

Programmer Disconnect

Accessory Manual for Retrofil CB

Programmer secondary disconnects are not provided on AKD5 legacy LVS breakers. If the customer has chosen to utilize the advanced features of the EntelliGuard ACB, the control wiring need to routed from the LVS directly to the secondary disconnect landing points on the cassette assembly of the EntelliGuard ACB cassette.

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Related Publications

Publication	Publication Number
Brochure	DEA-532
Snapshot	DEE-543
Installation Manual AKD8	DEH-41549
Installation Manual AKD6	DEH-41548
Installation Manual AKD5	DEH-41547
Accessory: Door Interlock (Door Interlock Kit)	DEH-41529
Accessory Retrofill Doors Assembly	DEH-41563
Accessory: Position Switch Plate & Position Switch Assembly & Wiring (Position Switch Kit)	DEH-41530
Accessory: Neutral Rogowski CT Disconnect (Neutral Assemblies)	DEH-41531
Accessory: Programmer Disconnects	DEH-41532
Accessory: Finger Clusters (Cluster Assemblies)	DEH-41533
Accessory: Secondary Disconnects	DEH-41534
FAQ	DEQ-171
Application Guide	DET-753
Guideform Spec	DET-754
Spare/Renewal Parts Guide	DET-755

Estimated Time to Complete Tasks

It takes about 20 minutes to install the assembly.

General Description

Description of the landing points on the EntelliGuard ACB secondary disconnect blocks given below. A-block is featured in [Figure 1](#) and B-block is featured in [Figure 2](#).

Figure 1. EntelliGuard G 39-Point Secondary A-Block

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13
	Motor	Motor	Spr NO/ RTC NO	Spr NO/ RTC NO	ST1	ST1	UV1	UV1	CC COM	CC IMM	CC CMD	ST2/ UV2	ST2/ UV2
Max. Current (I)	14.8 A	14.8 A	10 A	10 A	1.9 A	1.9 A	1.9 A	1.9 A	1.9 A	1.9 A	1.9 A	1.9 A	1.9 A
Max. Voltage (V)	440V	440V	240V	240V	440V	440V	440V	440V	440V	440V	440V	440V	440V
	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25	A26
	NC3	NC3	NC2	NC2	NC1	NC1	NO3	NO3	NO2	NO2	NO1	NO1	-
Max. Current (I)	15 A	15 A	15 A	15 A	15 A	15 A	15 A	15 A	15 A	15 A	1 A	15 A	-
Max. Voltage (V)	440V	440V	440V	440V	440V	440V	440V	440V	440V	440V	440V	440V	-
	A27	A28	A29	A30	A31	A32	A33	A34	A35	A36	A37	A38	A39
	O/P1a	O/P1b	O/P2a	O/P2b	24 V+	24 V-	BA NC	BA NO	BA COM	N-RC-	N-RC+	Eleg-CT	Eleg-CT
Max. Current (I)	1 A	1 A	1 A	1 A	<500 mA	<500 mA	10 A	10 A	10 A	<50 mA	<50 mA	5 A	5 A
Max. Voltage (V)	30 Vdc/ 25 Vac	30 dc/ 25 Vac	30 Vdc/ 25 Vac	30 Vdc/ 25 Vac	30 V	30 V	240 V	240 V	240 V	480 mV	480 mV	2 V	2 V

Figure 2. EntelliGuard G 39-Point Secondary B-Block

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13
	INPUT1	INPUT2	I/P COM	ST1 NO/ NC8	ST1 COM/ NC8	UV1 NO/ NC7	UV1 COM/ NC7	NC6	NC6	NC5	NC5	NC4	NC4
Max. Current (I)	<50 mA	<50 mA	<50 mA	10 A/15 A	10 A/15 A	10 A/15 A	10 A/15 A	15 A	15 A	15 A	15 A	15 A	15 A
Max. Voltage (V)	30 Vdc/ 25 Vac	30 Vdc/ 25 Vac	30 Vdc/ 25 Vac	240 V/ 440 V	240 V/ 440 V	240 V/ 440 V	240 V/ 440 V	440 V	440 V	440 V	440 V	440 V	440 V
	B14	B15	B16	B17	B18	B19	B20	B21	B22	B23	B24	B25	B26
	RELT INPUT	COM	-	CC NO/ NO8	CC COM/ NO8	ST2 NO/ UV2 NO/ NO7	ST2 COM/ UV2 COM/ NO7	NO6	NO6	NO5	NO5	NO4	NO4
Max. Current (I)	<50 mA	<500 mA	-	10 A/ 15 A	10 A/ 15 A	10 A/ 15 A	10 A/ 15 A	15 A	15 A	15 A	15 A	15 A	15 A
Max. Voltage (V)	5 V	0.1V	-	240 V/ 440 V	240 V/ 440 V	240 V/ 440 V	240 V/ 440 V	440 V	440 V	440 V	440 V	440 V	440 V
	B27	B28	B29	B30	B31	B32	B33	B34	B35	B36	B37	B38	B39
	ZSI out+	ZSI out-	ZSI in+	ZSI in-	ISO GND	5V ISO	TX EN 1	RX	TX	GND Volt-IN	Volt-A	Volt-B	Volt-C
Max. Current (I)	<50 mA	<50 mA	<50 mA	<50 mA	<500 mA	<500 mA	<50 mA	<50 mA	<50 mA	<500 mA	<50 mA	<50 mA	<50 mA
Max. Voltage (V)	28 Vdc	28 Vdc	30 Vdc	30 Vdc	0.1 V	5 V	5 V	5 V	5 V	0.1 V	1.76 V	1.76 V	1.76 V



- Turn off all power to switchgear. Tagout and lockout main source, up-stream or main breaker.
- Failure to comply with these instructions will result in death or serious injury from severe burns caused by arc flashing that has exceedingly high temperatures.
- Always wear personal protection equipment according to OSHA standards and appropriate to the severity of potential burns.

