



GE INDUSTRIAL SYSTEMS



..... **AKD-10 OEM Module Application Guide**
Featuring WavePro™ Breakers

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Introduction

GE's latest low voltage switchgear offering – AKD-10 OEM Module – uses WavePro™ Low Voltage Power Circuit Breakers and offers the OEM customer a switchgear product package just for their needs. Now, OEM's can order single vertical sections which can be arranged by their own personnel to form a wide variety of line-up configurations. There are many options for the modular sections which allow OEMs to order equipment that fits their manufacturing capabilities. This modular package gives OEM's the ultimate in design flexibility as highlighted below:

- Fabrication and stack pre-assembly by GE factory experts
- Detailed part drawings for fabrication and installation instructions
- Many AKD-10 switchgear features are available
- Designed for GE's latest power circuit breaker –WavePro™

AKD-10 OEM Module is different than the traditional switchgear line-up. It is purchased and shipped in individual vertical sections, which are referred to as stacks. The stack code determines the number of compartments and horizontal and vertical bus configuration. A wide range of options are available for the compartments, neutral bus, ground bus, and main bus. The compartments in the stacks can be ordered as a blank (auxiliary) space, or a circuit breaker compartment. Circuit breaker compartments have additional options, such as safety shutters, secondary disconnects and position switches.

AKD-10 OEM Module component switchgear is manufactured in GE's ISO 9002 certified facility in West Burlington, Iowa.

Standard Design

An AKD-10 OEM Module stack comes standard with the following items:

1. Basic stack frame 60", 67" or 74" deep **Indoor Construction Only.**
2. Removable top covers including the top front wire trough with necessary ventilation and dust covers.
3. Blank instrument panels above each blank (auxiliary) and breaker cubicle.
4. Breaker compartments (less doors) including line and load primary disconnects, drawout rails and a rating rejection bracket. Lugs are not provided or available.
5. Section barriers (with transformer transition stacks).
6. Vertical (riser) bus for all breaker stacks, braced for 65 kA momentary.

Safety and reliability features

Standard and optional features are available with the AKD-10 OEM Module to meet the customer demands for maximum uptime, system reliability and personnel safety.



- **Closed-door operation**

Optional breaker compartment doors have no ventilation openings, thus protecting operators from hot ionized gases vented by the breaker during circuit interruption.



- **Closed-door drawout**

True closed-door drawout construction is standard with AKD10 OEM Module. The breaker compartment doors remain stationary and closed while the breaker is racked out from the **CONNECT** position, through **TEST**, to the **DISCONNECT** position. Doors can be secured with rugged 1/4-turn latches.



- **Closed-door control circuit accessibility**

Standard construction provides a metal instrument panel above each circuit breaker. This panel can be used by the OEM for mounting a variety of control circuit devices. Fuses for the breaker close and trip circuits and toggle switches used for testing the breaker close and trip circuits can be mounted in this panel. The panel is easily removed for mounting devices and wiring.



- **Closed-door trip unit setup and display**

All WavePro™ breakers have front-mounted trip units. Operators can have full and safe access to the trip unit information without opening the breaker door. Depending on the trip unit supplied, the following information is available:

- Trip unit type
- Breaker trip rating
- Trip targets (optional on Power+™)
- Additional metering (MicroVersaTrip PM)—
 - Voltage [L-L, L-N]
 - Energy [kWh]
 - Total power [kVA]
- Protective relaying settings ** (MicroVersaTrip PM) — Pickup and delay for undervoltage, overvoltage, voltage unbalance, current unbalance, power reversal
- Communication address ** (MicroVersaTrip PM)
- Port for portable test kit (TVRMS2) or portable battery pack (TVPBP)

**Trip units have a sealable cover so that trip unit settings can be viewed but not changed

Easy-to-use breaker interlocking and locking features minimize the risk of operational errors:

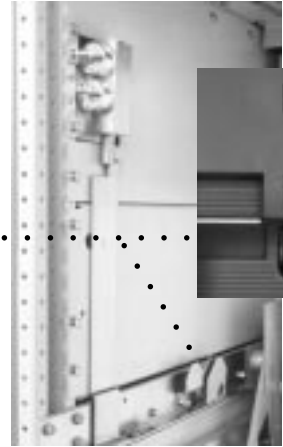
• **Low-voltage power circuit breaker locking**

As a standard feature, the low-voltage power circuit breaker can be padlocked in the open position with up to three 1/4" - 3/8" shank padlocks to prevent unauthorized closing.



• **Breaker insertion and withdrawal interlocks** • • • • •

Interlocks prevent racking of the breaker in or out when the breaker contacts are closed. Breakers are trip free when not in the **CONNECT** or **TEST** position.



The breaker compartment is designed to provide operator and system safety options:

• **Isolated breaker compartment (standard)**

Each circuit breaker is located in a completely enclosed ventilated compartment with grounded steel barriers to minimize the possibility of fault communication between compartments.



• **Safety shutters**

Safety shutters are optionally available in breaker compartments to protect operators from accidental contact with live conductors when the breaker is withdrawn.



• **Defeatable door interlock**

This option prevents inadvertent opening of the compartment door unless the breaker is in the test or disconnect position. A provision is made for authorized defeat of the interlock.



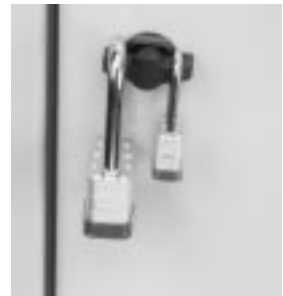
• **Padlockable door latch**

This optional feature enables padlocking of the door latch in order to prevent unauthorized entry into the breaker compartment.



• **Breaker rejection feature (standard)**

A rejection system is provided as standard in each breaker compartment to prevent the insertion of a breaker with inadequate short circuit and/or incorrect continuous current ratings.



Safety and reliability features (continued)

..... • **Wheels and guidebar (standard)**



All WavePro™ circuit breakers are equipped with wheels and a guidebar to provide easy and accurate drawout operation. When installing the breakers, they are lowered onto the extended drawout rails. Wheels on the side of the breaker allow the breaker to be easily rolled into the cubicle until the breaker engages the racking pins in the cubicle. The breaker is equipped with a rugged guidebar that ensures precise alignment of the primary and secondary disconnects during insertion.

Installation and maintenance are made easy with these design features:

• **Accessibility**

Accessibility to equipment compartments provides easy maintenance of the breaker cubicle, as well as convenient inspection of the bolted bus connections.



..... • **Cable space**

Conduit entrance area meets NEC requirements. A 7" extended depth frame is available for applications requiring additional cable space. Section width can also be increased (from 22" to 30" or 30" to 38") for additional cable space.

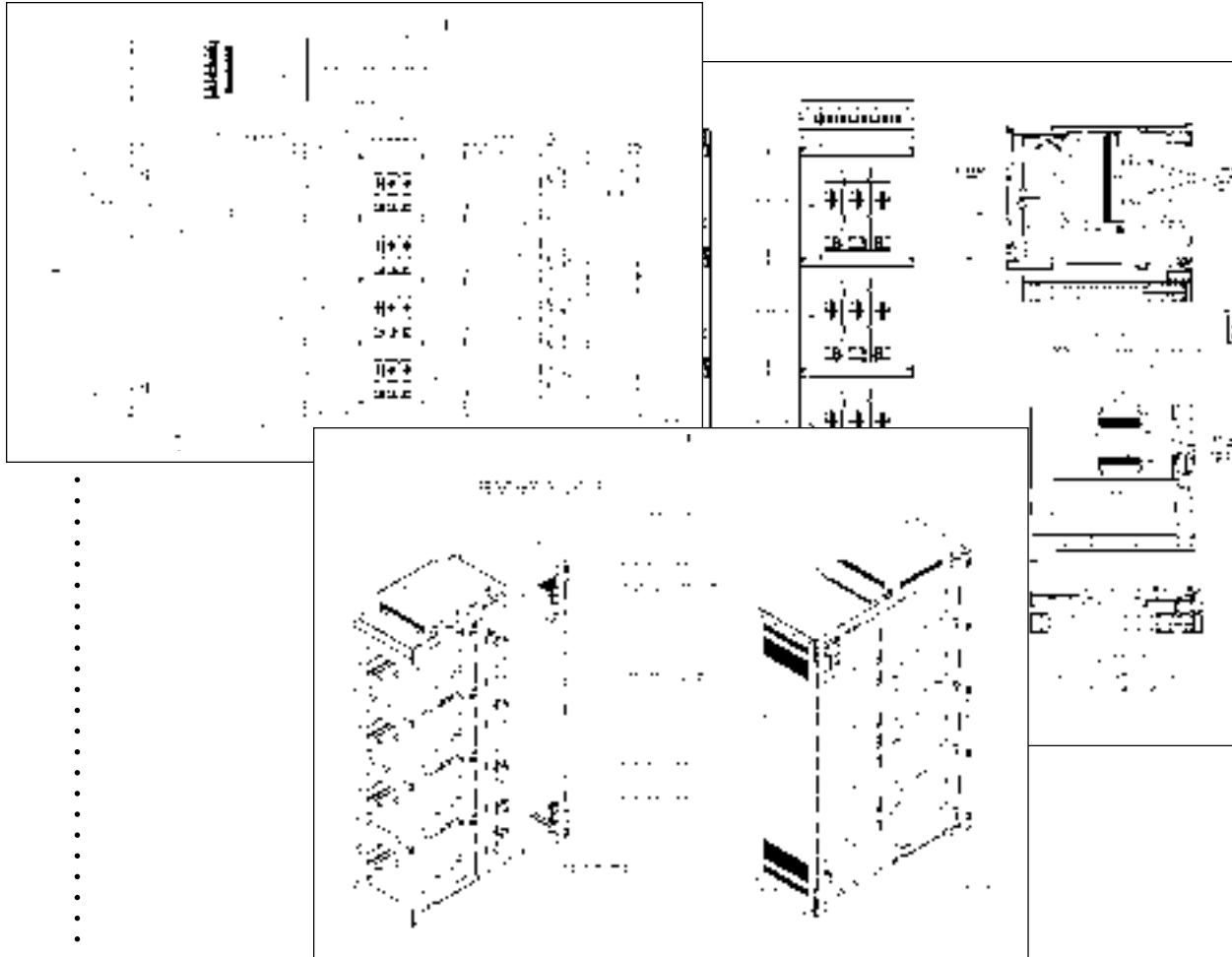
..... • **Breaker lifting device**

This optional top mounted hoist provides the means for installing and removing breakers from the equipment.

..... • **Control circuit isolation**

Control wires can be run between compartments in steel riser channels. Optional rear wire troughs located in the rear cable area can provide space for customer terminal blocks. Intercubicle wiring can be run in a wireway on top of the switchgear where interconnection terminal blocks can be located.





GE's manufacturing, engineering and testing set the quality standards in the switchgear industry:

• Paint finish

Standard paint finish is ANSI-61 light gray. Primer paint process uses the superior "E-coat", or electrodeposition process, based on electroplating principles. Each switchgear part is thoroughly cleaned and sealed prior to painting. This process guarantees resistance to harsh indoor environmental conditions. Final paint is the responsibility of the OEM.

• Seismic Certification

All OEM Module Equipment has been qualified for use in moderate loading conditions as defined in IEEE Std. 693-1997. Moderate seismic loading conditions are defined by forces up to 0.25g ZPA horizontal and 0.20g ZPA vertical. An accessory kit is available for high seismic conditions.

• Complete and accurate documentation

The AKD10 OEM Module information pack contains all the documentation required to design and assemble the module into a switchgear lineup.

Other available features and options for AKD-10 OEM Module

• **UL Requirement**

AKD-10 OEM Module can be labelled accordingly if the bus is furnished by GE or by the OEM.

• **Horizontal Main Bus Rating**

The main bus rating will be used to size the main bus that is shipped in excess. The horizontal main bus can be braced for 100 kA maximum duty. The bus is fabricated from copper, and the bus is sized as follows:

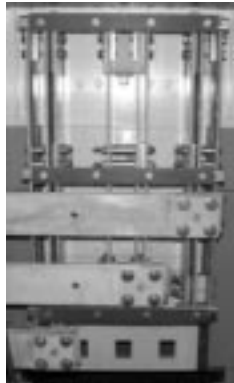
- A. 1600A bus consists of (1) 0.400" x 4.00" bar per phase
- B. 2000A bus consists of (1) 0.500" x 4.00" bar per phase
- C. 2500A bus consists of (2) 0.335" x 4.00" bars per phase
- D. 3200A bus consists of (2) 0.400" x 4.00" bars per phase
- E. 4000A bus consists of (3) 0.500" x 4.00" bars per phase

• **Bus Plating**

The standard plating is tin for the main, neutral, vertical (riser), and ground bus (when supplied). Fully silver plated bus is available.

• **Momentary Bus Bracing (kA RMS Symmetrical)**

The vertical bus bars are braced to withstand mechanical forces exerted during a short circuit of 65kA (Standard) or 100kA (optional) RMS symmetrical. The horizontal bus bars of the main bus when supplied are always braced for 100kA. Other buswork shall be braced to withstand mechanical forces exerted during a short circuit equivalent to the maximum interrupting capacity of the associated circuit breakers, or the maximum let-through current in the case of the load side of a fused circuit breaker.



