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Low Voltage Switchgear

GE low-voltage switchgear is heavy-duty equipment built to ANSI Standards. GE switchgear is designed to have more margin within its ratings and to provide maximum continuity of service for those applications subject to severe duty such as repetitive switching encountered with motor starting, power factor correction, demand control, and load shedding, etc. A major factor contributing to this extended continuity of service is the availability of renewal parts complete with detailed maintenance instructions and original equipment documentation. From a coordination standpoint, Air circuit breakers can provide full selectivity with each other and with other protective devices. The bus is thermally rated; i.e. based upon temperature rise, as opposed to switchboards where the bus may be sized on a current density basis.

Switchgear also houses instrumentation and other auxiliary circuit protective devices. It is available in single or multiple source configurations and applied as a power distribution unit or as part of a unit substation in indoor or outdoor construction.

Key Switchgear Features

- Full tin-plated copper bus
- Optional insulated/isolated bus bar system—protects against accidental contact by people or foreign objects and inhibits the spread of any arcing faults.
- Breaker compartment doors without ventilating slots
- True closed-door draw-out—added protection for operator
- Instrument panel for breaker control circuitry—permits several maintenance functions without subjecting operators to energized primary circuits of an open breaker compartment door
- Optional shutters over primary disconnects—provides personnel protection from energized disconnects
- Modular construction—for greater installation flexibility

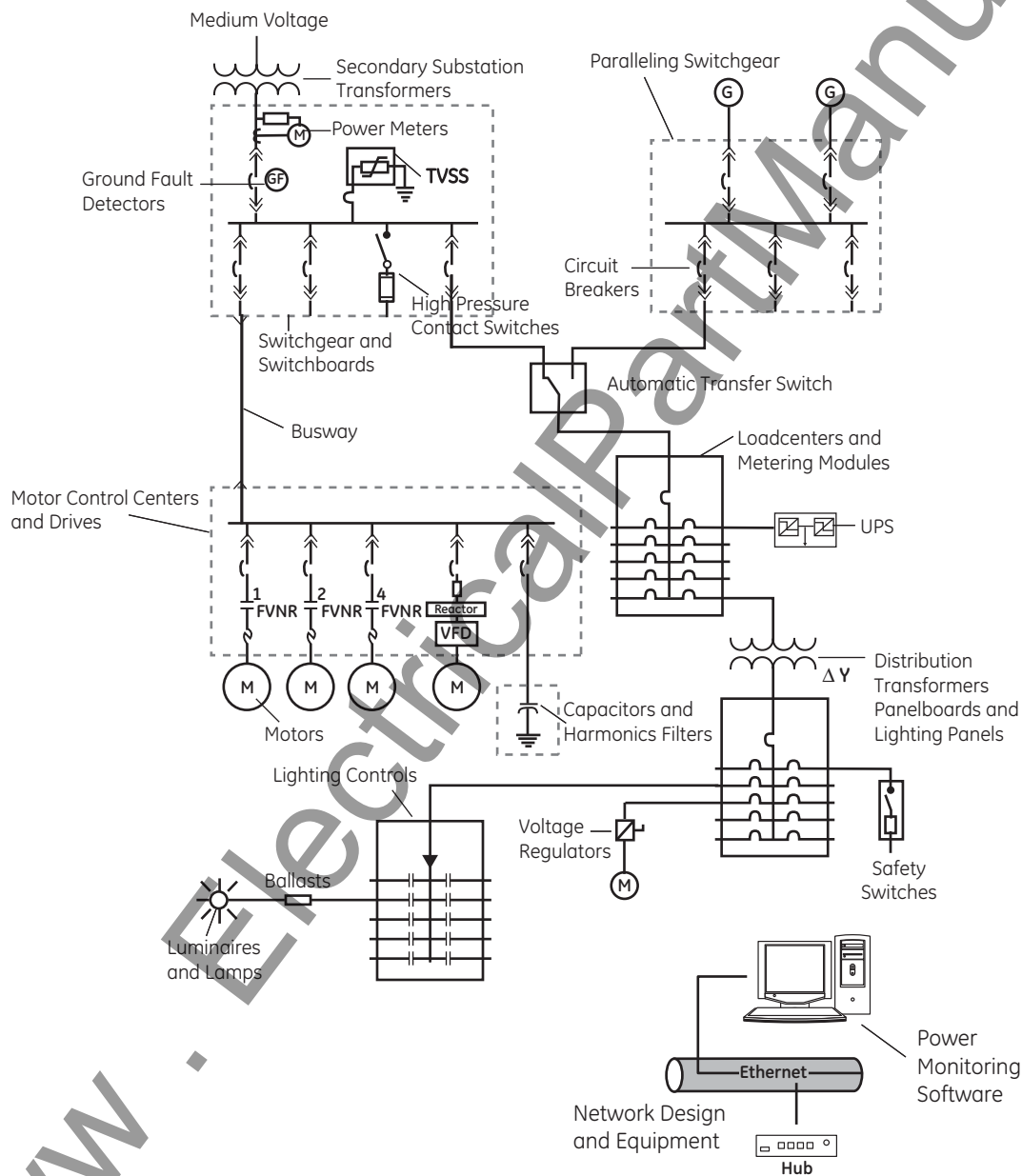


Publications and Reference: See Section 22 for a complete list of additional product-related publications

CSI Specifications

- Low Voltage Metal Enclosed
- 16400 Low Voltage Switchgear
- 26 23 00 Low Voltage Switchgear

Low Voltage Switchgear One-Line



Switchgear — Low Voltage

AKD-10 and AKD-20

Section 13

For pricing and application assistance, contact your local GE sales office.