- Ensure only qualified personnel install, operate, service, and maintain all electrical equipment.

- It should be always verified that the LVS stack is de-energized before any of the control wiring is established from the LVS to the EntelliGuard Secondary disconnect blocks

CAUTION

- Wrong connections will cause the breaker to malfunction.

AKD-5—Programmer Secondary Disconnect (Breaker Side—N/A)

Programmer secondary disconnects are not provided on AKD-5 legacy LVS breakers. If the customer chooses to apply the advanced features of the EntelliGuard ACB, the control wiring needs to be routed from the LVS directly to the secondary disconnect landing points on the cassette assembly of the EntelliGuard ACB cassette.

AKD-6—19-Pin Programmer Disconnect Overview

The 19-pin programmer disconnects can now be included with the AKD-6 series retrofills to accommodate the extended features of the EntelliGuard® Trip Unit. The programmer disconnect is pre-wired before the assembly leaves the factory. Note that the breaker side wiring itself is done at the factory. The compartment side is installed and wired in the field by a qualified electrician or installation service company.

AKD-6—Programmer Secondary Disconnect (Breaker Side)

Programmer disconnect assemblies come pre-installed and wired from the factory and do not require any installation in the field. The photo in [Figure 3](#) shows the 19-pin programmer-disconnect on the AKR30/50, bottom side of the breaker—already installed. [Figure 4](#) displays the wiring diagram for the programmer-disconnect (12-pin and 19-pin are combined in one diagram, although the AKD-6 does not use the 12-pin). [Figure 5](#) features an exploded view of the 19-pin programmer disconnect. An installed view of the 19-pin programmer disconnect appears in [Figure 6](#). For the compartment side, the 19-pin is ordered separately and comes in a box.

Immediately below, are the part numbers for the 19-pin programmer disconnect assemblies, both breaker side and compartment side.

BREAKER SIDE	P/N 10107108G1	19-PIN PROGRAMMER DISC ASSY	AKD6
COMPARTMENT SIDE	P/N 10106652G1	19-PIN PROGRAMMER DISC ASSY	AKD6

Figure 3. 19-Pin Programmer Disconnect on the AKR30/50 Breaker

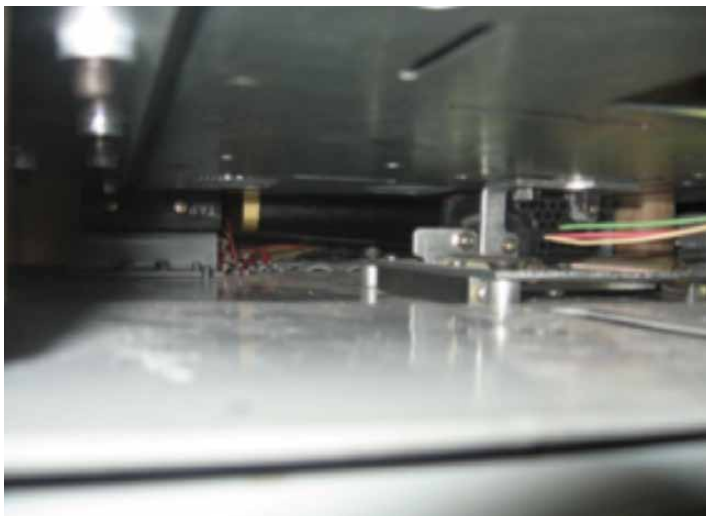


Figure 4. Wiring for Programmer Disconnect (12 and 19 Pin)

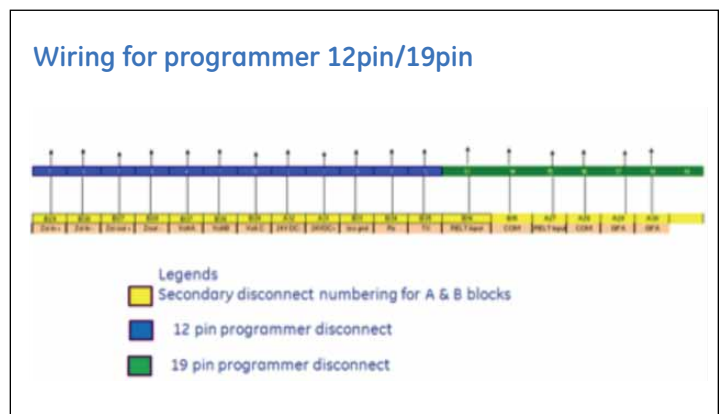


Figure 5. 19-Pin Programmer Disconnect for the AKD-6 AKR30H\50H Retrofill, Exploded View