• **Insulated / Isolated Bus**

Bare copper will be provided as standard for the riser bus and optional horizontal main bus. The insulated/isolated system fully insulates the horizontal main bus with fluidized epoxy coating and isolates each phase of the vertical riser bus with molded polyester glass. If ordered, the components of the insulated / isolated system will be installed at the factory with the exception of the optional horizontal main bus and associated bus insulation hardware which will be shipped excess.



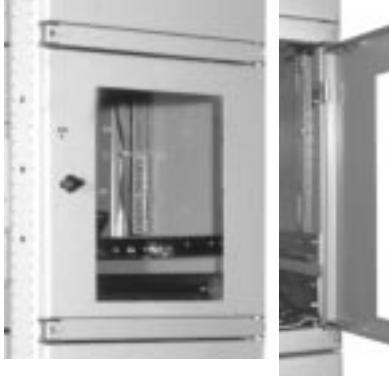
• **Neutral Bus**

There are two (2) positions for the horizontal neutral bus: bottom or top. There are four options for the neutral bus: none, solid, large frame link, and small frame link. The solid neutral bus comes in one piece. The large (3200 – 4000A) and small (800 – 2000A) frame **linked** neutral buses are separated into three pieces which allow an in-line neutral current transformer to be easily installed for Main and Tie breaker applications with 4 wire integral ground fault protection. A large frame link will be used for 30" or 38" wide stacks and a small frame link will be used for 22" wide stacks. In a transformer transition unit the only options are "no neutral" or "neutral". The neutral bus will be shipped assembled except for the neutral bus in a transition unit, which will be shipped excess. Be sure the coordination you need matches that of your transformer.

The horizontal neutral bus is fabricated from copper and is sized as follows:

- A. 800/1000A bus contains qty (1) 0.250" x .400"
- B. 1250A bus contains qty (1) 0.335" x 4.00"
- C. 1600A bus contains qty (1) 0.400" x 4.00"
- D. 2000A bus contains qty (1) 0.500" x 4.00"
- E. 2500A bus contains qty (2) 0.335" x 4.00"
- F. 3200A bus contains qty (2) 0.400" x 4.00"
- G. 4000A bus contains qty (2) 0.500" x 4.00"





• **Front Doors and Hinges**

Front doors and hinges are optional items. Options include: no front doors, front doors and hinges, and hinges only. If front doors are specified, the doors and hinges will be assembled and attached to the stack. If front doors are not specified a detail drawing of the doors for fabrication is available. Front doors must be selected if breaker door interlocks are to be provided. This selection will be applied to all the ordered stacks.

• **Front Door Latch**

Front door latches can be provided only when doors are selected. There are three types of front door latches: none, standard, and padlockable. The standard door latch has a ¼ turn handle. The padlockable door latch enables the door to be secured with two padlocks, one - 1/4", and one - 3/8" diameter shank.



• **Bolted Rear Doors**

A full-height vented rear door with hinges or "hinges only" without doors are optional. Transformer transition units will be equipped with two split bolted rear covers when the "rear door" option is selected. When the rear doors are not furnished a detailed drawing for fabrication with a vent detail will be provided. The rear door must be fabricated to GE specifications because the vents are essential in maintaining the correct temperature within the stack. If "rear doors" are selected, then all stacks will have rear doors and will be shipped mounted to the stack.

• **Ground Bus Size**

There are three options for the ground bus: none, qty (1) ¼" x 3", qty (2) ¼" x 3". Qty. (1) ¼" x 3" ground bus is rated for 800 Amps and qty. (2) ¼" x 3" ground bus is rated for 1600 Amps. The ground bus will be fabricated from copper. The required location of the ground (upper or lower) must be provided when selecting.



• **Hoist Rails**

Circuit breaker hoist rails are optional and are installed on top of the switchgear. The rails can accommodate a hoist for easy, safe removal and installation of breakers. The rails enable the hoist to travel the length of the switchgear, therefore, only one hoist is needed per switchgear line-up. Rails will be installed at the factory. The hoist and rails increases the height of the line-up to 103.5" inches. If hoist rails are selected, then all the stacks with the order will have hoist rails, except transformer transition sections.



Following items are accessories and shipped as excess material.

• Indoor End Covers

The end covers enclose the side of a stack at the end of a line-up. There are three types of end covers depending upon the depth of the stack: 60", 67", and 74". The end covers are designed to be used on either end of a line-up. When end covers are ordered they will be assembled to the first non-transition stack in the order for shipping purposes.

• Left Transformer 3-Phase Transition Bus

Specific stack codes must be selected for a transformer transition. Stack code 601-1 or 601-2 is for a Left End Transformer Transition (see Appendix A for more details). All transformer transition stacks are 22" wide. If a main bus rating is not selected then bus for a transformer transition stack is unavailable. The transformer transition bus is based upon the adjacent stack width: 22", 30", 38. The transformer transition bus will be shipped as excess material.



• Right Transformer 3-Phase Transition Bus

Specific stack codes must be selected for a transformer transition. Stack code 602-1 or 602-2 is for a Right End Transformer Transition (see Appendix A for more details). All transformer transition stacks are 22" wide. If a main bus rating is not selected then bus for a transformer transition stack is unavailable. The transformer transition bus is based upon the adjacent stack width: 22", 30", 38. The transformer transition bus will be shipped as excess material.

• Main Bus Splices



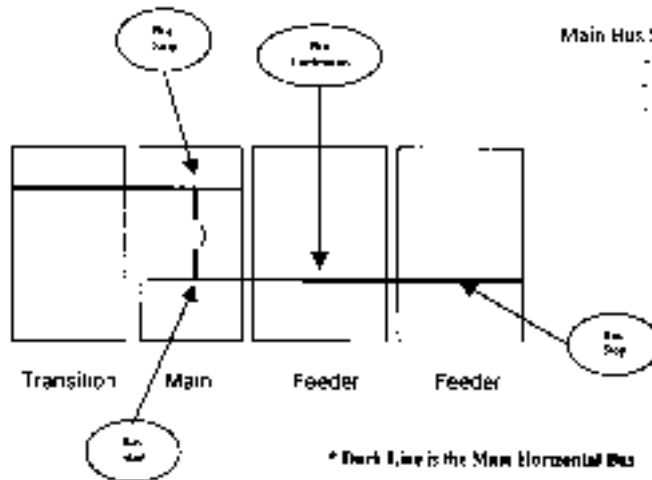
Main Bus Splices are required when connecting the Horizontal Main Bus to the Power Connections on the vertical bus. Working from left to right where the Horizontal Main Bus begins one (1) Bus Start Spacer is required. When the Horizontal Bus Stops at a Power Connector, one (1) Bus Stop Spacer is required and if the Horizontal Main Bus is connected to the riser and the connection is not a stop or a start a Horizontal Main Bus Continuous Spacer is required. These Main Bus Splices and spacers are shipped as excess material.

See below for an illustration of Bus Splice positions and types.

Illustration 1.0

Main Bus Splice needed for this line-up

- Qty (1) Bus Start
- Qty (1) Bus Continuous
- Qty (2) Bus Stops



• **Top Wire Trough End Covers**

The top of each stack has mounting areas for terminal blocks. This mounting area is toward the front of the stack between the front and rear hoist rails (if provided). Two (2) top wire trough end covers are needed per line-up to enclose the wire trough on the right and left side of a line-up. When the top wire trough end covers are ordered they will be assembled to the first non-transition stack in the order for shipping purposes.



• **Breaker Hoist**

A circuit breaker hoist is optional. There are different breaker hoists depending upon stack depth. Hoist rails must be selected on the order sheet. Only one hoist is needed per switchgear line-up. The hoist and rails increases the height of the line-up from 92" to 103.5". The hoist will be shipped excess. The hoist rails will be mounted to the stacks.

GE has developed a unique stack configuration identification method called a stack code:

• **Stack Code**

The stack code determines the width of the stack, horizontal bus connection, vertical bus configuration, circuit breaker location, number of compartments and ampacity of the compartments within the stack. See Appendix A – **Stack Codes**.

• **Vertical (Riser) Bus Amps**

The vertical bus is available with ratings from 1600A to 4000A in stacks limited to 800 – 2000A breakers (codes 701 - 751) and ratings of 3200A and 4000A in stacks having 3200 – 4000A breakers (codes 801- 834). For vertical bus ampacity ratings for each stack code see page 13 – Stack Rules Appendix A – **Stack Codes**. The vertical bus is fabricated from copper and will be shipped fully assembled in the stack with the necessary bracing hardware and insulation package (when furnished) in place. **A 4000A vertical bus requires a minimum 30" wide stack.**

• **Compartment Depth**

The Compartment Depth is the depth of the breaker / auxiliary compartment. Standard depth is 30" and a depth of 37" must be selected for fused breakers. **Stacks must have the same compartment depth to enable the stacks to be combined into a switchgear line-up.**

• **Stack Depth**

There are three different stack depths: 60", 67", 74". The breaker / auxiliary compartment depth plus the bus compartment depth determines the stack depth. **The breaker compartment is 30" deep (standard) and must be 37" deep with integrally fused breakers.** The bus compartment is 30" deep (standard) and 37" deep when requested by the customer for more cabling space. Stacks must be the same depth within a switchgear lineup. Refer to Table 1.0 for complete sizing and dimensional data.

Table 1.0

Enclosure type	Available depth options			
Front (breaker / auxiliary) compartment	30"		37"	
Rear Bus compartment (Std depth or 7" rear extension)	30" (std)	37" (7" ext)	30" (std)	37" (7" ext)
Indoor (total indoor frame depth)	60"	67"	67"	74"

• **Section Barriers**

Optional section barriers are mounted internally on the side of the stack in the bus and cable compartment. The barrier isolates the bus and cable compartments of adjacent stacks. For all stack codes except transition sections the section barrier will not be notched. This means notches will need to be cut into the barrier and sized depending upon the main bus rating and position.



For Transformer Transition Stacks, the section barrier is standard. If a main bus rating is not selected the size of the notches for the section barriers for transformer transition stacks will be for 1600- 2000A main bus. For higher main bus ratings, the notches need to be enlarged. If a main bus is selected, the notches in the section barriers will match the bus size. The section barriers are made of flat polyester glass sheet material and will be shipped attached to the stack.



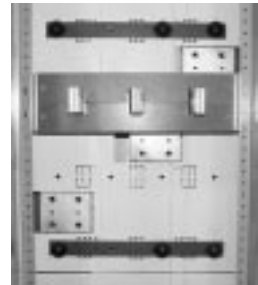
• **Rear Wire Trough with Covers**

A vertical wire trough with covers, mounted in the rear of the stack is optional. The wire trough will have mounting for terminal blocks but terminal blocks must be supplied by purchaser. There are three different options for the troughs in the rear: left, right and both. Transition stacks can not have a rear wire trough but do contain a mounting pan for terminal blocks if needed.



• **Top / Middle / Bottom Power Connectors**

Depending upon the stack code selected there may be three (3) positions for power connectors: top, middle and bottom. The power connectors allow the vertical (riser) bus to be connected to cables, busway or other horizontal main bus connections. The power connectors must be specified on the order sheet. To connect two stacks to each other with the horizontal main bus, both stacks must have power connectors at the same position, such as bottom – bottom.



Stack codes will determine the unit types required. Additional accessories are also available:

• **Auxiliary Compartment Height**

An auxiliary compartment is a blank (non-breaker) compartment that can be used for mounting instruments on the door or inside the compartment

• **Breaker Type**

Stacks are designed for WavePro™ AKD-10 Equipment breakers (CAT #WE). The possible types of WavePro™ breakers for each compartment position are with the stack codes. **Table 2.0 WavePro™ Breaker Interrupting Ratings** on page 16 lists the ratings for the breaker types. More details for the WavePro™ circuit breaker can be found in WavePro™ Application Guide DET-167.

• **Key Interlocks**

This option provides a means of locking of the circuit breaker in the open, trip-free position when fully connected. Mounting only for a Kirk Keylock is provided and Kirk keylock is provided by others. Applicable schemes would be mechanical interlocking of two breakers so only one can be closed at a time, or in load center unit substations, interlocking of the primary switch and secondary main breaker such that the secondary main must be open before the primary switch can be operated. Up to two key positions can be accommodated in each breaker compartment.

• **Secondary Disconnects Blocks, Mounting, and Wiring Harness**

Secondary disconnects, mounting, wiring and terminal blocks can be installed for two separate 36 point disconnect blocks. The two (2) positions are specified as either A (left side) or C (right side). The number of disconnects in the compartment is determined by the number of disconnects on the circuit breaker. If the circuit breaker designated for the compartment has any of the following options, then the compartment needs both secondary disconnects A and C. If the circuit breaker does not have any of these options then only the A (left side) position requires a secondary disconnect.



- A. 7-Stage Auxiliary Switch (6 NO / NC 6 contacts)
- B. 2nd Shunt Trip
- C. Remote Charge Indicator
- D. Open Fuse Lock-out (OFLO) Device - 2000 / 3200 / 4000A breakers

Note: If the breaker is manually operated, has no accessories and is equipped with a PowerPlus or MicroVersaTrip Plus Trip Unit, then a secondary disconnect may not be required.

• **Position Switch**



The position switch is used to indicate if the breaker is in the Test/Disconnect or Connect position. The position switch will be supplied without wiring. The position switch mounting differs depending upon which type of circuit breaker is specified for the compartment. The switch may be mounted on the bottom or on the rear barrier of the compartment. The position switch is optional and will be shipped installed.

