

1	SAFETY AND PROTECTION OF SYSTEMS AND DEVICES	38	..Transformer with structurally combined protective device
2	.Arc suppression at switching point (i.e., includes solid- state switch)	39	...With lightning arrester and fuse
3	..Synchronized or sequential opening or closing	40	...With lightning arrester (e.g., spark gap)
4	...Counter electromotive force	41	...With fuse
5	..With current sensitive control circuit	42	.Ground fault protection
6	...With voltage sensitive control circuit	43	..Fault suppression (e.g., Petersen coil)
7	...With combined voltage and current sensitive control circuit	44	..With differential sensing in a polyphase system
8	...Shunt bypass	45	..With differential sensing in a single phase system
9	...With sequentially inserted impedance	46	...With more than two wires
10	..By inserting series impedance	47	..In a polyphase system
11	..Nonlinear impedance	48	...With more than three wires
12	..By arc stretching (e.g., horn gap)	49	..In a single phase system
13	..Shunt bypass of main switch	50	...With more than two wires
14	..Arc blowout for main breaker contact (e.g., electromagnet, gas, fluid, etc.)	51	.Overspeed responsive
15	.Capacitor protection	52	.By regulating source or load (e.g., generator field killed)
16	..Series connected capacitors	53	..Prime mover control
17	..Shunt connected capacitors	54	.Load shunting by fault responsive means (e.g., crowbar circuit)
18	.Voltage regulator protective circuits	55	..Disconnect after shunting
19	.Superconductor protective circuits	56	..Voltage responsive
20	.Generator protective circuits	57	..Current responsive
21	..Voltage responsive	58	.Impedance insertion
22	.Compressor protective circuits	59	.Circuit automatically reconnected only after the fault is cleared
23	.Motor protective condition responsive circuits	60	..With differential voltage comparison across the circuit interrupting means
24	..Current and temperature	61	..Reclosing of the nonfaulty phases of a polyphase system
25	..Motor temperature	62	.Feeder protection in distribution networks
26	...With bimetallic sensor	63	..With current responsive fault sensor
27	...With thermistor sensor	64	...With communication between feeder disconnect points
28	..With time delay	65	..With current and voltage responsive fault sensors
29	...During energization of motor	66	...With communication between feeder disconnect points
30	..Current and voltage	67	.Series connected sections with faulty section disconnect
31	..Current	68	..With communication between disconnect points
32	..Bimetallic element	69	...Pilot wire communication
33	..Voltage		
34	..Bimetallic element		
35	.Transformer protection		
36	..With differential sensing means		
37	..With temperature or pressure sensing means		

70	..Constant current system	93.6	..Transformer sensor (i.e., toroidal current sensor)
71	.Automatic reclosing	93.7	..Resistor sensor
72	..With lockout means	93.8	..Thermal sensing
73	...Including timer reset before lockout	93.9	..Current limiting
74	..Continuous	94	..With time delay protective means
75	...With time delay before reclosing	95	...With instantaneous override
76	..With phase sequence network analyzer	96	...With multiple timing characteristics (e.g., short, long)
77	.Reverse phase responsive	97	...With multiple timing characteristics
78	..With specific quantity comparison means	98	...Transistorized
79	..Voltage and current	99	...Combined thermal-electromagnetic relay
80	...Distance relaying	100	..With semiconductor circuit interrupter (e.g., SCR, Triac, Tunnel Diode, etc.)
81	...With communication means between disconnect points	101	...With transistor circuit interrupter
82	...Reverse energy responsive (e.g., directional)	102	..With mechanical circuit breaker
83	...With time delay protective means	103	.Circuit interruption by thermal sensing
84	..Reverse energy responsive (e.g., directional)	104	..With fuse
85	..Phase	105	..With bimetallic element
86	..Voltage	106	..With thermistor
87	..Current	107	..With specific transmission line (e.g., guarded)
88	..With specific voltage responsive fault sensor	108	..Plural conductors in single sheath (e.g., compound)
89	..With time delay protective means	109	..Too large fault makes breaker inoperative
90	..Overvoltage and undervoltage	110	..Transient nonresponsive (e.g., ignores surge on transmission line)
91.1	..Overvoltage	111	..Transient responsive
91.2	...With resistor sensor	112	..With space discharge means
91.3	...Including time delay	113	..With tuned circuit
91.4	...Including photo-coupling (e.g., photo-receptors, photo-emitters, etc.)	114	..With manual or automatic opening of breaker and manual reclose
91.5	...Including P-N junction (e.g., a diode, a zener diode, or transistor)	115	..With specific circuit breaker or control structure
91.6	...With zener diode sensor	116	..Pneumatically operated circuit breaker
91.7	...Protection by snubber circuitry	117	..High voltage dissipation (e.g., lightning arrester)
91.8	...Protection for thyristor	118	..Surge prevention (e.g., choke coil)
92	..Undervoltage	119	...In communication systems
93.1	..With specific current responsive fault sensor	120	..Vacuum or gas filled space discharge
93.2	..Digital control		
93.3	..Rating plug		
93.4	..Automatic reset after trip		
93.5	..Transformer and resistor sensors		