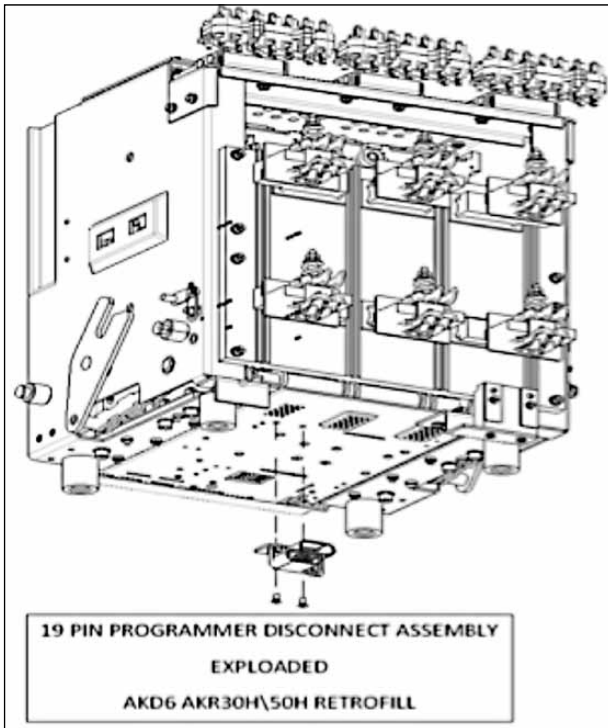
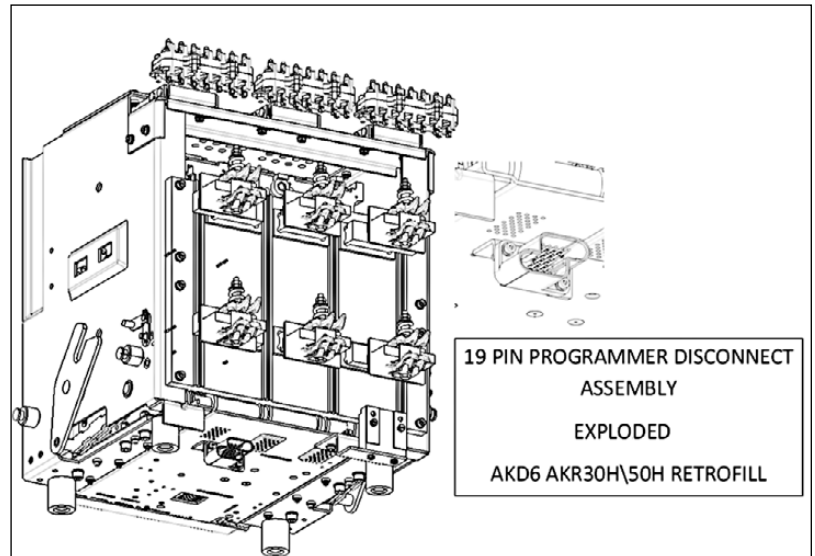


Figure 6. 19-Pin Programmer Disconnect AKD-6 AKR30H\50H Retrofill, Installed



AKD-6—Programmer Secondary Disconnect (Compartment Side)



- Turn off all power to switchgear. Tagout and lockout main source, up-stream or main breaker.
- Failure to comply with these instructions will result in death or serious injury from severe burns caused by arc flashing that has exceedingly high temperatures.
- Always wear personal protection equipment according to OSHA standards and appropriate to the severity of potential burns.

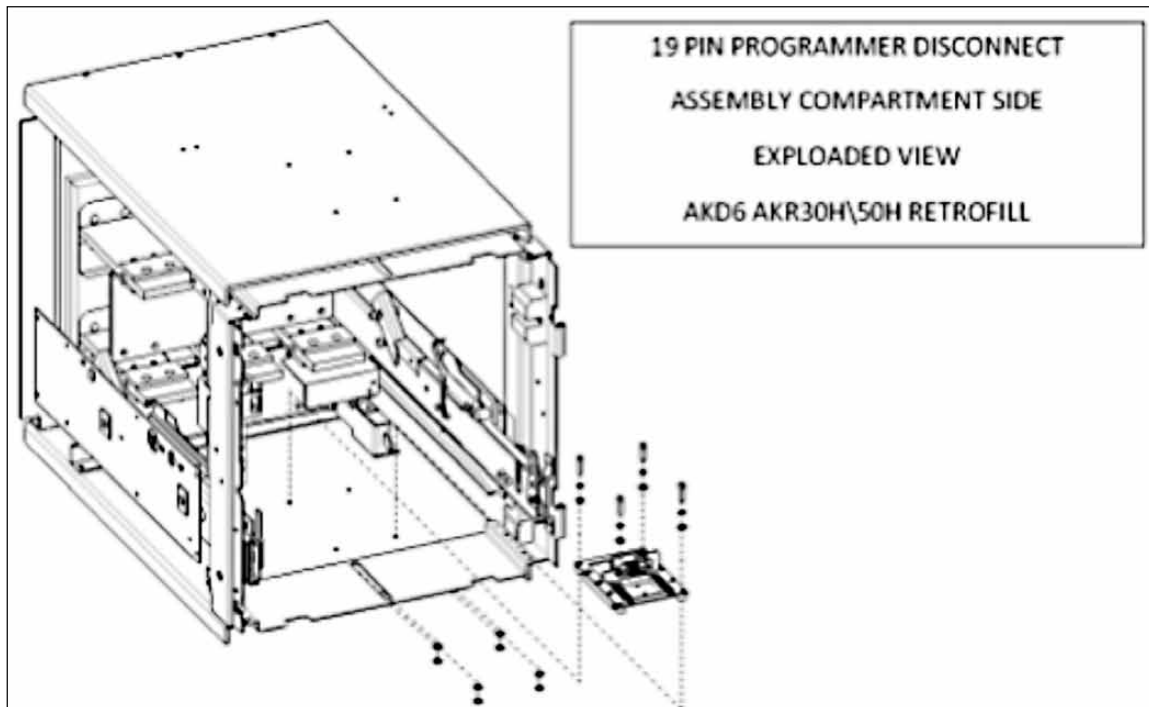
- Ensure only qualified personnel install, operate, service, and maintain all electrical equipment.

