,018	b/ 119,282
3353143104	Metal mill controls and accessories (all voltages).....	5	(D)	(D)	(D)	(D)
3353143307	Crane and hoist controls, constant and adjustable voltage, including operators' desks and stations.....	16	47,966	a/ 157,169	58,322	a/ 158,120
3353143311	Definite-purpose contactors and starters (600 volts and less).....	15	(S)	c/ 55,343	(S)	c/ 59,465
	Machine tool applications (motion controllers):					
	Stand-alone controls for numerically controlled machine tools:					
3353143313	Computer numerical controls (CNC); positioning (point-to-point).....	5	(S)	19,931	(S)	14,942
3353143316	Computer numerical controls (CNC); continuous path (contouring).....	7	24,095	b/ 185,101	24,239	a/ 156,581
3353143319	Robotic controls	2	(D)	(D)	(D)	(D)
3353143322	Other stand-alone motion controls.....	16	(S)	a/ 186,671	(S)	a/ 65,975
3353143325	Subordinate motion controls	12	25,937	c/ 9,431	20,543	c/ r/ 7,755
3353143228	Programmable controllers, sold separately.....	45	(S)	a/ 953,209	(S)	b/ 1,022,197
3353143331	Other specific- or special-purpose ac and dc controllers, other definite-purpose devices.....	101	(X)	a/ 1,111,839	(X)	a/ 1,034,783
3353146	General-purpose industrial controls and power circuit devices.....	209	(X)	a/ 3,445,559	(X)	b/ 3,597,803
	General-purpose controls:					
3353146101	Ac full voltage noncombination magnetic starters (1,000 volts or less).....	26	(S)	46,590	(S)	b/ r/ 60,500
	Ac full voltage combination magnetic starters (1,000 volts or less):					
3353146104	Combination starters (less pumping panels).....	16	101,757	39,097	113,991	a/ 49,555
3353146107	Pumping panels.....	18	72,484	46,209	57,696	a/ 43,717
3353146111	Disconnect switches (600 volts or less).....	21	(S)	56,457	2,571,034	53,486
	Ac full voltage manual controllers, 1,000 volts or less:					
3353146113	Designed and rated to U.S. National Standards (NEMA) 7/.....	10	2,307,572	30,767	2,066,503	30,373
3353146116	Designed and rated to International Standards (IEC) 7/.....	5	(D)	(D)	(D)	(D)

Appendix.

General CIR Survey Information, Explanation of General Terms and Historical Note

GENERAL

The CIR program has been providing monthly, quarterly, and annual measures of industrial activity for many years. Since 1904, with its cotton and fats and oils surveys, the CIR program has formed an essential part of an integrated statistical system involving the quinquennial economic census, manufacturing sector, and the annual survey of manufactures. The CIR surveys, however, provide current statistics at a more detailed product level than either of the other two statistical programs.

The primary objective of the CIR program is to produce timely, accurate data on production and shipments of selected products. The data are used to satisfy economic policy needs and for market analysis, forecasting, and decision making in the private sector. The product-level data generated by these surveys are used extensively by individual firms, trade associations, and market analysts in planning or recommending marketing and legislative strategies, particularly if their industry is significantly affected by foreign trade. Although production and shipments information are the two most common data items collected, the CIR program collects other measures also such as inventories, orders, and consumption. These surveys measure manufacturing activity in important commodity areas such as textiles and apparel, chemicals, primary metals, computer and electronic components, industrial equipment, aerospace equipment, and consumer goods.

The CIR program uses a unified data collection, processing, and publication system. The U.S. Census Bureau updates the survey panels for most reports annually and reconciles the estimates to the results of the broader-based annual survey of manufactures and the economic census, manufacturing sector. The manufacturing sector provides a complete list of all producers of the products covered by the CIR program and serves as the primary source for CIR sampling. Where a small number of producers exist, CIR surveys cover all known producers of a product. However, when the number of producers is too large, cutoff and random sampling techniques are used. Surveys are continually reviewed and modified to provide the most up-to-date information on products produced. The CIR program includes a group of mandatory and voluntary surveys. Typically the monthly and quarterly surveys are conducted on a voluntary basis. Those companies that choose not to respond to the voluntary surveys are required to submit a mandatory annual counterpart corresponding to the more frequent survey.

NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS), 1997

The adoption of the North American Industry Classification System (NAICS) in the 1997 Economic Census has had a major impact on the comparability of current and historic data. Approximately half of the industries in the manufacturing sector of NAICS do not have comparable industries in the Standard Industrial Classification (SIC) system that was used in the past.

While most of the change affecting the manufacturing sector was change within the sector, some industries left manufacturing and others came into manufacturing. Prominent among those that left manufacturing are logging and portions of publishing. Prominent among the industries that came into the manufacturing sector are bakeries, candy stores where candy is made on the premises, custom tailors, makers of custom draperies, and tire retreading. The net effect of the classification changes are such that if the 1997 value of shipments data for all manufacturers were tabulated on an SIC basis, it would be approximately 3 percent higher.