GE type AKD-10 low-voltage switchgear consists of WavePro power circuit breakers combined with the field-proven switchgear design features needed to meet today's exacting requirements for safety, reliability, maintainability, flexibility, convenience, economy and continuity of service. Integral to the WavePro low-voltage power circuit breaker is the Power+, enhanced MicroVersaTrip® Plus or MicroVersaTrip® PM solid-state, digital trip unit. The optional POWER LEADER® Power Management System is available for applications requiring a completely integrated system including overcurrent protection, protective relaying and system monitoring. AKD-10 switchgear and WavePro circuit breakers meet or exceed industry standards including UL 1066 and 1558; CSA C22.2; NEMA SG-3 and SG-5; ANSI-C37.13 and C37.20.1.

WavePro and EntelliGuard® Low Voltage Power Circuit Breakers

- Time proven—for trouble free performance
- Five cycle stored energy closing
- 6 frame sizes 800-5000 amps—for application flexibility
- Interrupting ratings: 30kA-200kA
- Fully maintainable—to assure operational readiness
- MicroVersaTrip® solid-state protection trip unit with LCD—increased flexibility and accuracy with true rms sensing for standard (s) and optional (o) time-current adjustments:
 - Adjustable current setting (s)
 - Adjustable long-time delay (s)
 - Phase selectable digital rms ammeter (s)
 - Adjustable instantaneous pick-up (s)
 - Adjustable ground fault pick-up and adjustable ground fault delay with selectable I²t curve (o)
 - Adjustable short-time pick-up and adjustable short-time delay with selectable I²t curve (o)
- Zone selective interlocking—for improved selectivity on both short-time and ground-fault or ground-fault only (o)
- Defeatable GF (o)
- Switchable INST/ST and GF (o)
- Integrally fused breakers—for high fault-current applications
- Rating plugs for added flexibility
- Power+ Trip unit with true rms sensing and rotary selection of pick-up and delay settings:
 - Adjustable long-time pick-up and delay (s)
 - Adjustable instantaneous pick-up (s)
 - Adjustable short-time pick-up and delay with I²t in or out (o)
 - Adjustable ground fault pick-up and delay with I²t in or out (o)
 - Defeatable ground fault (o)
 - Target module with LED trip indicators (o)
- Ground fault function contained within the rating plug



POWER LEADER® Power Management System

- A MicroVersaTrip® PM trip unit on each breaker for overload, short-circuit and ground fault protection, with true rms sensing and an LCD for local metering.
- Trip unit mounted in the breaker escutcheon, providing convenient "out front" trip unit information on the LCD.
- A Modbus Monitor mounted on the switchgear with a display screen and keypad to display power systems data.
- A shielded, twisted pair communication bus that carries information between the POWER LEADER® Monitor and breakers.
- A port for remote communication. All information can be transmitted to a host computer for metering, energy monitoring, load analysis and other functions using POWER LEADER® Power Management Control System software.

AKD-20 Low-Voltage Switchgear — For Release 4Q 2008

For pricing and application assistance, contact your local GE sales office.

GE type AKD-20 low-voltage switchgear consists of EntelliGuard® G power circuit breakers and state-of-the-art EntelliGuard® TU digital trip unit that together provide enhanced protection, endurance and safety. The key features of the AKD-20 are the tried and true construction of the AKD family heritage, common transitions to older versions of AKD equipment, true closed door racking with remote racking devices, non vented circuit breaker panels, insulated and isolated bus construction and more. The product is fully rated to UL 1066 and 1558; CSA C22.2; NEMA SG-3 and SG-5; ANSI C37.13 and C37.20.1; Seismic ratings to IBC-2003 and IEEE-693-1997.

Instructions/Maintenance

Low Voltage Switchgear	
AKD-10 Application Guide	DET-196
WAVEPRO Low Voltage Power Circuit Breaker	
Application Guide	DET-167
User Publication Summary	DEE-194



Publications and Reference: See Section 22 for a complete list of additional product-related publications

NOTES:

Lined area for notes.





Entellisys® 4.0 is the sensible choice to save you money over the lifetime of your system.

Entellisys® Low-Voltage Switchgear is the first system to provide the power of knowledge about the entire switchgear lineup.

This power can be used:

- by the engineer to improve protection,
- by the installing contractor to shorten installation time,
- by the operator to stay out of the arc flash zone,
- by the maintenance personnel to save maintenance time and money, and
- by the owner to adapt the equipment to the dynamic needs of the facility.