- Installing the programmer disconnect should not be carried out when the compartment is live.
 - The compartment should be de-energized before the installing the programmer disconnect assembly.
1. Check the movement of programmer disconnect on slides for biasing.
 2. Complete the wiring harness from the programmer disconnect to source wiring.

NOTE: 12-pin programmer disconnect configuration is not provided with the AKD6 version of Retrofills of EntelliGuard ACB.

Figure 7 shows the exploded view of the 19-pin programmer disconnect for the AKD-6.

Figure 7. AKD-6—19-Pin Programmer-Disconnect Assembly, Compartment Side

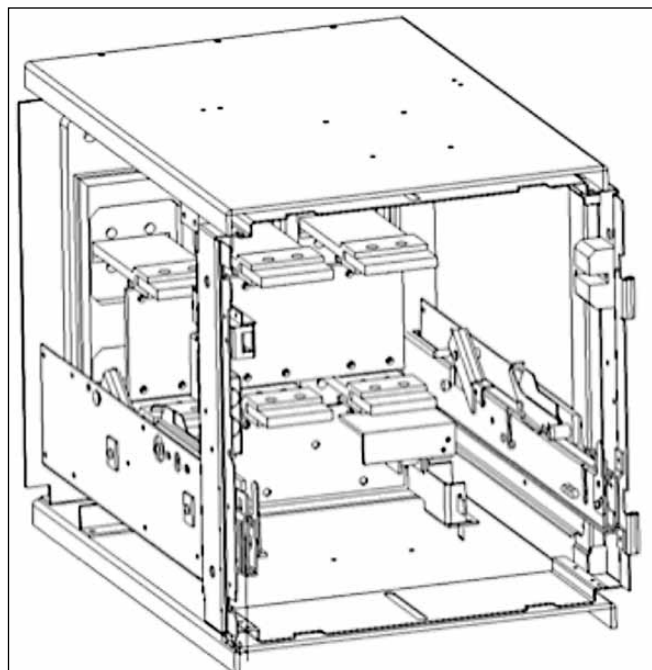


To install the programmer disconnect in the AKD-6 switchgear, do the following:

1. Turn off power to the switchgear, if not done already.
2. Have these tools ready for doing the task—hand-drill, cleaning solution, antirust, and wrench for metric M6 bolt/nut.