Below is a table which shows the switching sequence. Make electrical connections as desired (1/4" wire strip required).

Contact Closed Condition	3 Stage					
	1 Stage					
Breaker Out	1-2	5-6	9-10	13-14	17-18	21-22
Breaker In	3-4	7-8	11-12	15-16	19-20	23-24

NOTE: USE EDGE GUARD TO PROTECT WIRES FROM ALL SHARP EDGES.

• **Defeatable Door Interlock**

Doors must be purchased if a defeatable door interlock is required. This option prevents opening the breaker compartment door when the breaker is in the "Connected" position. The door interlock is comprised of a linkage, which is mounted on the left side of the breaker compartment, a latch on the inside of the door and an opening in the door. An opening in the door allows for authorized defeat of interlock. The door interlock will be shipped installed.



• **Shutters**

Shutters are available as an optional accessory to protect personnel from accidental contact with the primary disconnects in an energized compartment. The shutters cover the primary disconnects in the compartment when the circuit breaker is in the withdrawn position. When the circuit breaker is moved into the connect position the shutters open to allow connection between the breaker and the primary disconnects. When ordered, the shutters will be shipped installed. To install current transformers, the shutters will need to be removed by taking out eight (8) self-tapping screws. Note: The shutters are **NOT** available for 1600A frame fused breaker (WPF-16) with a 2500A current limiting fuse.

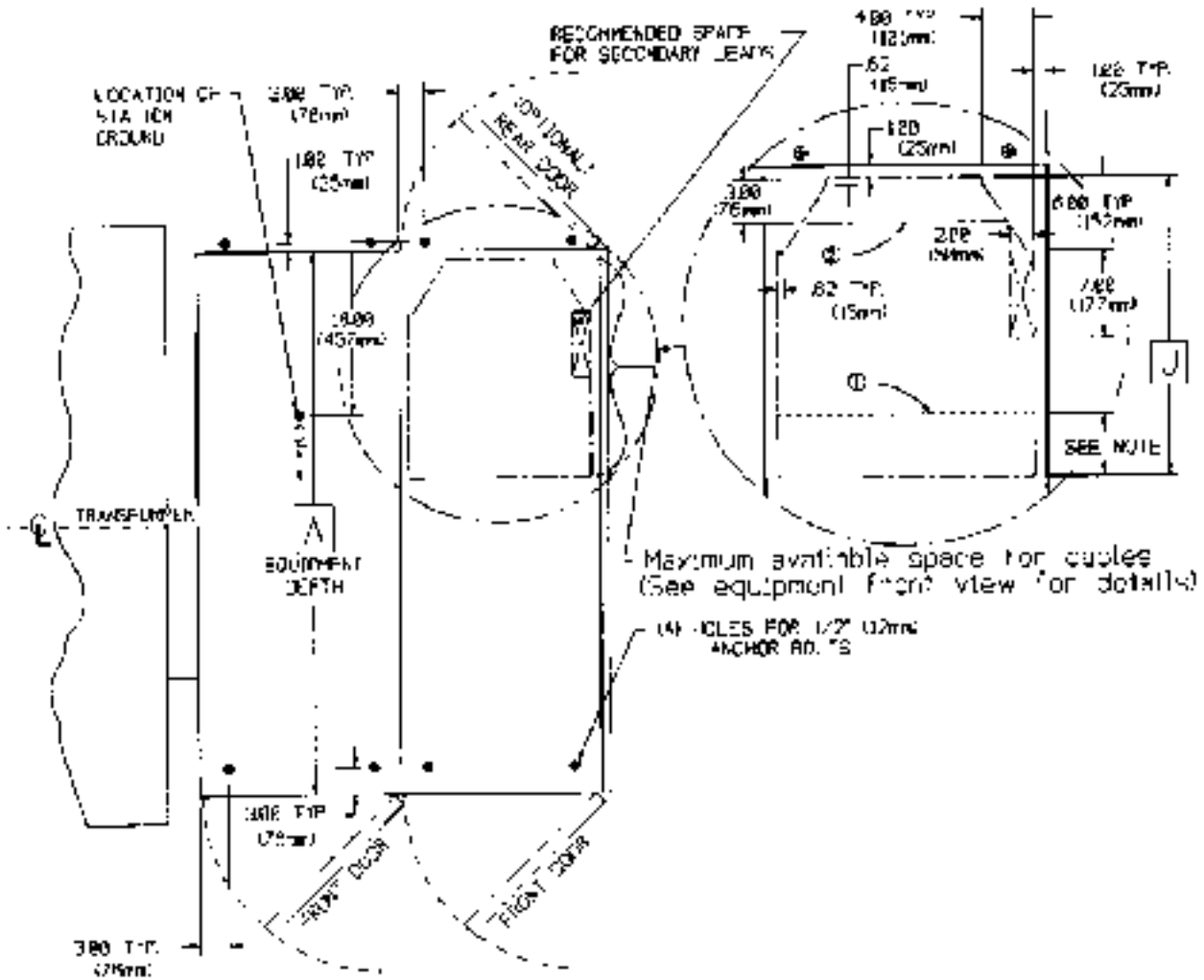


• **Open Fuse Lockout (OFLO) Device**

The open fuse lockout device is provided with any fused breaker. The OFLO consists of an individual trip solenoid for each pole, connected directly across the fuse in that phase. When any fuse blows, the solenoid is energized and trips the breaker to prevent single-phasing. The breaker is mechanically locked out and cannot be reclosed until the fuse is replaced and the target indicator of the phase involved is reset. Units for 2000, 3200 & 4000A frame breakers with open fuse lockout (OFLO) devices are furnished with a unique rejection device that ensures correct breaker installation.



Floor Plans and Side Views



A Equipment Depth	Direction of Cables	J	Rear Extension Depth
60" Non-Fused or 67" with Fused WPF-08/16	Below	19.00 (482 mm)	None
	Above	24.00 (609 mm)	
67" Non-Fused or 74" with Fused WPF-08/16	Below	26.00 (660 mm)	7.00 (177 mm)
	Above	31.00 (787 mm)	

NOTES:

CABLES BELOW - AVAILABLE SPACE FOR CABLES REDUCED BY 4.00" (101 MM) IF 800 - 2000A BREAKER IS LOCATED IN BOTTOM COMPARTMENT.

2 SPACE REQUIRED FOR UPPER NEUTRAL WITH LEADS ABOVE OR LOWER NEUTRAL WITH LEADS BELOW.

Sizing, Weight and Breaker Guidelines

The height of the AKD-10 OEM Module equipment is 92" (97" over the top wiring trough and 103.5" over the optional breaker hoist). The available breaker stacking space is 84".

Breaker frame size and type determine the width of the breaker sections and also the minimum depth of the switchgear line-up. When combining stacks into a line-up, the depth of the deepest device in the line-up determines the depth the line-up. For example, a line-up with a WPS-20 breaker, fuse roll-out (depth - 60") and WPH-08 breakers (depth - 67") would be a minimum of 67" deep — the WPH-08 being the deepest device. Refer to Table 3.0 for section sizing.

Table 2.0 WavePro™ Breaker Interrupting Ratings

WPS — STANDARD IC

WPH — HIGH IC

WPX — EXTENDED IC

WPF — INTEGRALLY FUSED (Up to 200 kA IC)

Rated AC Voltage Nominal (max)	Breaker Type	Frame Size (amps)	Short-Circuit RMS Symmetrical kA		
			Short-Time Withstand	With Instantaneous Trip	Without Instantaneous Trip
600 (635)	WPS-08	800	30	30	30
	WPH-08	800	42	42	42
	WPX-08	800	50	50	50
	WPS-16	1600	42	42	42
	WPH-16	1600	65	65	65
	WPS-20	2000	65	65	65
	WPS-32	3200	65	65	65
480 (508)	WPH-32	3200	85	85	85
	WPS-40	4000	85	85	85
	WPS-08	800	30	30	30
	WPH-08	800	42	42	42
	WPX-08	800	65	65	65
	WPS-16	1600	50	50	50
	WPH-16	1600	65	65	65
240 (254)	WPS-20	2000	65	65	65
	WPS-32	3200	65	65	65
	WPH-32	3200	85	85	85
	WPS-40	4000	85	85	85
	WPS-08	800	30	42	30
	WPH-08	800	42	50	42
	WPX-08	800	65	65	65

See DET-167, WavePro™ Low Voltage Power Circuit Breaker Application Guide, for additional breaker information.

Table 3.0 Section Sizing

Breaker type	Device combination or bus rating	Frame size (amperes)	Breaker compartment vertical height inches	Minimum section width ¹ (inches)	Minimum equipment depth [Front/rear compt] (inches)	Optional equipment depth (inches)
WPS-08 WPH-08 WPX-08		800	21	22	60 [30 / 30]	67
WPF-08					67 [37 / 30]	74
WPS-16		1600			60 [30 / 30]	67
WPH-16					60 [30 / 30]	67
WPF-16			67 [37 / 30]	74		
WPS-20		2000	56	30	60 [30 / 30]	67
WPS-20	with fuse roll-out				60 [30 / 30]	67
WPS-32		3200	35	30	60 [30 / 30]	67
WPH-32					60 [30 / 30]	67
WPS-40					4000	60 [30 / 30]

¹ Section width can be increased for additional cable / conduit space. 22" sections can be increased to 30" wide, 30" wide sections can be increased to 38" wide.

² Optional stack depth is to be determined by the deepest stack in lineup. A 74" deep frame is available if integrally fused breakers are in the lineup.

Table 4.0 Enclosure Weights

To calculate line-up weight:

- 1) Add the estimated finish weight to each section using Table 4.0
- 2) Add the weight to each circuit breaker and fuse roll-out using Table 5.0

Indoor Vertical section weights, Lb. [Kg]		
Stack width	# of breaker or fuse rollout compartments in vertical section	Net Weights Lb. [Kg]
22"	1	940 [426]
	2	1100 [499]
	3	1270 [576]
	4	1440 [653]
30"	1	1300 [590]
	2	1400 [635]
38"	1	1660 [753]
	2	1900 [862]
22" or 30" Aux Section		1170 [531]

Table 5.0 WavePro™ breaker and fuse roll-out weight

Device	Net weight, Lb. (kg)	
	Manual	Electrical
WPS / WPH / WPX -08	200 [91]	205 [93]
WPF-08	245 [112]	250 [114]
WPS / WPH-16	210 [96]	215 [98]
WPF-16	255 [116]	260 [118]
WPS-20	220 [100]	225 [102]
WPS / WPH-32	475 [216]	485 [221]
WPS-40	535 [243]	545 [248]
2000/3200A Fuse Roll-out (WP32FRE)	250 [114]	—
4000a Fuse Roll-out (WP40FRE)	400 [182]	—

Stack Codes Rules

Different stack codes are located on pages 20-28. These illustrations have been included to show the vertical (riser) bus and configuration of the compartments. The stack code is given a numeric, for example 701-1. The 700-899 stack codes have 84 inches of total height in which to assemble the combinations of auxiliary and breaker compartments. The 7" filler compartments for the 800-899 stack codes do **NOT** have to be specified because these compartments will be provided when needed.

There are three possible positions (Top, Middle, Bottom) for the main horizontal bus, and the main bus position is designated by horizontal lines labeled T (top), M (middle) or B (bottom). The vertical lines extending from one compartment to another designate the vertical (riser) bus. The compartment height, for example 21 or 42, is shown in the bottom right-hand side of each compartment. The ampere ratings shown beside each breaker symbol indicates the range of circuit breaker frame sizes that are allowed in the compartment. If the compartment is not designated for a circuit breaker, the compartment will be an auxiliary compartment.

1. Any breaker compartment shown on the stack drawings can be made blank to provide additional space for mounting protection, instrumentation, and control devices.
2. Any blank compartment greater than 7 inches high can be used for instrumentation (except vent compartments).
3. 3200A and 4000A fuse roll-outs are the same size as their respective breakers, therefore any compartment shown with a 3200A or 4000 A breaker will also accommodate a fuse roll-out and vice versa.
4. Additional cable and conduit space is available by making breaker sections wider (22 inches wide to 30 inches wide, or 30 inches wide to 38 inches wide) or by increasing rear depth by 7 inches for a maximum depth of 74".

Vertical (riser) Bus Ampacity for Stack Codes

Each stack code has an amp range for the vertical (riser) bus rating. The amp ratings of the circuit breakers in a stack determine the vertical bus rating. See Table 6.0 to determine the rating of the vertical (riser) bus.

Table 6.0

Stack Code	Vertical Bus	Amps Stack Code	Vertical Bus Amps
701	1600-2000A*	801	3200-4000A
702	1600-2000A*	802	3200-4000A
703	1600-2000A*	803	3200-4000A
704	1600-4000A	804	3200-4000A
705	1600-4000A	805	3200-4000A
706	1600-4000A	810	3200-4000A
711	1600-2000A*	811	3200-4000A
712	1600-4000A	812	3200-4000A
713	1600-2000A*	813	3200-4000A
714	1600-4000A	815	3200-4000A
715	1600-2000A*	816	3200-4000A
721	1600-2000A*	826	3200-4000A
722	1600-2000A*	831	2000A
723	1600-4000A	832	2000A
724	1600-2000A*	833	2000A
741	1600-4000A	834	2000A
742	1600-2000A*		
743	1600-2000A		
751	No Vertical Bus		

*only available @ 2000A when breaker is 2000A

Appendix A – Stack Codes

Stack Code Information

Device Unit Heights:

21 inches:

Circuit breakers up to 2000A (WP –08, WP –16, WP-20)

35 inches:

Circuit breakers and fuse roll outs for 3200A or 4000A (WP –32, WP –40, WP32FRE, WP40FRE)

Codes 601, 602

Transformer Transition Stacks

Code 601 is for a left transformer transition stack and code 602 is for a right transformer transition stack.