Entellisys® helps to reduce costs, shorten schedules, and increase reliability throughout the process of designing, installing, maintaining, and owning your low-voltage power distribution switchgear.

Entellisys® is becoming the preferred solution in critical applications such as data centers, hospitals, petro/chem facilities and airports around the world. State-of-the-art protection, monitoring and control make it the intelligent choice to provide reliable power distribution now and in the future.

Contact your account manager and request a financial savings report, customized for your application.

Layout and sizing14-2



Publications and Reference: See Section 22 for a complete list of additional product-related publications

Entellisys® indoor low voltage switchgear height 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. Refer to tables below for properly sizing Entellisys® line-ups. The depth of the entire line-up is determined by the deepest device in the line-up. For example, a line-up with an EGF-20 breaker with a fuse roll-out (depth – 60") and EGF-08 breakers (depth – 67") would be a minimum of 67" deep – the EGF-08 being the deepest device. Also refer to the section arrangements on the following pages for available breaker stacking configurations.

Switchgear Layout Considerations

- Sections can be bussed together if there are matching bus levels in the adjacent sections. Refer to the sample Entellisys® line-up.
- Any breaker compartment shown on the section drawings can be made blank to provide additional space for mounting Entellisys® devices.
- The ampere ratings shown beside each breaker symbol indicate the range of frame sizes that are allowed in the particular section arrangement. This takes into consideration the temperature rise in the section due to breaker loading. Refer to ANSI C37.20.1-2002 para 8.4.2.3 for cumulative circuit breaker loading guidelines.
- Devices cannot be mounted on breaker cubicle doors.
- 3200A, 4000A, and 5000A fuse roll-outs are the same size as their respective breakers, therefore any compartment shown with a 3200, 4000, or 5000 amp breaker will also accommodate a fuse roll-out and vice versa.

- Front busway connections to a circuit breaker require a blank compartment above the breaker for busway above or a blank compartment below the breaker for busway below.
- Use of fused breakers does not necessarily require 200kA bus bracing. Bus bracing should be based on the available short circuit current on the switchgear bus.
- 200kA bus bracing can limit feeder breaker placement. 200kA bus bracing does not allow adjacent 22 inch wide sections.
- Factory review of layout is required for bus bracing greater than 100kA
- Some cable entrance designs are not suitable for service entrance. Consult the factory if service entrance is required for the incoming cable section.
- Additional cable and conduit space is available by making breaker sections wider (22 inch wide to 30 inch wide or 30 inch wide to 38 inch wide) or by making the line-up deeper (7 or 14 inches). Refer to the tables below.

Indoor Enclosure Depth Options

Available Depth Options						
Front compartment	30"			37"		
Rear compartment (Std depth or 7" or 14" rear extension)	30" (std)	37" (7" ext)	44" (14" ext)	30" (std)	37" (7" ext)	44" (14" ext)
Total depth	60"	67"	74"	67"	74"	81"

Breaker Type	Device Combination or Bus Rating	Frame Size (Amperes)	Breaker Cubicle Vertical Height (Inches)	Minimum Section Width ³ (Inches)	Minimum Equipment Depth [Front/Rear Comp] (Inches)	Optional Equipment Depth (Inches)
EGS-08		800	21	22	60 [30/30]	67/74
EGH-08		800	21	22	60 [30/30]	67/74
EGX-08		800	21	22	60 [30/30]	67/74
EGF-08		800	21	22	67 [37/30]	74/81**
EGS-16		1600	21	22	60 [30/30]	67/74
EGH-16		1600	21	22	60 [30/30]	67/74
EGF-16		1600	21	22	67 [37/30]	74/81**
EGS-20		2000	21	22	60 [30/30]	67/74
	EGF-20 with fuse roll-out	2000	56	30	60 [30/30]	67/74/81 ²
EGS-32		3200	35	30	60 [30/30]	67/74/81 ²
EGH-32		3200	35	30	60 [30/30]	67/74/81 ²
EGX-32		3200	35	30	60 [30/30]	67/74/81 ²
	EGF-32 with fuse roll-out	3200	84	38	67 [37/30]	74/81**
EGS-40		4000	35	30	60 [30/30]	67/74/81 ²
EGX-40		4000	35	30	60 [30/30]	67/74/81 ²
	EGF-40 with fuse roll-out	4000	84	38	67 [37/30]	74/81**
EGS-50		5000	35	38	74 [37/37]	81**
EGX-50		5000	35	38	74 [37/37]	81**
	EGF-50 with fuse roll-out ¹	5000	35	38	74 [37/37]	81**
	1600-4000A main bus rating	—	—	—	60 [30/30]	67/74/81 ²
	5000A main bus rating	—	—	—	67 [30/37]	74/81 ²

¹ Breaker and fuse roll-out must be mounted in separate vertical sections.

² 81" depth available only when these devices are used in a line-up with items identified with **.

³ 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.