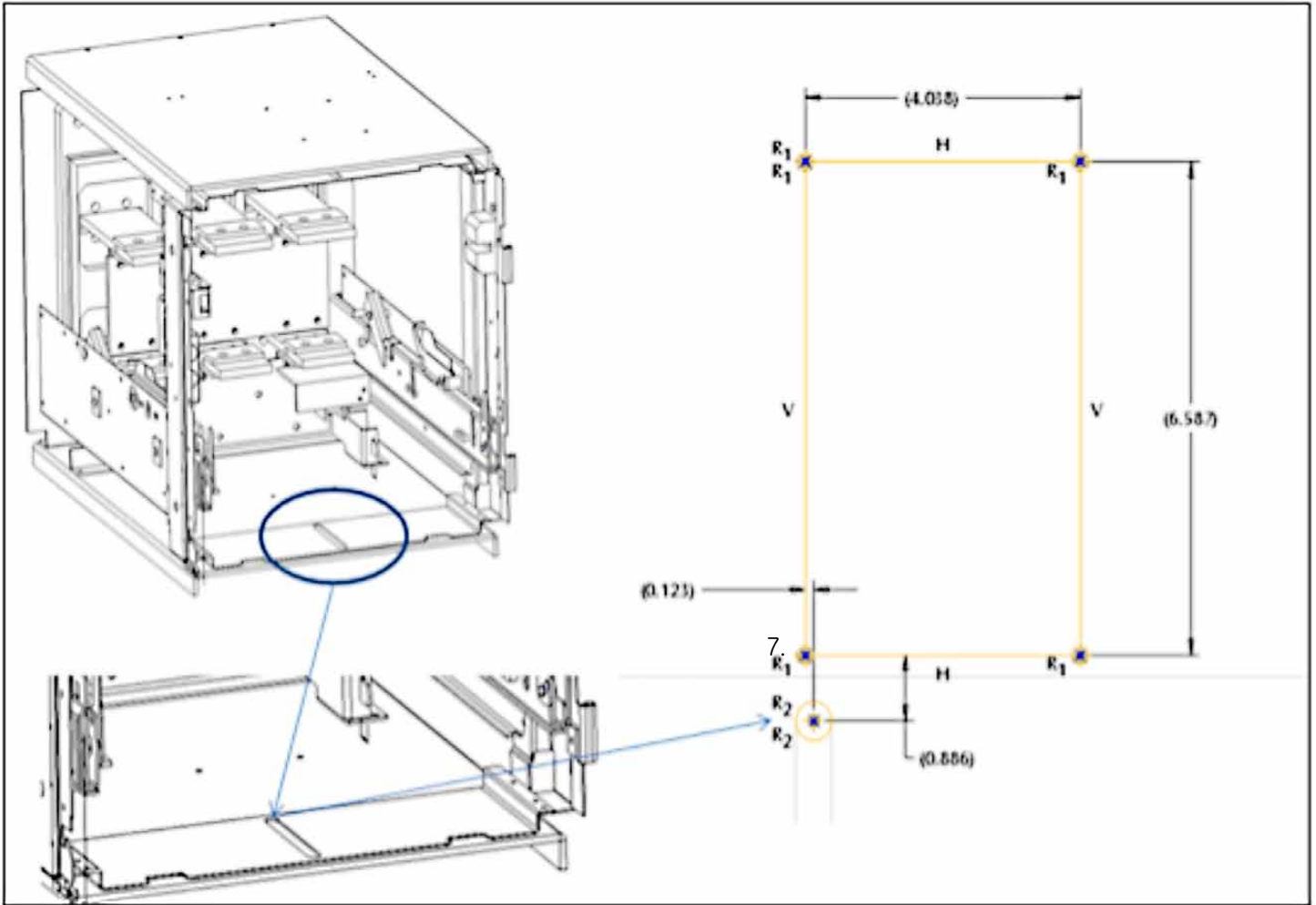
Clean the base of the compartment of any dirt or foreign particles, if not done already (Figure 8).

Figure 8. Prepare AKD-6—Compartment



3. Slide the inner frame assembly to its maximum inserted condition.
4. Note that his position corresponds to the frame position when the breaker would be all the way in and fully connected.
5. Use the slot, inner semicircle as a datum reference and mark the mounting-hole locations using the template shown in [Figure 9](#). Dimensions shown are in inches.
6. Drill ¼-inch diameter holes at 4 locations as marked.

Figure 9. AKD-6—Slide the Inner Frame (Dimensioning)



Place the programmer disconnect assembly on the mounting holes and secure it to the base of the programmer using hardware (Bolt—M6 X 35, Nut—M6 (metric)) provided along with the programmer disconnect assembly kit ([Figure 10](#)).

8. Check the movement of programmer disconnect on slides for biasing.
9. Tighten the hardware hand-tight ([Figure 11](#)).
10. From the disconnect plug, route the wire to suitable incoming cables from the compartment.

Figure 10. AKD-6—Holes Drilled for Mounting Programmer Disconnect

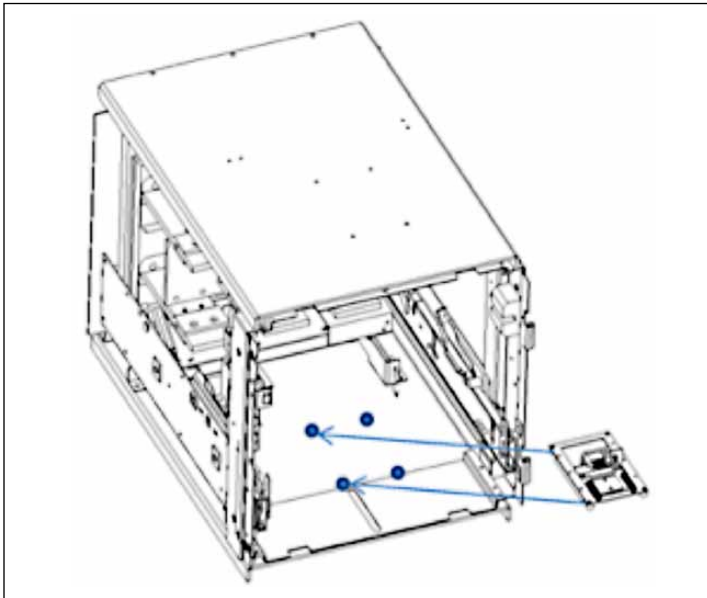
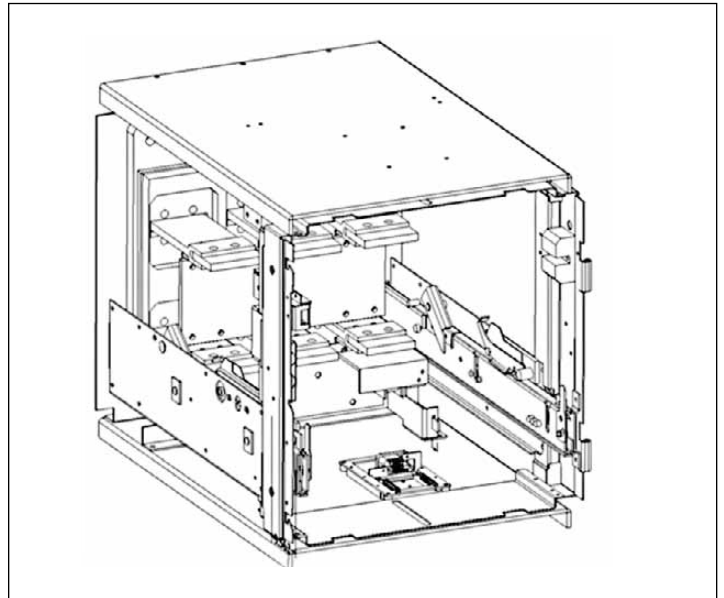