- Stack width must be 22".
- Vertical (Riser) bus is not available.
- Power connector selections cannot be made.
- Auxiliary compartments are 28", 42" or 56" high.
- Breaker compartments are not available.
- Transformer flange end cover will not be furnished.

Code 603

Blank Stack

Code 603 is for a stack designed with no riser or circuit breakers.

- Riser and neutral bus are not available.
- Ground bus can be provided.
- Wire trough not available.
- Power connector selections cannot be made.
- Auxiliary compartments are 42" high.
- Stack width can be 22", 30" or 38" wide.
- Breaker compartments are not available.

Codes 701 - 751

For Small Frame Circuit Breakers – 800A to 2000A

These stacks are limited to small frame breakers (WPS-08, WPH-08, WPX-08, WPF-08, WPS-16, WPH-16, WPF-16 and WPS-20)

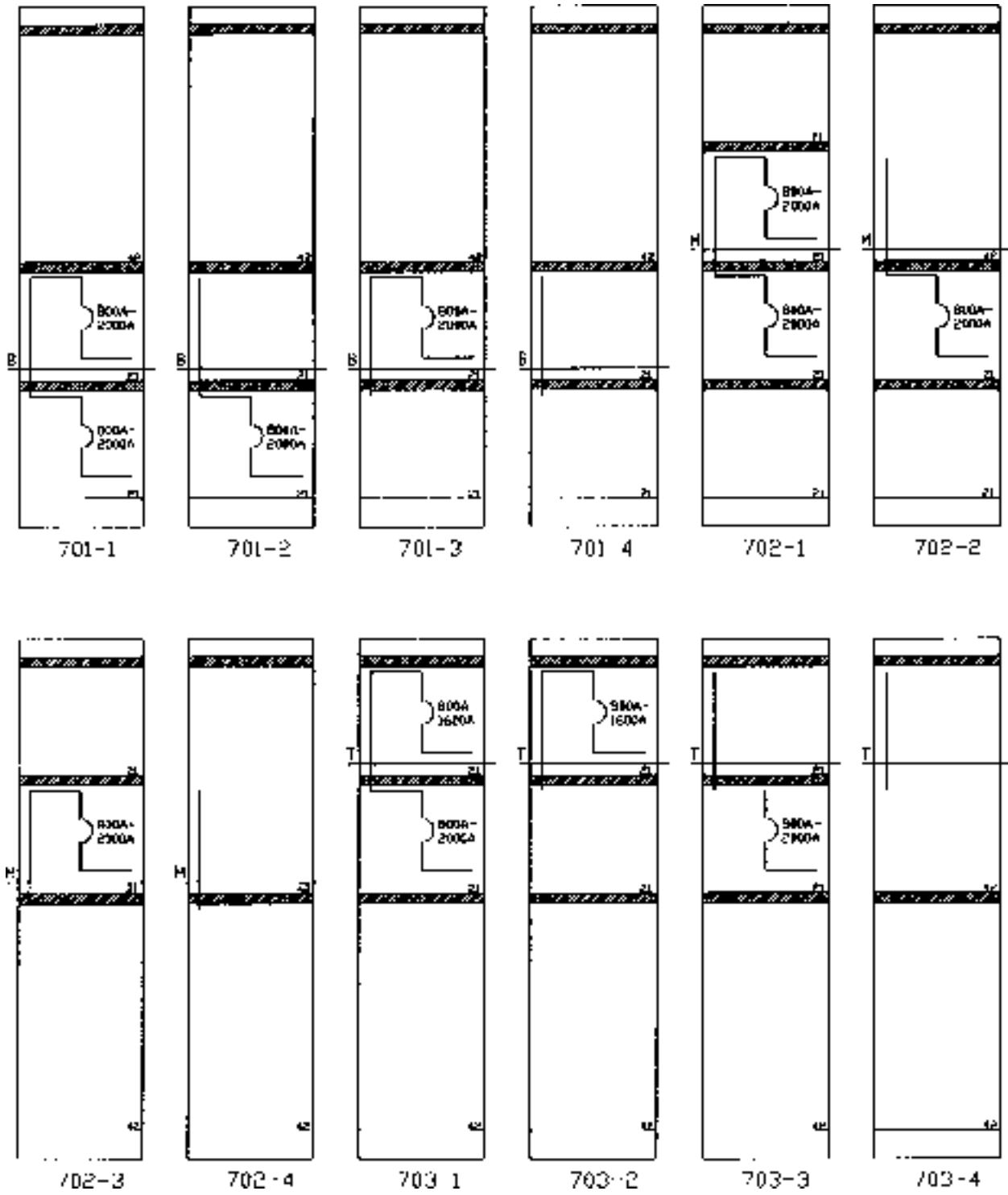
- Breaker compartment must be 21" high
- Auxiliary compartments are limited to 21" and 42" high
- Some stacks can have an entire stack of auxiliary compartments by specifying auxiliary compartments in place of breaker compartments.
- Unit width can be 22", 30" or 38". When a breaker is in a 38" wide stack, the stack will have a 4" spacer on each side.

Codes 801 – 834

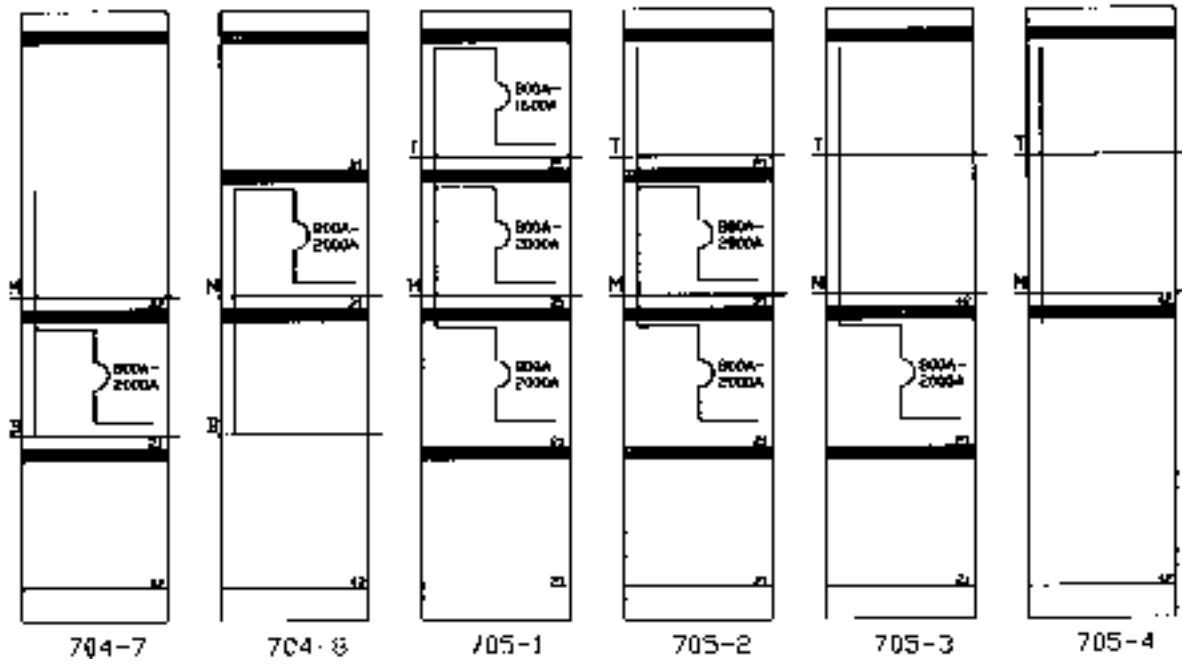
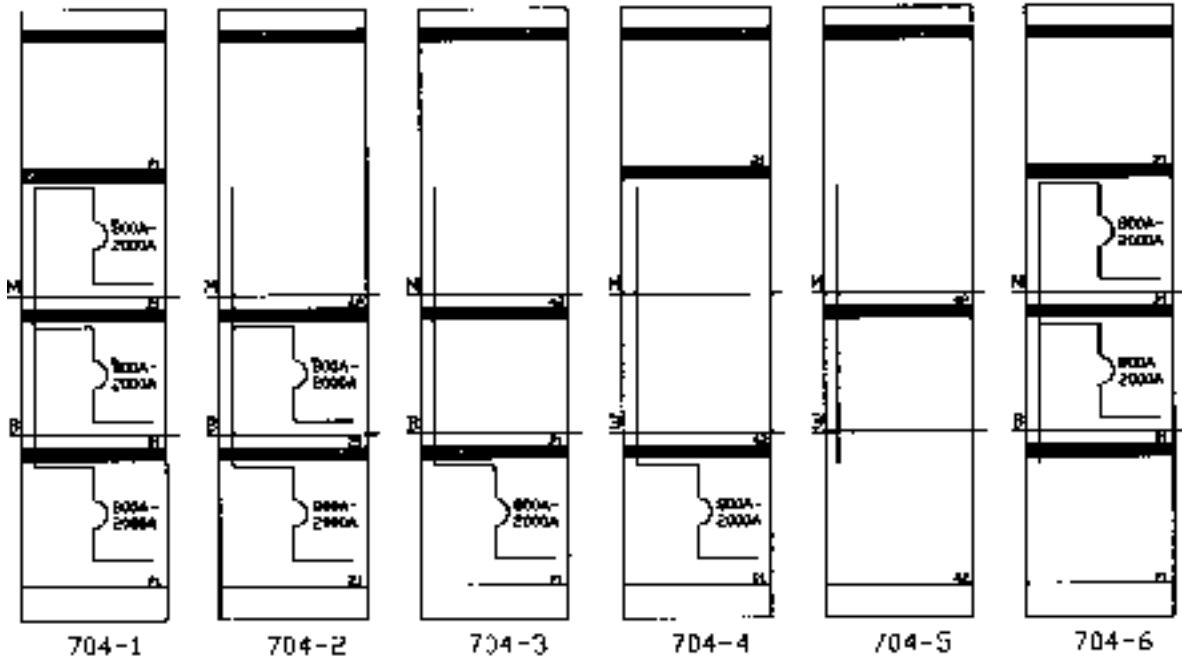
For Large and Small Frame Circuit Breakers with Fuse Roll-Outs

- Stack width must be 30" or 38" wide.
- Large frame breaker units are 35" high and are sometimes coupled with a 7" filler causing them to occupy the bottom 42" of the 84" height.
- **If there is a 7" filler section in the stack it will be selected automatically and does not need to be ordered.**