121	..Fluid (e.g., mercury, quenching)	156	...With capacitor charging or discharging through coil
122	...Electrolytic	157	.Including instrument (e.g., meter-relay)
123	...Gas blast	158	..Temperature indicating instrument
124	..Thermal (e.g., fusible, bimetallic)	159	.Including means for using, or compensating for, the induced EMF of the electromagnetic device
125	...With cutout (e.g., blowout type)	160	.For relays or solenoids
126	..Current limiting material in discharge path	161	..Including thermal device
127	..Nonlinear material (e.g., valve type)	162	...Thermoelectric
128	...With plural gaps in discharge path	163	...Bimetallic element
129	..Plural gaps with common electrode	164	...Including heater
130	..Plural gaps serially connected	165	...Thermistor
131	..Combined (e.g., with disconnect switch)	166	..Plural relays or solenoids sequentially operated
132	..With line supporting insulator	167	...Alternately operated
133	..With magnetic means (e.g., electromagnet)	168.1	...Pulse responsive
134	...Arc stretching (e.g., blowout)	169.1	...Including electronic element
135	...By separating contacts	170	..Condition responsive (e.g., external circuit condition)
136	..For grounding line	171	...Code responsive
137	..Horn gap	172	...Including electronic element
138	..With resistance insertion	173	...Light
139	CONTROL CIRCUITS FOR ELECTROMAGNETIC DEVICES	174	...Light sensor controls its light path
140	.Including compensation for thermal change of electromagnetic device	175	...Including electronic element
141	.Including superconductivity	176	....Plural light sensors
142	.Including housing	177	...Plural light sensors
143	.Systems for magnetizing, demagnetizing, or controlling the magnetic field	178	...Fluid (e.g., liquid level, humidity)
144	..For lifting or holding	179	...Proximity or contact
145	..Magnetic chuck-type	180	...Metal presence or absence responsive
146	..Systems for magnetic field stabilization or compensation	181	...Capacitance change-type
147	..With permanent magnet	182	...Frequency (e.g., audio, radio)
148	...Calibration or permanent magnet	183	...Plural relays or solenoids as loads
149	..Demagnetizing	184	...Specific frequency responsive relay
150	...Television degaussing	185	...Phase
151	..Magnetic tape	186	...Pulse
152	..Including particular drive circuit	187	...Voltage or current level discriminators
153	...Pulse initiated	188	...Variable impedance
154	..Including means to establish plural distinct current levels (e.g., high, low)	189	..Plural switches in control circuit
155	...With capacitor charging or discharging through coil	190	...Including electronic switch
		191	..Plural relay or solenoid load selectively operated
		192	...Including interlock
		193	...Electronic interlock