Figure 11. AKD-6—Programmer Disconnect Assembly Secured in Place



AKD-8—Programmer Secondary Disconnect



- Turn off all power to switchgear. Tagout and lockout main source, up-stream or main breaker.
- Failure to comply with these instructions will result in death or serious injury from severe burns caused by arc flashing that has exceedingly high temperatures.
- Always wear personal protection equipment according to OSHA standards and appropriate to the severity of potential burns.

- Ensure only qualified personnel install, operate, service, and maintain all electrical equipment.

CAUTION: WIRING

- Before installing the breaker, the programmer disconnect must be wired to the EntelliGuard Breaker.
- Wires with wire markers are provided on the retrofill. Make sure that the switchgear wiring connection points match up with the original wiring of the cubicle. This ensures that all wiring connections are properly made.
- Wrong connections will cause the breaker to malfunction.

Description

The programmer disconnect consists of two assemblies, one mounted on the breaker side and the second mounted on the cabinet. The breaker side assembly consists of the mounting bracket, plug assembly. The compartment side assembly consists of the plug assembly mounted on spring loaded assembly that receives the breaker side plug.

Tools required: Spanner, Flat Head Screw driver, Wire stripper, Wire Cutter, Star type screw driver

Steps to assemble programmer disconnect assembly are as follows:

Identify Existing Programmer Disconnect (Compartment)

The existing programmer disconnect plugs used in AKD8 generation of the AKR breakers are provided on the right side in case of AKR30/30H/50/50H/30L and on the left side for AKR30S retrofits.

Programmer disconnects are provided with legacy AKR breakers in AKD8 LVS. The breakers were equipped with the following pin configurations depending on the application

- 9-pin configuration
- 12-pin configuration
- 24-pin configuration

Identify Programmer Disconnect Type to be Installed (with Kit)

The programmer disconnect assembly to be assembled depends on the type of breaker the retrofit is replacing. These are as follows:

- AKR30/30H/50/50H/30L: In these switchgear, mount the programmer disconnect on the left side wall of the retrofit.
- AKR30S: In these switchgear, mount the programmer disconnect on the right side wall of the retrofit.

Programmer disconnect assemblies are available in two configurations for the Retrofill EntelliGuard ACB:

12-pin configuration: If the legacy LVS has a 12-pin programmer disconnect in use, it can be used with the Retrofill EntelliGuard ACB. In this case, only the breaker side programmer disconnect assembly needs to be installed. Programmer disconnects are itemized below.

19-pin configuration: If the legacy LVS doesn't have a 12-pin programmer disconnect configuration, and the customer chooses to install a programmer disconnect, then the 19-pin programmer disconnect assembly needs to be installed in the compartment and the breaker.

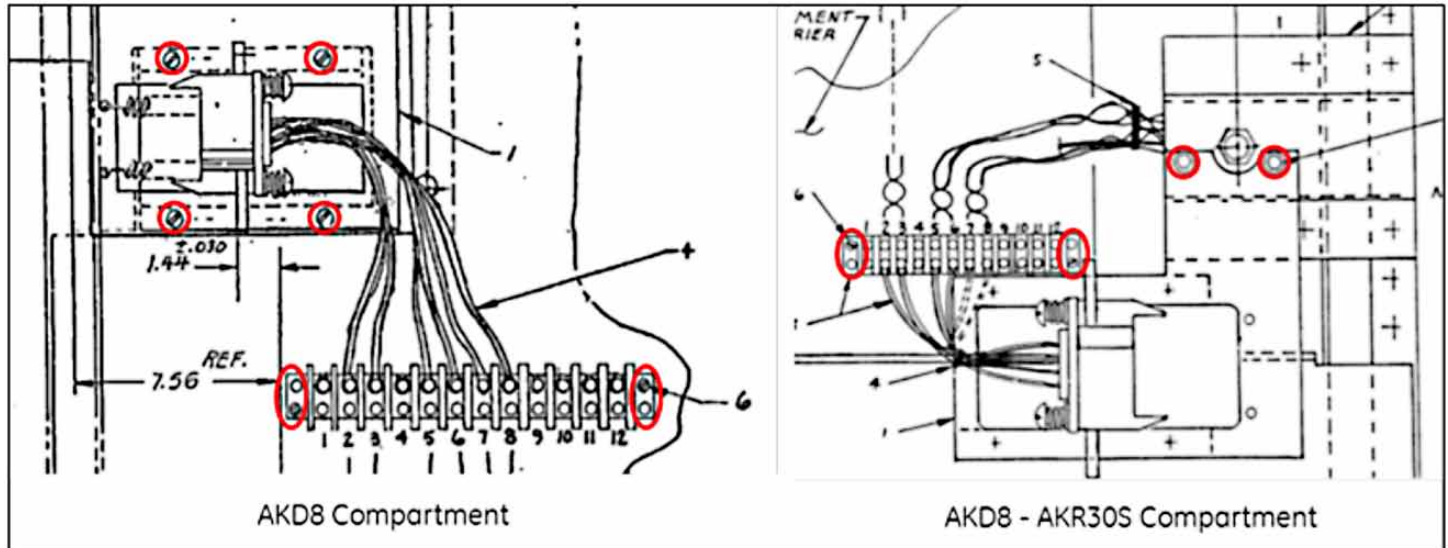
Remove Existing Programmer Disconnect (Compartment)