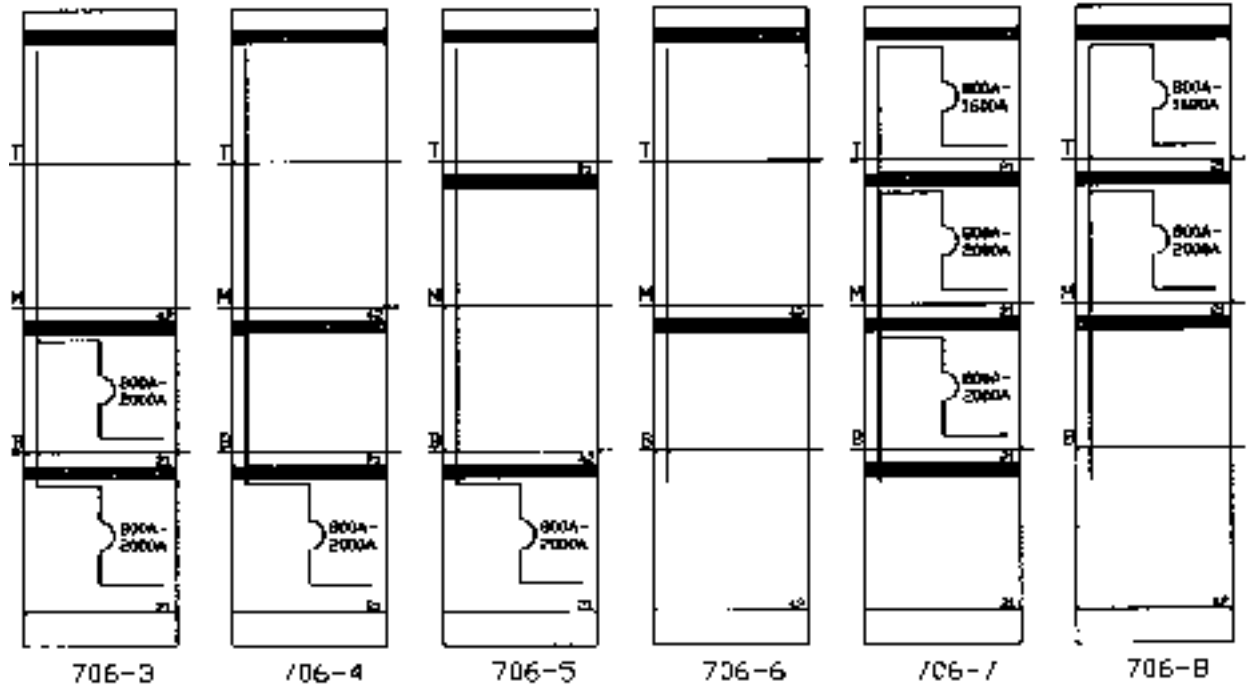
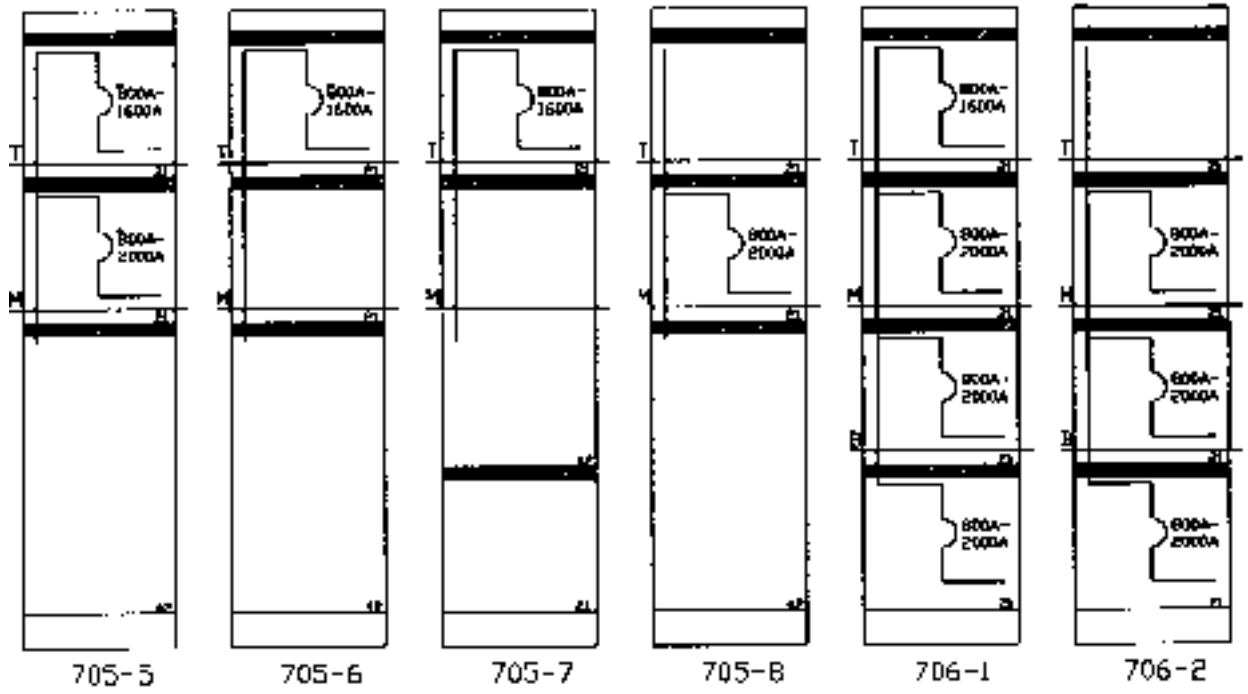
Stack Codes