Listed below are the NAICS sectors:

- 21 Mining
- 22 Utilities
- 23 Construction
- 31-33 Manufacturing
- 42 Wholesale Trade
- 44-45 Retail Trade
- 48-49 Transportation and Warehousing
- 51 Information
- 52 Finance and Insurance
- 53 Real Estate and Rental and Leasing
- 54 Professional, Scientific, and Technical Services
- 55 Management of Companies and Enterprises
- 56 Administrative and Support and Waste Management and Remediation Services
- 61 Educational Services
- 62 Health Care and Social Assistance
- 71 Arts, Entertainment, and Recreation
- 72 Accommodation and Foodservices
- 81 Other Services (except Public Administration)

(Not listed above are the Agriculture, Forestry, Fishing, and Hunting sector (NAICS 11), partially covered by the census of agriculture conducted by the U.S. Department of Agriculture, and the Public Administration sector (NAICS 92), covered by the census of governments conducted by the Census Bureau.)

The 20 NAICS sectors are subdivided into 96 subsectors (three-digit codes), 313 industry groups (four-digit codes), and, as implemented in the United States, 1170 industries (five- and six-digit codes).

FUNDING

The Census Bureau funds most of the surveys. However, a number of surveys are paid for either fully or partially by other Federal Government agencies or private trade associations. A few surveys are mandated, but all are authorized by Title 13 of the United States Code.

RELIABILITY OF DATA

Survey error may result from several sources including the inability to obtain information about all cases in the survey, response errors, definitional difficulties, differences in the interpretation of questions, mistakes in recording or coding the reported data, and other errors of collection, response, coverage, and estimation. These nonsampling errors also occur in complete censuses. Although no direct measurement of the biases due to these nonsampling errors has been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data in an effort to minimize their influence.

A major source of bias in the published estimates is the imputing of data for nonrespondents, for late reporters, and for data that fail logic edits. Missing figures are imputed based on period-to-period movements shown by reporting firms. A figure is considered to be an impute if the value was not directly reported on the questionnaire, directly derived from other reported items, directly available from supplemental sources, or obtained from the respondent during the analytical review phase. Imputation generally is limited to a maximum of 10 percent for any one data cell. Figures with imputation rates greater than 10 percent are suppressed or footnoted. The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse, because the actual yearly movements for nonrespondents may or may not closely agree with the imputed movements. The range of difference between the actual and imputed figures is assumed to be small. The degree of uncertainty regarding the accuracy of the published data increases as the percentage of imputation increases. Figures with imputation rates above 10 percent should be used with caution.

DATA REVISIONS

Statistics for previous years may be revised as the result of corrected figures from respondents, late reports for which imputations were originally made, or other corrections. Data that have been revised by more than 5 percent from previously published data are indicated by footnotes.

DISCLOSURE

The Census Bureau collects the CIR data under the authority of Title 13, United States Code, which specifies that the information can only be used for statistical purposes and cannot be published or released in any manner that would identify a person, household, or establishment. "D" indicates that data in the cell have been suppressed to avoid disclosure of information pertaining to individual companies.

EXPLANATION OF GENERAL TERMS

Capacity. The maximum quantity of a product that can be produced in a plant in 1 day if operating for 24 hours. Includes the capacity of idle plants until the plant is reported to be destroyed, dismantled, or abandoned.

Consumption. Materials used in producing or processing a product or otherwise removing the product from the inventory.

Exports. Includes all types of products shipped to foreign countries, or to agents or exporters for reshipment to foreign countries.

Gross shipments. The quantity or value of physical shipments from domestic establishments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale or use. Shipments of products purchased for resale are omitted. Shipments of products made under toll arrangements are included.

Interplant transfers. Shipments to other domestic plants within a company for further assembly, fabrication, or manufacture.

Inventories. The quantity or value of finished goods, work in progress, and materials on hand.

Machinery in place. The number of machines of a particular type in place as of a particular date whether the machinery was used for production, prototype, or sampling, or was idle. Machinery in place includes all machinery set up in operating positions.

Net receipts. Derived by subtracting the materials held at the end of the previous month from the sum of materials used during the current month.

Production. The total volume of products produced, including: products sold; products transferred or added to inventory after adjustments for breakage, shrinkage, and obsolescence, plus any other inventory adjustment; and products that undergo further manufacture at the same establishment.

Quantities produced and consumed. Quantities of each type of product produced by a company for internal consumption within that same company.

Quantity and value of new orders. The sales value of orders received during the current reporting period for products and services to be delivered immediately or at some future date. Also represents the net sales value of contract change documents that increase or decrease the sales value of the orders to which they are related, when the parties concerned are in substantial agreement as to the amount involved. Included as orders are only those that are supported by binding legal documents such as signed contracts or letter contracts.

Quantity and value of shipments. The figures on quantity and value of shipments represent physical shipments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale. The value represents the net sales price, f.o.b. plant, to the customer or branch to which the products are shipped, net of discounts, allowances, freight charges, and

returns. Shipments to a company's own branches are assigned the same value as comparable appropriate allocation of company overhead and profit. Products bought and resold without further manufacture are excluded.

Stocks. Total quantity of ending finished inventory.

Unfilled orders (backlog). Calculated by adding net new orders and subtracting net sales from the backlog at the end of the preceding year.

HISTORICAL NOTE

Data on switchgear, switchboard apparatus, relays, and industrial controls have been collected by the Census Bureau since 1971. Historical data may be obtained from Current Industrial Reports available at your local Federal Depository Library.