The programmer disconnect assembly must be removed under these conditions:

- 9-pin programmer disconnect assembly is installed in cabinet.
 - 24-pin programmer disconnect assembly is installed in cabinet.
 - Customer chooses to replace a 12-pin configuration with a 19-pin configuration.
1. Before uninstalling the existing programmer disconnect assembly, make sure that the wiring details are checked against the wiring numbers. Any changes or deviations need to be noted for use during installation of the new programmer disconnect.
 2. Check that the compartment is de-energized and is safe to work on and the existing breaker, if present within the cabinet, has been removed.
 3. Disconnect the wires that connect the terminal block to the compartment programmer disconnect assembly.

4. If the customer has chosen to install a 19-pin programmer disconnect assembly in place of a 12-pin programmer disconnect assembly, the terminal block mounted on the compartment needs to be removed as well. This can be done by unfastening the two screws that secure the terminal block to the side wall of the compartment.
5. Unfasten the 4 bolts (Figure 12) that hold the programmer disconnect assembly on the wall of the compartment to remove the compartment side programmer disconnect assembly.

Figure 12. Fasteners (Bolts) to be Loosened for Remove Programmer Disconnect



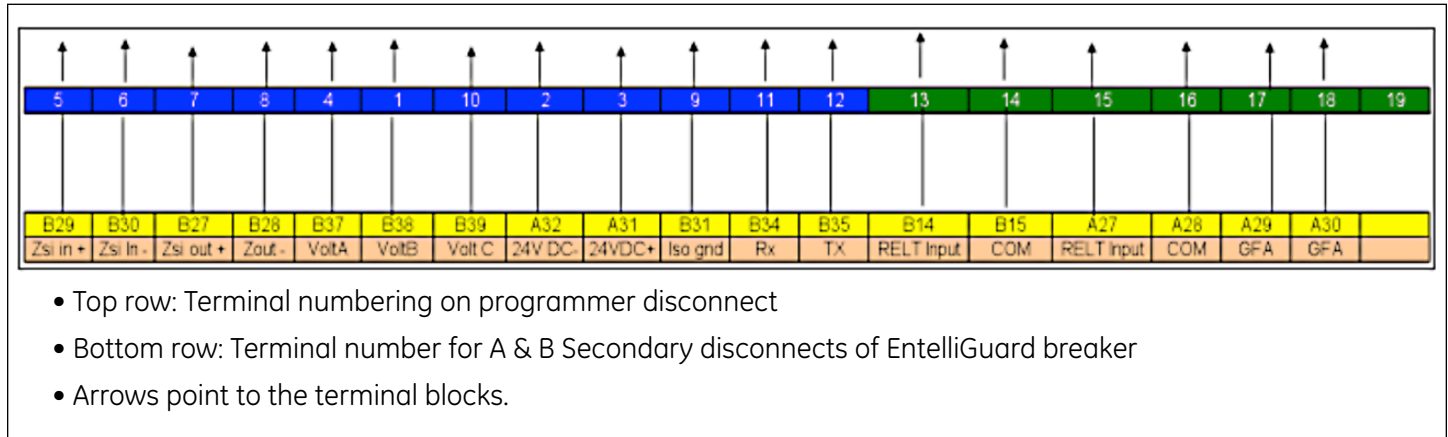
Install 19-Pin Programmer Disconnect (Compartment and Breaker)

1. Unpack the 19-pin programmer disconnect assembly from the box. Each box of programmer disconnect assembly has a 20-pin terminal block supplied.
2. Check that the programmer disconnect plug assembly is not damaged and the wiring is intact.
3. Check that the programmer disconnect block is moving freely within the assembly and retracts to its original position by spring loading when it is slid back to its fully activated state.
4. Check for electrical continuity between the contact pins on one end and the wire termination on the other. Blocks containing faulty pins should not be used for installation.
5. Install the new terminal block on the side wall of the compartment and land the incoming wires from the compartment to the terminal block. Any additional wires from the compartment side, required for the 19 pin programmer, need to be landed on the terminal block and checked for electrical continuity.
6. Mount the programmer disconnect assembly on the side wall of the compartment where the original programmer disconnect assembly was mounted.
7. Land the wires from the programmer disconnect to the terminal block mounted earlier.
8. Check for continuity between the terminal block contact points to the corresponding pins on the programmer disconnect. This should match against the wiring scheme planned for the new 19-pin programmer disconnect assembly on the compartment.