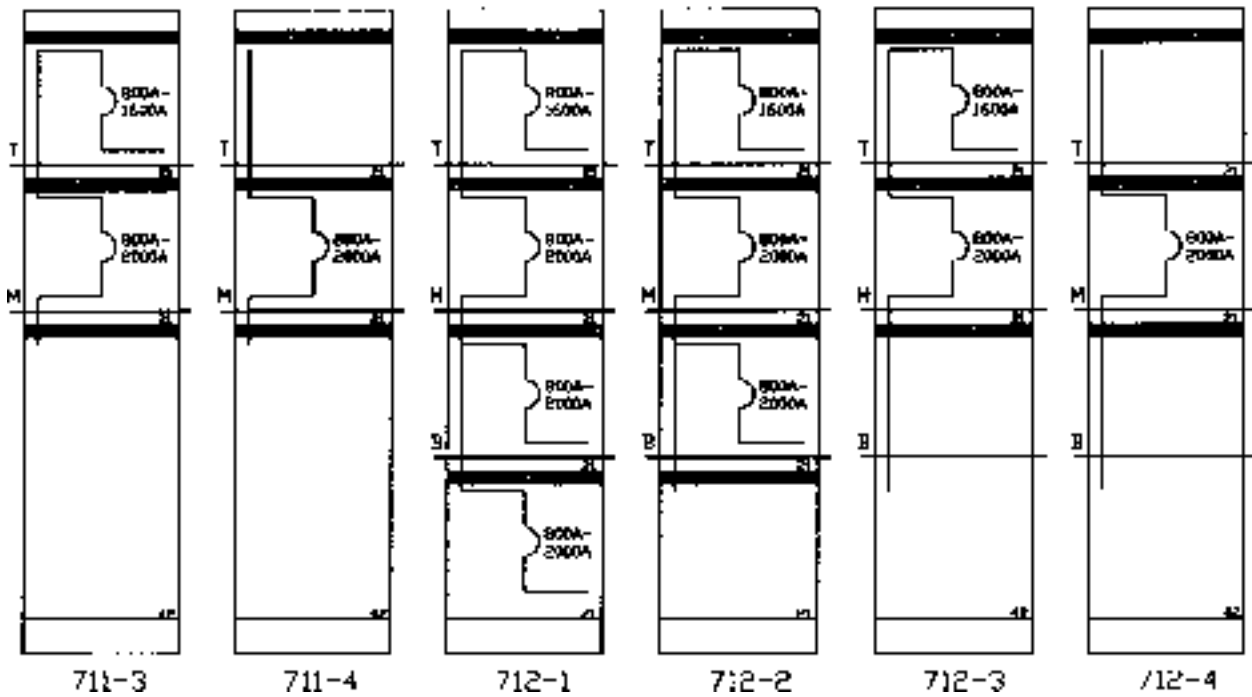
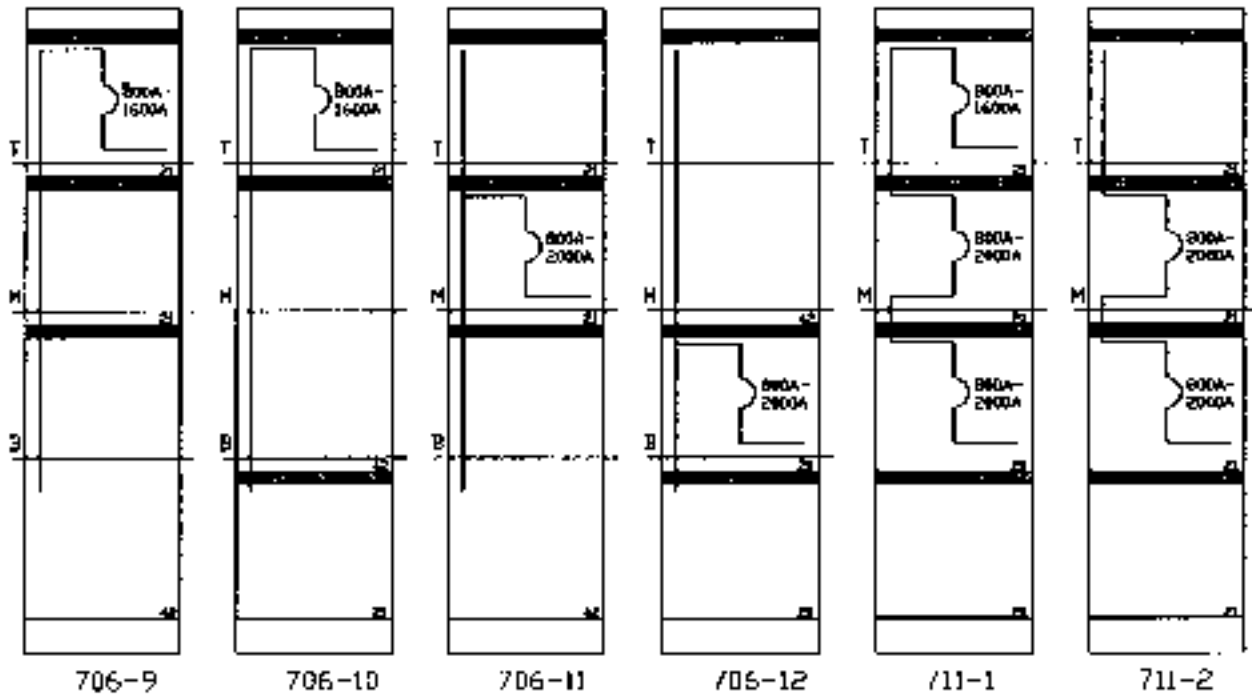
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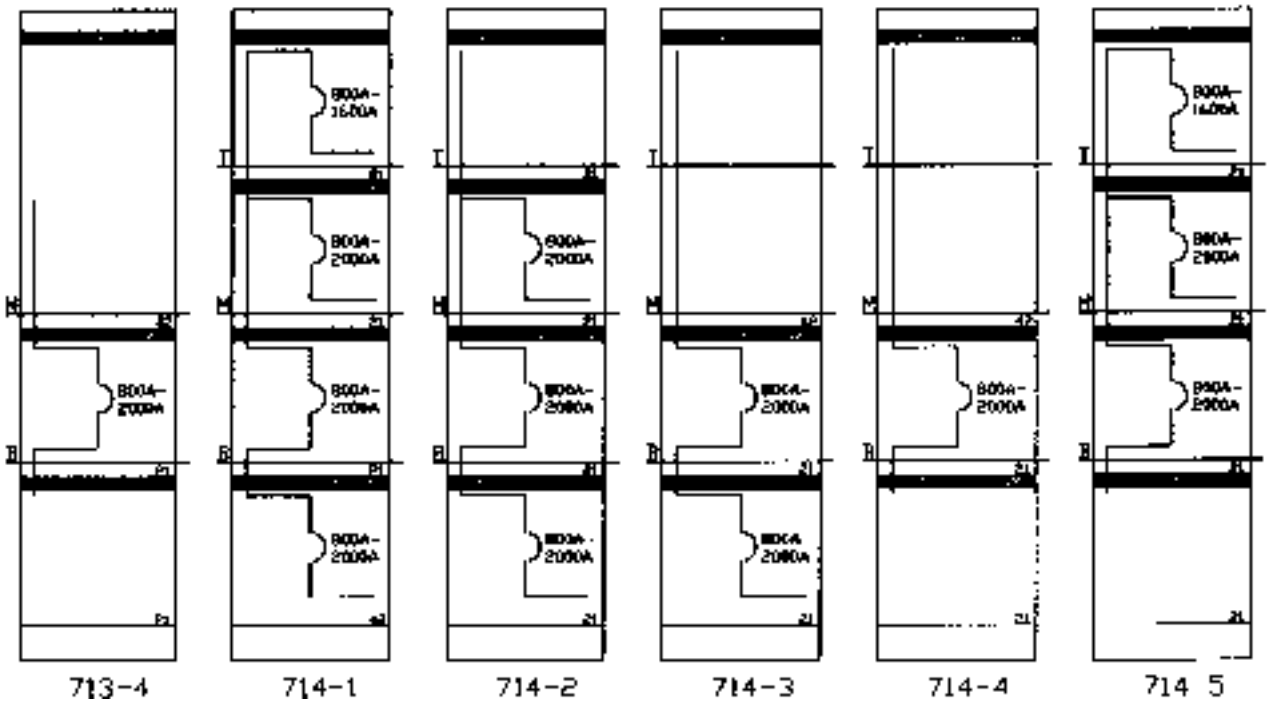
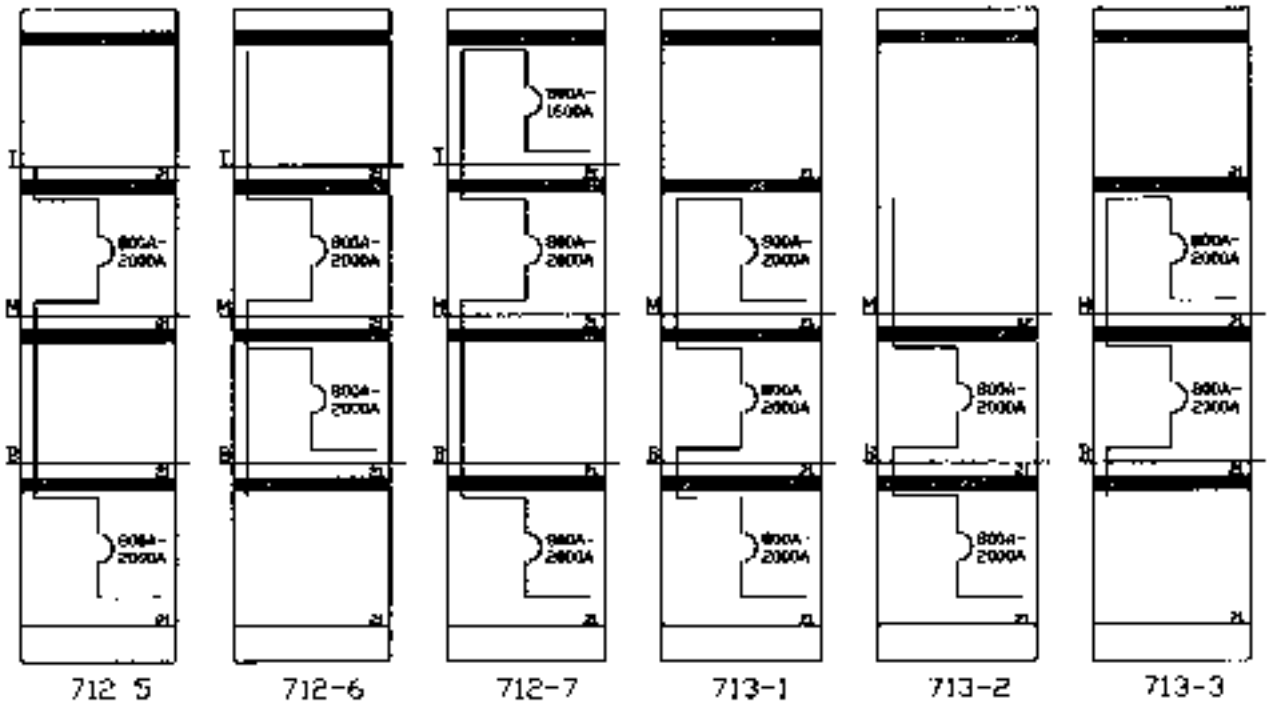
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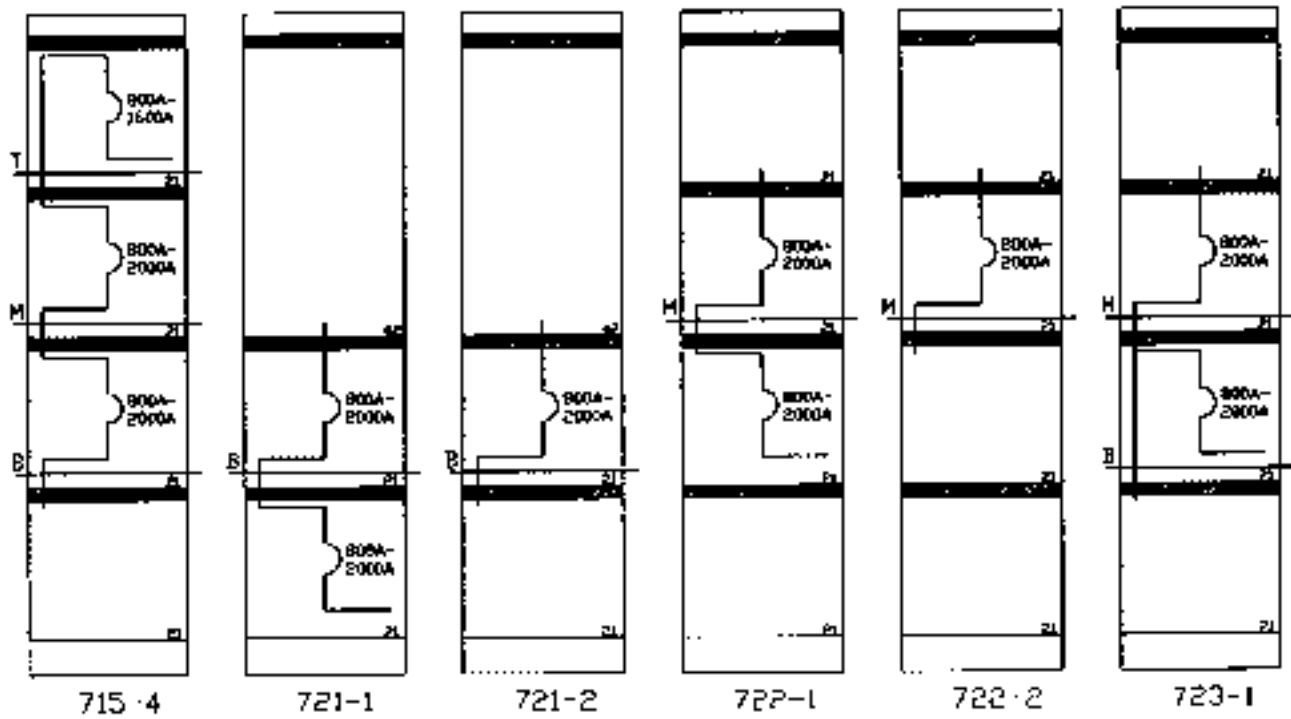
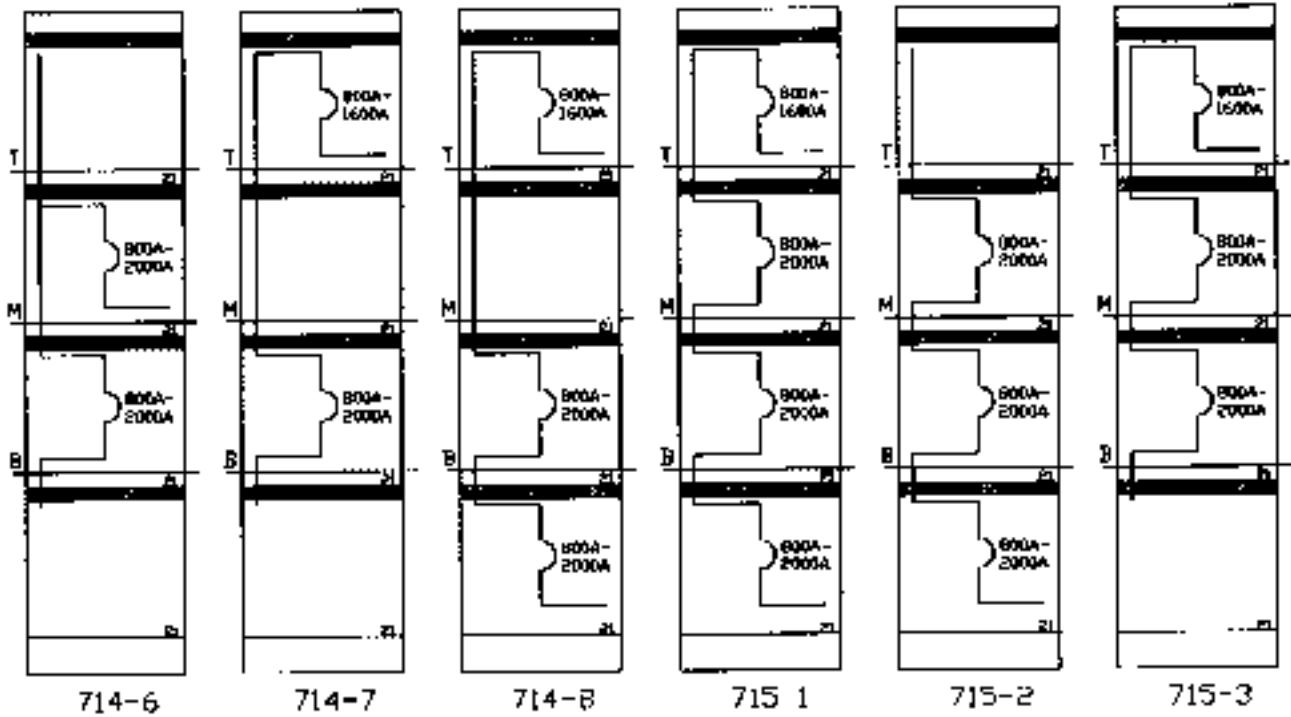
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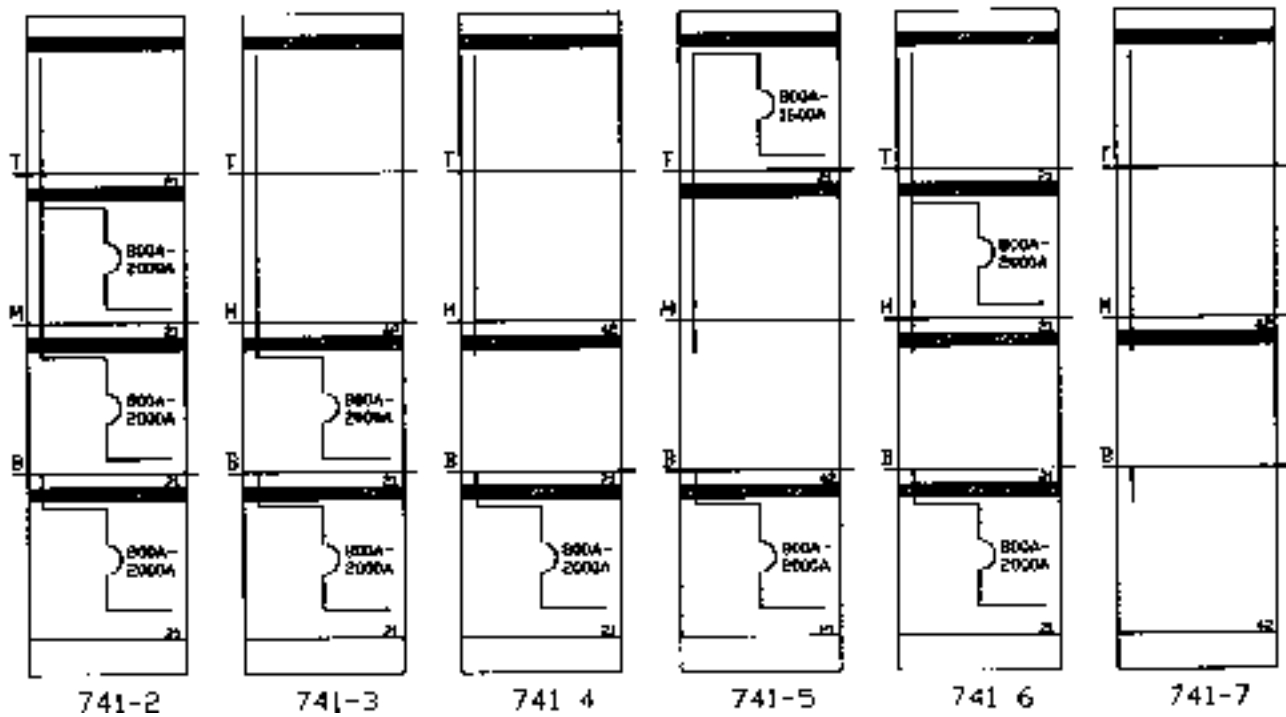
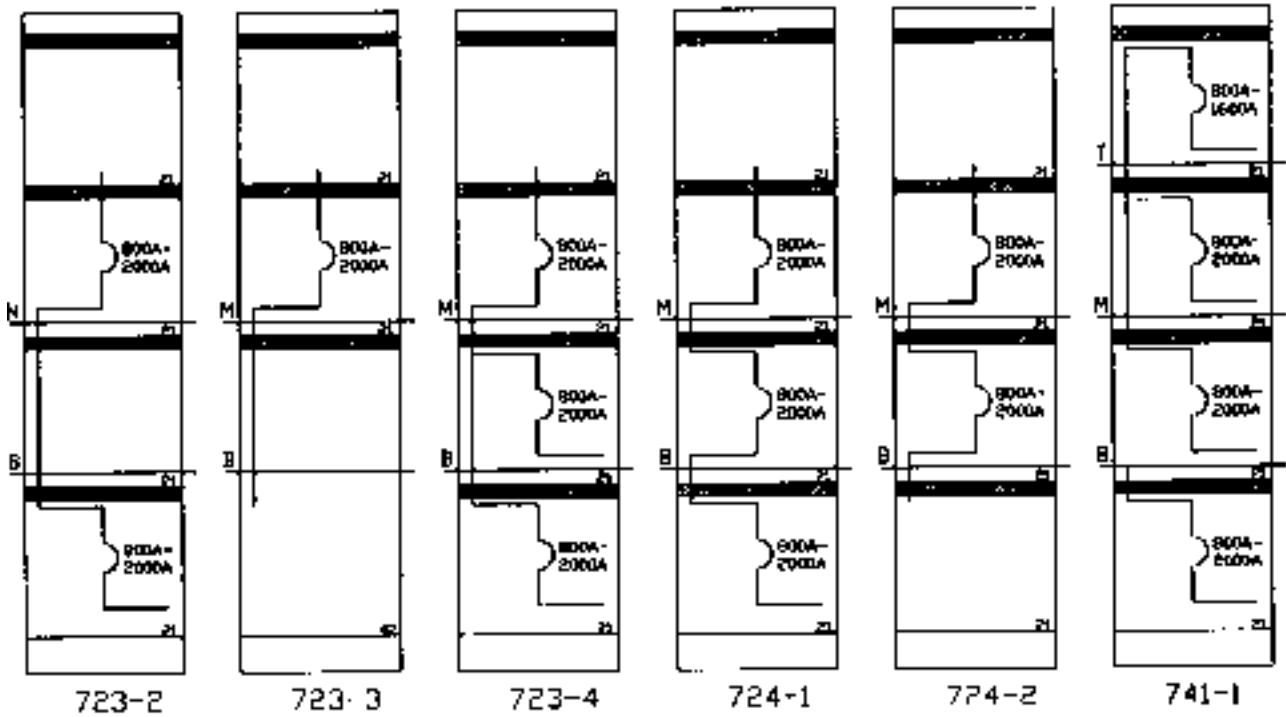
Stack Codes