194	..Holding means	230	ELECTRIC CHARGE GENERATING OR
195	..Time delay		CONDUCTING MEANS (E.G.,
196	...Including semiconductor device		CHARGING OF GASES)
	connected to timing element	231	.Modification of environmental
197	....Threshold device (e.g.,		electric charge
	zener, schockley diode)	232	.For application to living beings
198	....Including three or more	233	.Use of forces of electric charge
	electrodes (e.g., unijunction)		or field
199	...Including electric discharge	234	..Pinning
	device	235	.With specific power supply
200	....Threshold device (neon tube)	236	ELECTRICAL SPEED SIGNAL
201	....Including thyatron		PROCESSING SYSTEMS
202	..Electromechanical delay means	237	.With centrifugal weight means
203	..With oscillator	238	.Antislip detection and circuitry
204	..With magnetic amplifier or	239	.With speed analog electrical
	saturable reactor		signal
205	..Threshold device (e.g., SCR,	240	.Including frequency generators
	thyatron)	241	.Two position (e.g., on-off)
206	..Particular relay or solenoid	242	.With speed comparison
207	..Electrostatic	243	.Synchronization of shafts
208	..Polarized	244	..Phase comparison
209	..Alternating current type	245	POLARITY REVERSING
210	..Plural coils	246	.Automatic
211	CONTROL CIRCUITS FOR	247	IGNITING SYSTEMS
	NONELECTROMAGNETIC TYPE RELAY	248	.For explosive devices
	(E.G., THERMAL RELAYS)	249	..With sequential firing by
212	DISCHARGING OR PREVENTING		electronic switching
	ACCUMULATION OF ELECTRIC	250	..With sequential firing by
	CHARGE (E.G., STATIC		mechanical switching
	ELECTRICITY)	251	..With capacitor discharging into
213	.By charged gas irradiation		explosive device
214	.Of paper or paper handling	252	..With electromechanical power
	machine		source
215	.Of storage or hazardous area or	253	.For electric spark ignition
	fluid handling	254	..With electromagnet control
216	.Structurally combined with		means
	building or vehicle	255	...Including spark electrode
217	..With external structure of		make-break
	vehicle	256	..With capacitor discharging into
218	..Aircraft		sparkling transformer
219	..Chain-type grounding means	257	..With capacitor discharge into
220	..Specific conduction means or		spark gap
	dissipator	258	..With electromechanical
221	..Brush- or roller-type structure		generator
222	..Rod-type structure	259	...With permanent magnet
223	..Shoe type	260	...With piezoelectric element
224	..Integral with shoe	261	..With mechanical arrangement for
225	ELECTRIC CHARGING OF OBJECTS OR		spark electrode make-break
	MATERIALS	262	..With one spark electrode which
226	.Particulate matter (e.g.,		is hand held
	liquids with suspended	263	..With spark coil or transformer
	particles)	264	.For incandescent ignition
227	..For spray production	265	..With electromagnet control
228	..Liquid type		means
229	.By charged gas irradiation		

266	..With helical heating element	299.2	.....Details of electrical connecting means (e.g., terminal or lead)
267	DEMAGNETIZING SYSTEMS AND PROCESSES		
268	TRANSFORMERS AND INDUCTORS WITH INTEGRAL SWITCH, CAPACITOR, OR LOCK (E.G., IGNITION COIL)	299.3	.....Details of mounting means
		299.4	.....With adjustment means
269	..With lock for preventing unauthorized use	299.5	.....Details of insulator feature
270	..With capacitor element	298.2	....Details of plate feature
271	ELECTROSTATIC CAPACITORS	298.3	....Details of dielectric
272	..With protection or compensating means	298.4	....Details of electrical connecting means (e.g., terminal or lead)
273	..Self-healing	298.5	....With adjustment means
274.1	..Temperature	300	...With controlling or indicating means
274.2	..With fluid cooling means		
274.3	..With heat sink	301.1	..Fixed capacitor
275.1	..For electrical irregularities	301.2	..Special type (e.g., "bypass" type)
275.2	..With over-pressure breakaway fuse	301.3	..Encapsulated
275.3	..With resistance element	301.4	..Stack
275.4	..With thermal fuse	301.5	..Wound
276	..Cryogenic	302	..Feed through
277	..Variable	303	..Significant electrode feature
278	..With significant electrode or terminal feature	304	...Non-self-supporting electrodes
279	..Gas or vacuum dielectric	305	...Material
280	..Responsive to external condition	306.1	..Details of electrical connection means (e.g., terminal or lead)
281	...Electrical	306.2	...For decoupling type capacitor
282	...Thermal	306.3	...For multilayer capacitor
283.1	...Pressure	307	...Lead extends into body of capacitor
283.2	....By displacement of stylus or lever	308.1	...Lead attached to edge of capacitor
283.3	....By differential capacitor		
283.4	....By diaphragm	308.2	....Cap
284	...Liquid level	308.3	....Wire
285	...Fluid flow	309	....Metallized terminal
286	...Humidity	310	...Lead extends around at least a portion of capacitor
287	..Mechanically variable		
288	...Push button	311	..Solid dielectric
289	...Motor driven	312	...Plural dielectrics
290	...By varying distance between electrodes	313	....Layered
		314	....Impregnated
291	....Compression type	315	....With specific impregnant
292	...By varying effective area of electrode	316	.....Including wax
		317	.....Including halogen (e.g., chlorinated)
293	....Disk trimmer		
294	....Direct travel piston type	318	.....With stabilizer or modifying substance
295	....Piston trimmer		
296	....Sliding plates	319	....With stabilizer or modifying substance
297	....Spiral or helical plates		
298.1	....Rotary plates	320	...Ceramic and glass
299.1	.....Plural capacitors	321.1	...Ceramic, glass, or oxide particles