Wiring and Task Completed

1. The breaker side programmer disconnect assemblies comes pre-installed and wired from the factory. Hence no action is needed on the breaker.
2. Verify that the compartment side programmer disconnect assembly wiring scheme matches that of the breaker side wiring scheme.
3. A typical wiring diagram used for the programmer disconnect on the breaker side is shown in [Figure 13](#).

Figure 13. Typical Programmer disconnect Wiring Scheme for Retrofill EntelliGuard ACB in AKD8 LVS



Wiring Diagram for the AK/AKR Retrofill

16
AK/AKR - SECONDARY DISCONNECT BULLET IDS

15
AK/AKR SECONDARY DISCONNECT BLOCK - A

(A1) (A2) (A3) (A4) (A5) (A6) (A7)

AK/AKR SECONDARY DISCONNECT BLOCK - B

(B1) (B2) (B3) (B4) (B5) (B6) (B7)

AK/AKR SECONDARY DISCONNECT BLOCK - C

(C1) (C2) (C3) (C4) (C5) (C6) (C7)

14
NEUTRAL DISCONNECT

SEE NOTE 2

NEUTRAL DISCONNECT

(1) (2)

13
BLOCK - D

(D1) (D2) (D3) (D4) (D5) (D6) (D7)

12
PROGRAMMER DISCONNECT 19 PIN

SEE NOTE 2

PROGRAMMER DISCONNECT 19 PIN

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19)

PROGRAMMER DISCONNECT 12 PIN

SEE NOTE 2

PROGRAMMER DISCONNECT 12 PIN

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12)

11
ENTELLI GUARD G SECONDARY DISCONNECT ASSEMBLY

ENTELLI GUARD G SECONDARY DISCONNECT ASSEMBLY

Part must conform to SI 900000 Sect. 4, Toxicity Procedure

AI	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13
MOTOR	MOTOR	Spr NO/ RTC NO	ST1	ST1	ST1	UV1	UV1	CC COM	CC IMM	CC CMD	ST2/UV2	ST2/UV2
A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25	A26
NC3	NC3	NC2	NC2	NC1	NC1	NO3	NO3	NO2	NO2	NO1	NO1	-
A27	A28	A29	A30	A31	A32	A33	A34	A35	A36	A37	A38	A39
O/P1a	O/P1b	O/P2a	O/P2b	24V+	24V-	BA NC	BA NC	BA NO	BA COM	N-RC-	N-RC+	Eleg CT
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13
INPUT1	INPUT2	I/P COM	REL1 INPUT	ZS1 out+	ZS1 out-	ZS1 in+	ZS1 in-	ISO GND	5V ISO	TX EN I	TX VO11-A	VO11-B
B14	B15	B16	B17	B18	B19	B20	B21	B22	B23	B24	B25	B26
ST1 NO/ST1 COM/ NC8	UV1 NO/ NC7	UV1 COM/ NC7	ST2 NO/ UV2 COM/ NO7	CC NO/ CC COM/ NO8	ST2 NO/ UV2 COM/ NO7	UV1 NO/ NC7	UV1 COM/ NC7	NC6	NC6	NC5	NC4	NC4
B27	B28	B29	B30	B31	B32	B33	B34	B35	B36	B37	B38	B39
ZS1 out+	ZS1 out-	ZS1 in+	ZS1 in-	ISO GND	5V ISO	TX EN I	TX VO11-A	VO11-B	VO11-C	NC5	NC4	NC4

A - DISCONNECT ALWAYS PROVIDED

10
PVI

9
ENTELLI GUARD G SECONDARY DISCONNECT ASSEMBLY

ENTELLI GUARD G SECONDARY DISCONNECT ASSEMBLY

8
NAME OF SITE :
SWITCHEAR/CUBICLE IDENTIFICATION :
DATE :

7
NOTE:
1. BLOCK - D IS ONLY PROVIDED WITH AK25 SERIES BREAKER.
2. NEUTRAL DISCONNECT AND PROGRAMMABLE DISCONNECT ARE OPTIONAL FEATURES USED FOR AK06 AND AK08.

6
THIRD ANGLE PROJECTION

5
FOR ADDITIONAL INFO REFER TO:
APPLIED FRAGILITIES:
DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED IN DRAWING

4
UNLESS OTHERWISE SPECIFIED IN DRAWING:
1. DIMENSIONS # 0.1
2. PL. DECIMALS # 0.01
3. QUALITY ISSUED # 0.5
FRACTIONS # FINISH CRITICAL TO QUALITY CHARACTERISTIC

3
DRAWING FILE: 10109762PVI
SOLID MODEL: 10109762PVI

2
SIGNALURES:
ISSUED: [Signature] 10/25/11
CHECKED: [Signature] 10/25/11
DESIGN: [Signature] 10/25/11

1
Customer & Industrial
GENERAL ELECTRIC COMPANY

WIRING DIAGRAM
ENTELLI GUARD G CIRCUIT BREAKER

10109762 1

10109762 1

10109762 1

10109762 1

Notes

These instructions do not cover all details or variations in equipment nor do they provide for every possible contingency that may be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise that are not covered sufficiently for the purchaser's purposes, the matter should be referred to the ABB Inc.

—
ABB Inc.
305 Gregson Drive
Cary, NC 27511.
electrification.us.abb.com

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