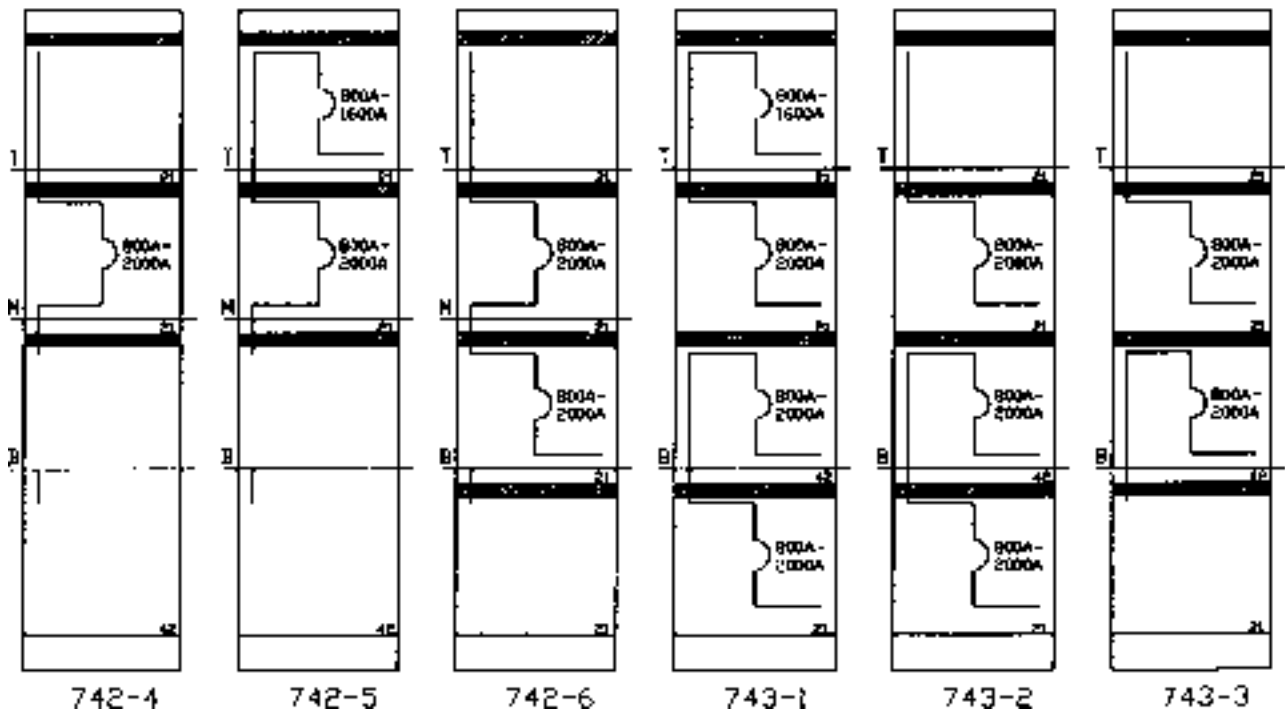
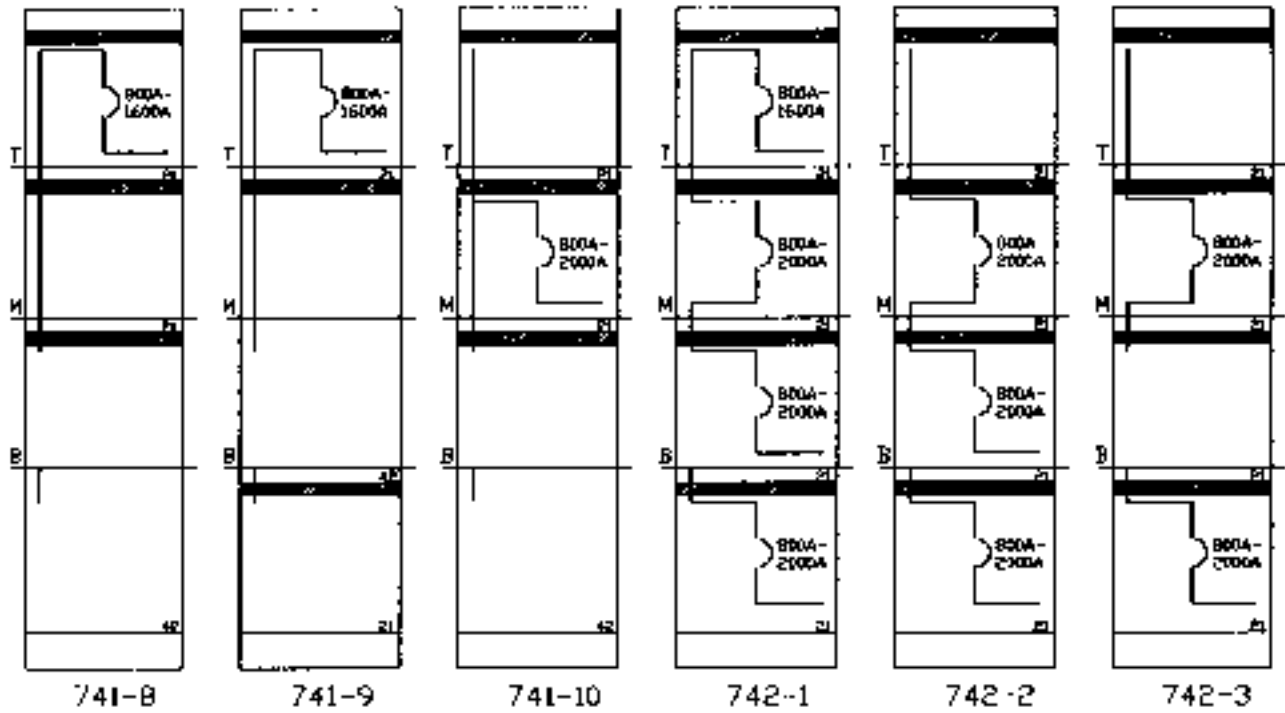
Stack Codes



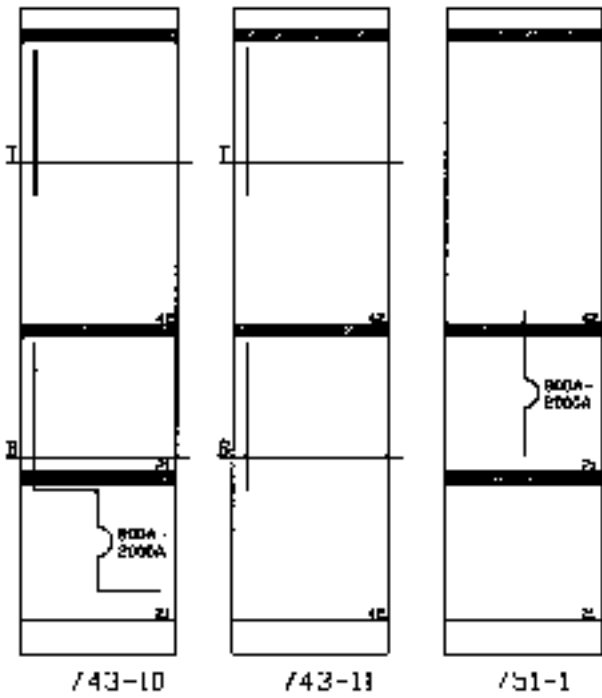
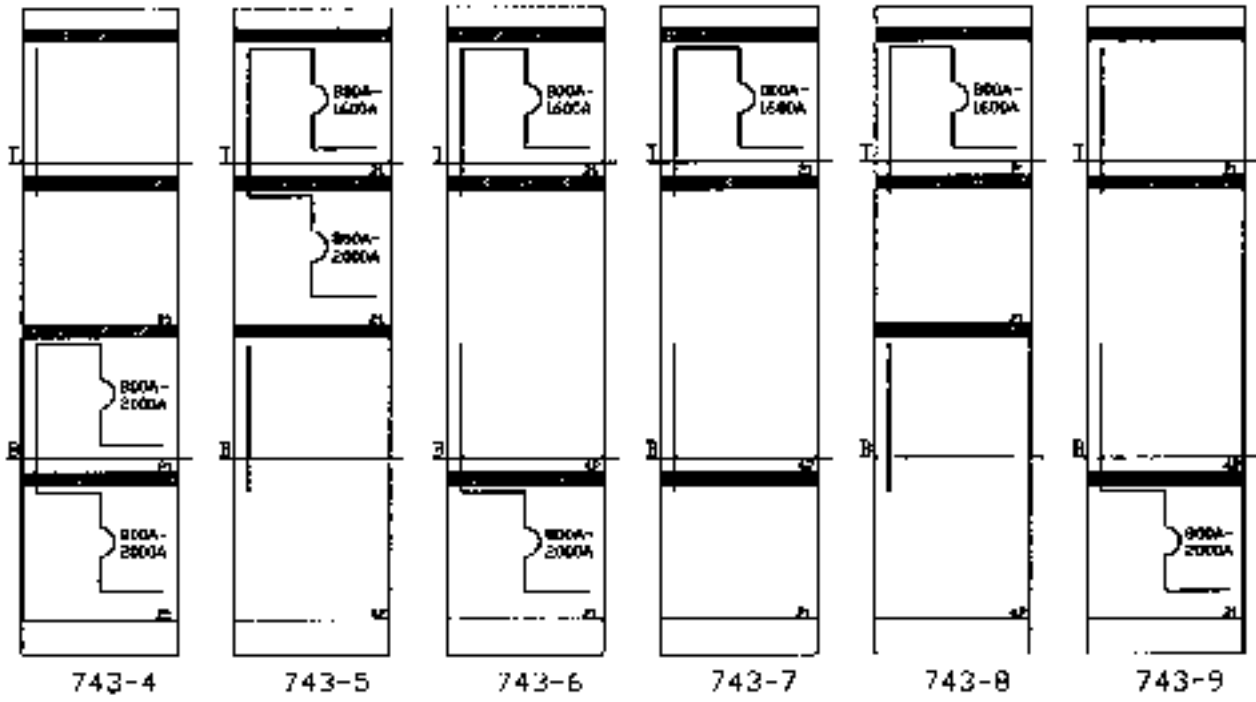
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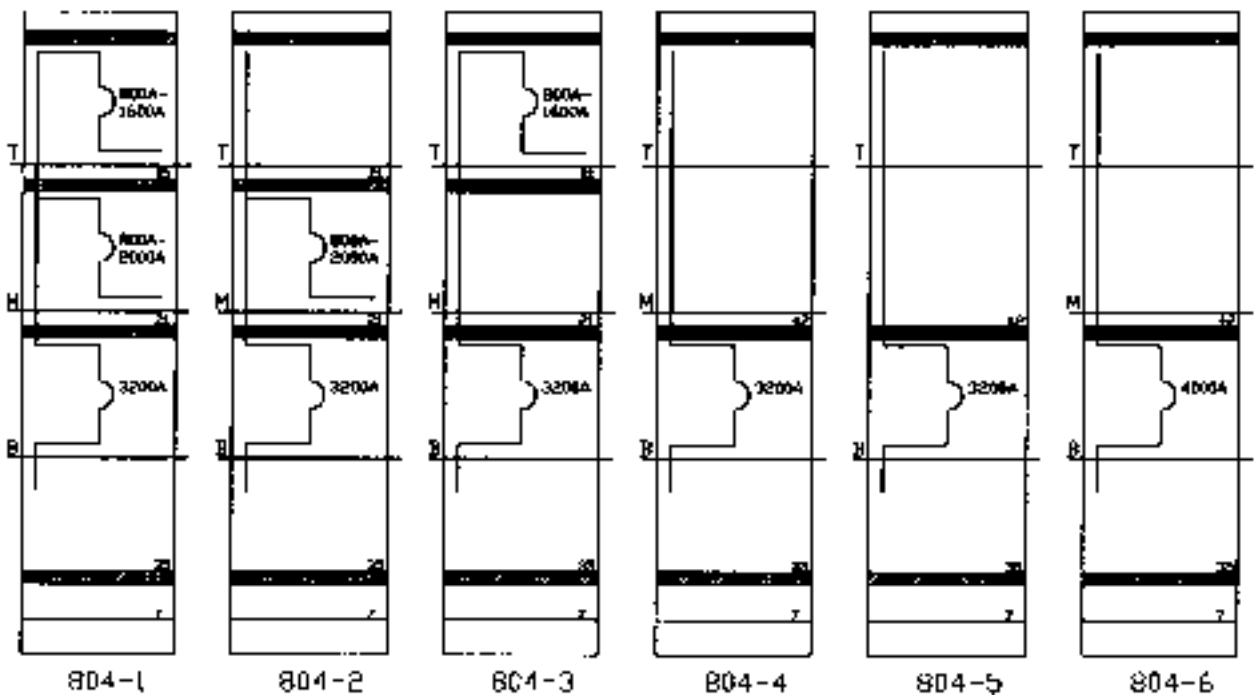
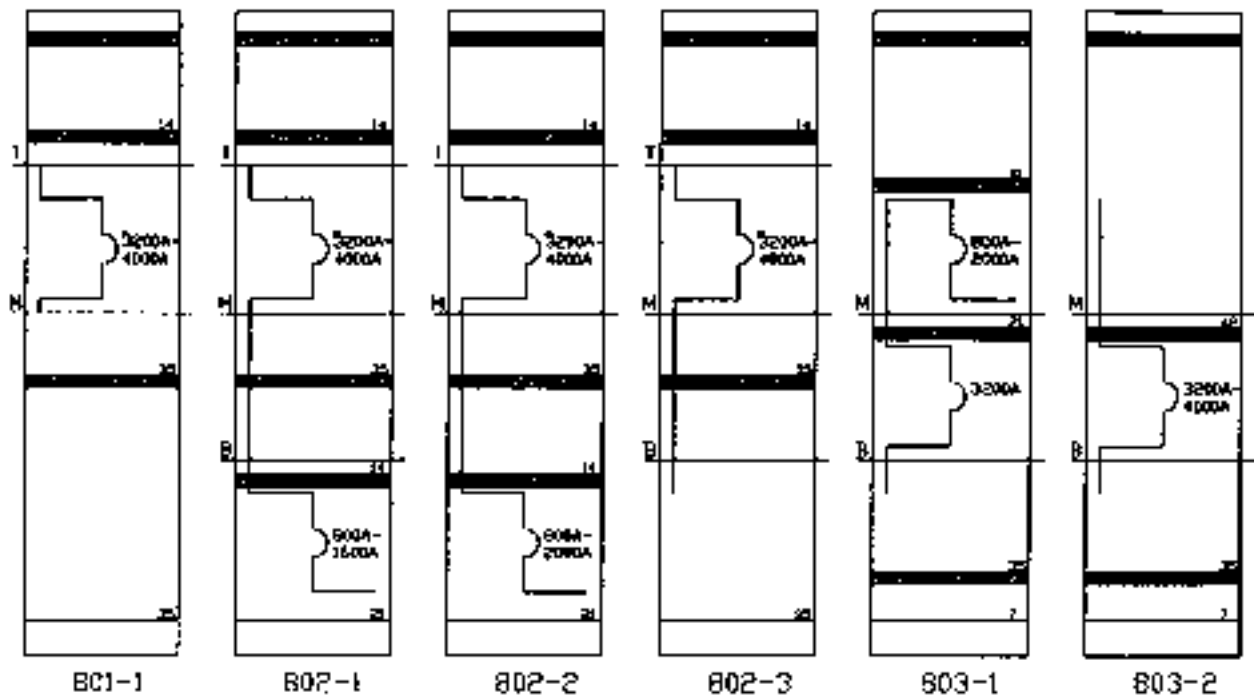
Stack Codes