321.2	....With multilayer ceramic capacitor	630	...With fuses
321.3	.....Including metallization coating	631	...With switches
321.4	.....Composition	632	...With switch actuating arrangements
321.5	....Composition	633	...Plugboards
321.6	...With tubular capacitor	634	...With circuit breaker arrangements
322	....Oxide film	635	...With discriminating means
323	...Plastic	636	....Plug-in or removable
324	..Fibrous or fabric (e.g., paper, etc.)	637	...Busbar or conductor arrangements
325	..Mica	638	....U-shaped member
326	..Vacuum or gas dielectric	639	...With horizontal busbar
327	..Liquid dielectric	640	...With removable or plug-in connection
328	..Multiple capacitors	641	..Electrical service distribution box
329	...Distinct physically	642	..With fuse
330	...Shared electrode	643	..With switch
600	HOUSING OR MOUNTING ASSEMBLIES WITH DIVERSE ELECTRICAL COMPONENTS	644	...Including panel board
601	..For electrical power distribution systems and devices	645	....Adjustable panel
602	..Distribution station (i.e., substation)	646	....With fuse support means
603	...Having transformer	647	....With switch support means
604	...Gas insulated	648	....Busbar arrangements
605	..Electrical switchgear	649	.....U-shaped member
606	...Truck type	650	.....Spaced parallel relationship
607	....With interlock	651	...Panel board corner mountings
608	...Drawer type	652	...Circuit breaker supporting arrangements
609	....With interlock	653	....With discriminating means
610	...Pivoted support means	654	....With tamper prevention means
611	...Busbar arrangements	655	....Having two row arrangement
612	....Gas insulated	656	....With plug-in circuit breakers
613	....Liquid insulated	657	...With removable member
614	....With plural removable control units in housing	658	...With plastic enclosure or support
615	...With interlock	659	..For electricity service meter
616	....Door or cover type	660	...Plural
617	....Shutter type	661	...With meter circuit controller
618	...Gas insulated	662	....Bypass arrangement
619	...Having gas circuit breaker	663	...With transformer or circuit breaker
620	...Having transformer	664	...Meter mounting arrangements
621	...Having isolating switch	665	....Adaptable meter supports
622	..Distribution or control unit	666	....Retractable or detachable meter support
623	..Having transformer	667	....Removable cover
624	...Having busbar arrangement	668	...Meter terminal and connector arrangements
625	...Portable	669	....Terminal block
626	...Having fuse or relay	670	....Contact blade receiving structure
627	..Distribution or control panel board		
628	...With switches and fuses		
629	....Unit block		