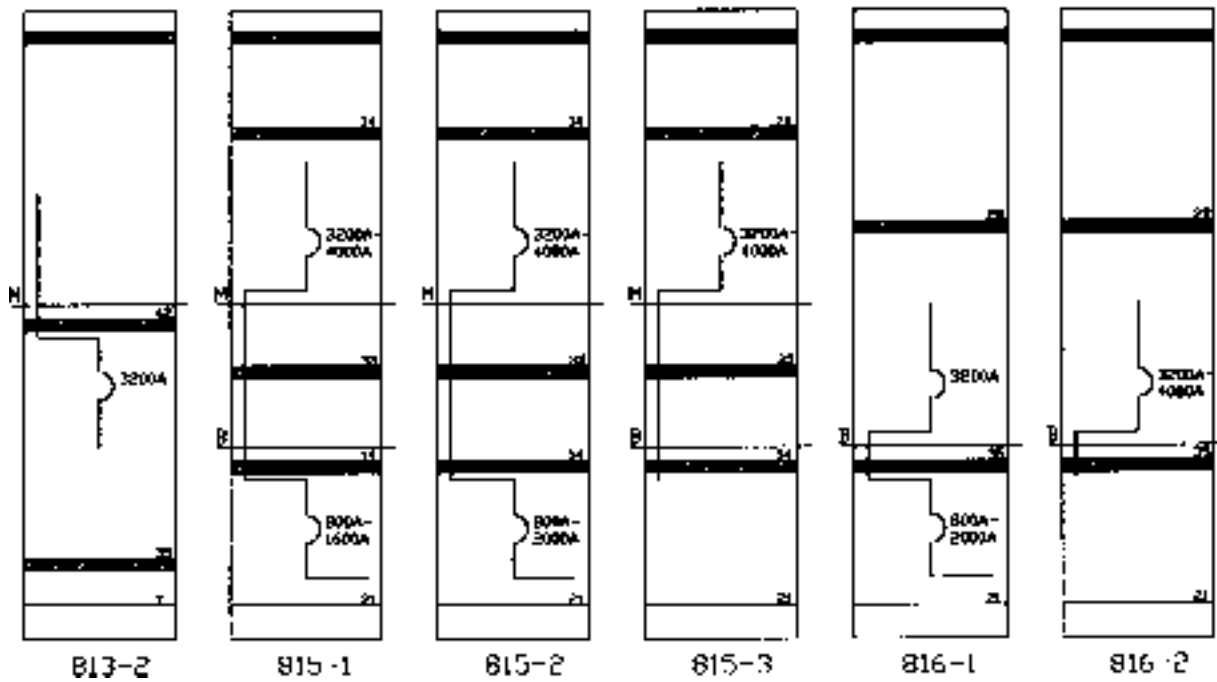
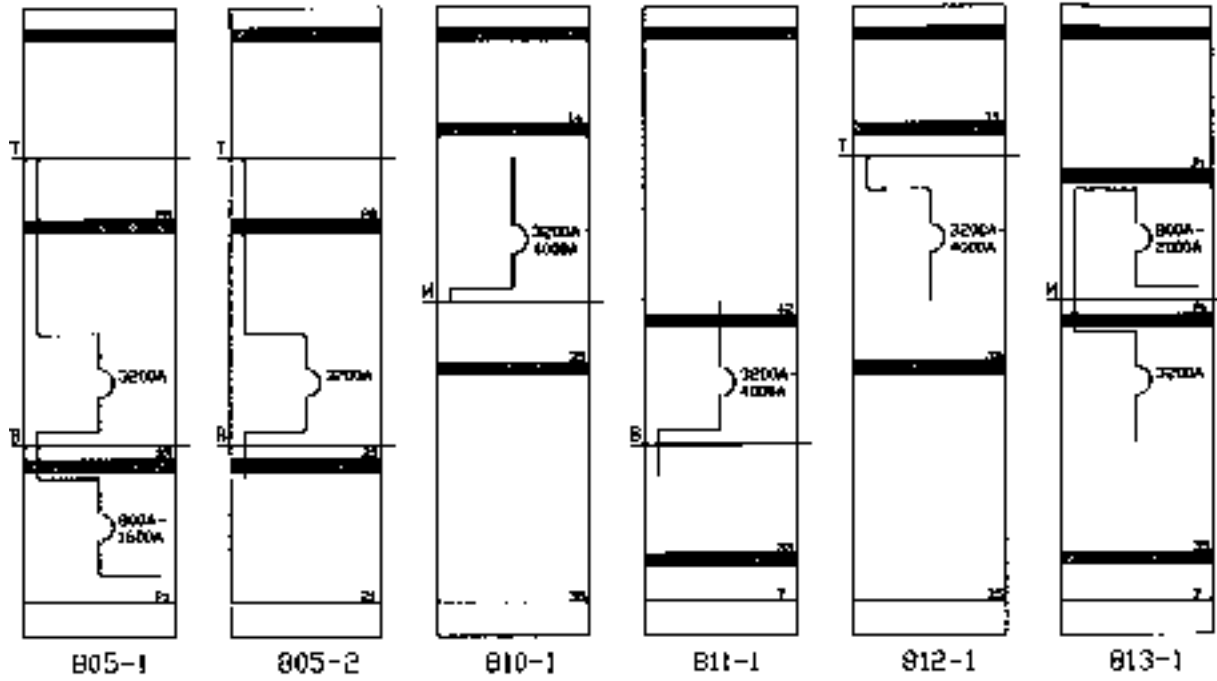
Stack Codes



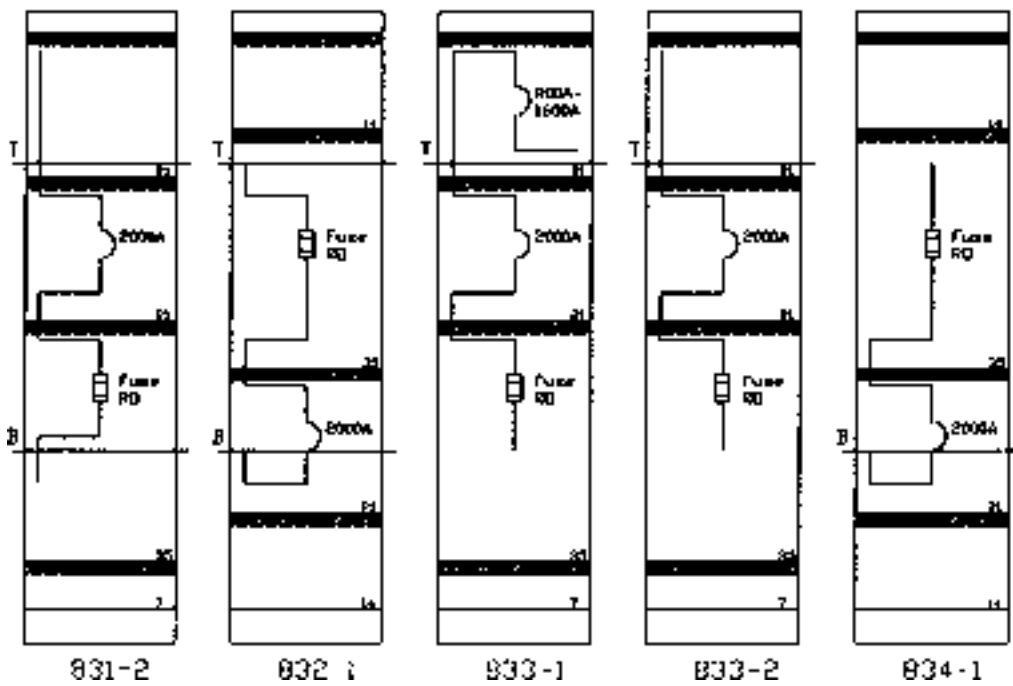
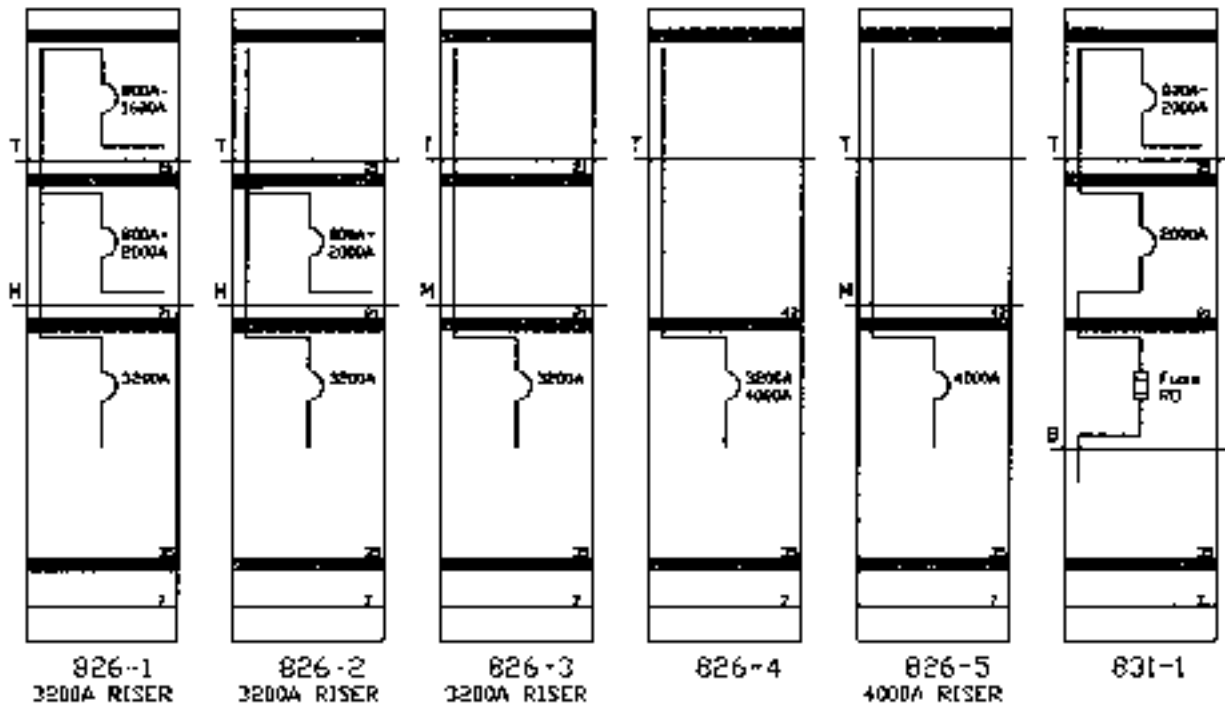
Stack Codes



Stack Codes



Stack Codes



Stack Codes



601-1
22" Wide

Transformer
on left



601-2
22" Wide

Transformer
on left



602-1
22" Wide

Transformer
on right



602-2
22" Wide

Transformer
on right



603-1
22, 30, 38" Wide

Blank

Notes



GE Industrial Systems

DET-290 1200

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