671	....Adjustable or adaptable contacts	679.31	...For computer memory unit
672	...Tamper resistant	679.32	....Expansion module type
673	..Circuit breaker supporting means (i.e., attaching, mounting, etc.)	679.33	....Disk drive type
674	..For ballast elements	679.34	.....External shock mounting/vibration damping
675	..Bus duct	679.35	.....Spring
676	..With cooling means	679.36	.....Elastomeric
677	...Fluid	679.37	.....Removable disk drive support
678	....Air	679.38	.....Ejectable
679.01	..For electronic systems and devices	679.39	.....Slidable
679.02	..Computer related housing or mounting assemblies	679.4	...For input/output device
679.03	...Wearable computer structure	679.41	...Expansion/docking station
679.04	...Plural independently movable displays	679.42	....Motorized
679.05	...Telescoping display	679.43	....Latching
679.06	...Display rotatable about plural axes	679.44	....Adjustable
679.07	....About perpendicular axes	679.45	....Port replicator
679.08	...For computer keyboard	679.46	...With cooling means
679.09	....Portable computer type	679.47	....Plural diverse cooling means integrated into one system; e.g., fan with heat pipe or heat sink, etc.
679.1	.....Integrated pointing device; e.g., trackball, joystick	679.48	....Fan
679.11	.....Adjustable keyboard	679.49	.....With air flow enclosure; e.g., ducts, plenums, etc.
679.12	.....Tilttable	679.5	.....Plurality of air streams
679.13	.....Collapsible key type	679.51	....With baffle
679.14	.....Split keyboard	679.52	...Heat pipe
679.15	.....Foldable keyboard	679.53	...Liquid
679.16	.....Plural foldable sections	679.54	...Thermal conduction; e.g., heat sink
679.17	.....Detachable keyboard	679.55	...For portable computer
679.18	....Integrated pointing device; e.g., trackball, joystick, etc.	679.56	...Handheld; e.g., PDA
679.19	....Hand, wrist or palm rest	679.57	...With security means (i.e., locking structure)
679.2	....Adjustable	679.58	...With latching mechanism
679.21	...For computer display	679.59	...Handle/foot support
679.22	....Desktop type	679.6	...For desktop computer
679.23	.....With support for multimedia device; e.g., speaker, camera, microphone	679.61	..CRT type
679.24	.....With support for light protective shield	688	..With cooling means
679.25	.....With document holder	689	...Fluid
679.26	....Portable computer type	690	....Air
679.27	.....Hinged or folding display; e.g., laptop computer display	691	.....Pressurized or conditioned
679.28	.....Electrically connected through hinge means	692	.....Plural Openings
679.29	.....Removable display	693	.....Circular
679.3	.....Handheld computer; e.g., personal digital assistant (PDA)	694	....With air circulating means
		695	.....Fan or blower
		696	.....With heat exchanger unit
		697	.....With heat sink or cooling fins
		698	....And liquid
		699	...Liquid
		700	....Change of physical state
		701	...With heat exchanger unit
		702	...With cold plate or heat sink

703	....With cooling fins	748	..Printed circuit board
704	...Thermal conduction	749	...Flexible board
705	....By specific coating	750	....With specific dielectric material or layer
706	.....Containing silicon or aluminum	751	....With particular conductive material or coating
707	....Through support means	752	...With housing or chassis
708	.....Specific chemical compound or element	753	....Specific chassis or ground
709	.....Heat sink	754	....With ejector means
710	.....Details	755	....Rotatable
711	.....Cooling plate or bar	756	....Guiding means
712	....Thermally and electrically conductive	757	....With particular material
713	....Electrically insulating thermally conductive	758	....With spacer
714	....Through component housing	759	....With lock or interlock
715	....For module	760	...Connection of components to board
716	.....Plural	761	....Component within printed circuit board
717	....For active solid state devices	762	....With specific dielectric material or layer
718	....For integrated circuit	763	.....Capacitor and electrical component
719	.....Circuit board mounted	764	.....Integrated circuit
720	....For printed circuit board	765	....By direct coating of components on board
721	.....Plural	766	....Capacitor and resistor
722	....For electronic circuit	767	....With mounting pad
723	....For lead frame	768	.....Having leadless component
724	..Cabinet-type housing	769	.....Having spring member
725	...With retractable or readily detachable chassis	770	.....Having spacer
726	....With locking means or device	771	.....Having particular material
727	....Sliding component or compartment	772	....With specific lead configuration
728	..Module	773	.....Shaped lead on components
729	...Plural	774	.....Shaped lead on board
730	....With housing	775	.....Busbar
731	.....Interchangeable	776	.....Flexible connecting lead
732	.....Having lock or interlock	777	....By specific pattern on board
733	.....Selective connections	778	.....Cross-connected
734	....With coupling or decoupling capacitor	779	....With specific connection material
735	....Stacked	780	...Different voltage layers
736	...With printed circuit boards	781	...With switch
737	....IC card or card member	782	....Having passive component
738	....With resistor and capacitor	783	....Having semiconductive device
739	....With particular material	784	...Plural
740	....With locking means or device	785	....With separable connector or socket means
741	....Guiding means	786	.....Having key connection
742	....With spacer	787	.....Having spring member
743	....Solder connection	788	.....Having backplane connection
744	....Cordwood type	789	.....Having flexible connector
745	.....Welded connection	790	.....Stacked
746	...With specific dielectric material or layer	791	.....Multiple contact pins
747	...With locking means or device		

792	....Plural contiguous boards	500	ELECTROLYTIC SYSTEMS OR DEVICES
793	.....Thick film component or material	501	.Coulometer (i.e., electrochemical timer)
794	.....Power, voltage, or current layer	502	.Double layer electrolytic capacitor
795	.....Plural dielectric layers	503	.Liquid electrolytic capacitor
796	...With housing or chassis	504	..With significant electrolyte
797	.....Storage or file cabinet	505	...Salt solute
798	.....With ejector or extractor	506	...Ethylene glycol
799	.....Grounding Construction or Detail	507	...With depolarizer
800	.....With Shielding Structure	508	..Anode type electrode
801	.....Specific latching or retaining device	509	...Aluminum or tantalum
802	.....Specific alignment or guide means	510	...Anode riser
803	....Interconnection details	511	...Wound
804	....Spacer details	512	....With separator
805	..Matrix assembly	513	....With mounting means (e.g., anchoring means or clamping)
806	..Diode	514	....With heat conductor (e.g., heat sink)
807	..Component mounting or support means	515	....With common conductor (e.g., stripline)
808	..Mounting pad	516	..Cathode type electrode (e.g., cathode casing)
809	..With discrete structure or support	517	..Casing
810	..Plural mounting or support	518	...With hermetic seal
811	..With passive components	519	...With header, cover, or endseal
812	..With particular insulation	520	....Significant electrical connection means (e.g., terminals or leads)
813	..Lead frame	521	...With vent means
814	..Radio type	522	..Multiple capacitors
815	..Tube mounting	523	.Solid electrolytic capacitor (e.g., dry electrolytic capacitor)
816	..Shielding	524	..Dielectric
817	..For electronic tube	525	..With significant electrolyte or semiconductor
818	..EMI	526	...Paste or gel
819	..For relay	527	...Organic salt (e.g., TCNQ)
820	..For semiconductor device	528	..Anode type electrode
821	..For capacitor and inductor	529	...Aluminum or tantalum
822	.Contact banks	530	...Wound
823	.Terminal block	531	....With lead conductor
824	..With protective device or unit	532	..Cathode type electrode
825	.Support brackets	533	...With significant lead
826	.Wire distribution (e.g., harness, rack, etc.)	534	..With protection means
827	..With interconnecting cable	535	..Casing
828	..With switchboard or switch	536	...With hermetic seal
829	.Frame	537	...With header, cover, or endseal
830	..With plurality of capacitors	538	....Significant electrical connection means (e.g., terminals or leads)
831	..With cooling means	539	....With potting
832	..With switchboard or switch	540	..With terminal
833	.Fuse block		
834	..Plural		
835	.Fuse pullout device		
836	.For transformer		
837	.For switch or fuse		

- 541 ..Multiple capacitors
- 434 .Systems (e.g., plural cells,
standby exciting voltage)
- 435 .Current interruption type (e.g.,
circuit breaker, D.C.-to-pulse
converters)
- 436 .Rectifiers
- 437 **MISCELLANEOUS**

FOREIGN ART COLLECTIONS

FOR 000 CLASS-RELATED FOREIGN DOCUMENTS

Any foreign patents or non-patent literature from subclasses that have been reclassified have been transferred directly to FOR Collections listed below. These Collections contain ONLY foreign patents or non-patent literature. The parenthetical references in the Collection titles refer to the abolished subclasses from which these Collections were derived.

SAFETY AND PROTECTION OF SYSTEMS AND DEVICES (361/1)

- .With specific voltage responsive
fault sensor (361/88)
- FOR 100 ..Overvoltage (361/91)

SAFETY AND PROTECTION OF SYSTEMS AND DEVICES (361/1)

- FOR 101 .With specific current responsive
fault sensor (361/93)

HOUSING OR MOUNTING ASSEMBLIES WITH DIVERSE ELECTRICAL COMPONENTS (361/600)

- FOR 102 .For electronic systems and
devices (361/679)
- FOR 103 ..Including keyboard support
(361/680)
- FOR 104 ..Including display support (361/
681)
- FOR 105 ...CRT support (361/682)
- FOR 106 ..Computer related support (361/
683)
- FOR 107 ...Memory unit support (361/684)
- FOR 108Disk drive support (361/685)
- FOR 109 ...Input/output device support
(361/686)
- FOR 110 ...With cooling means (361/687)