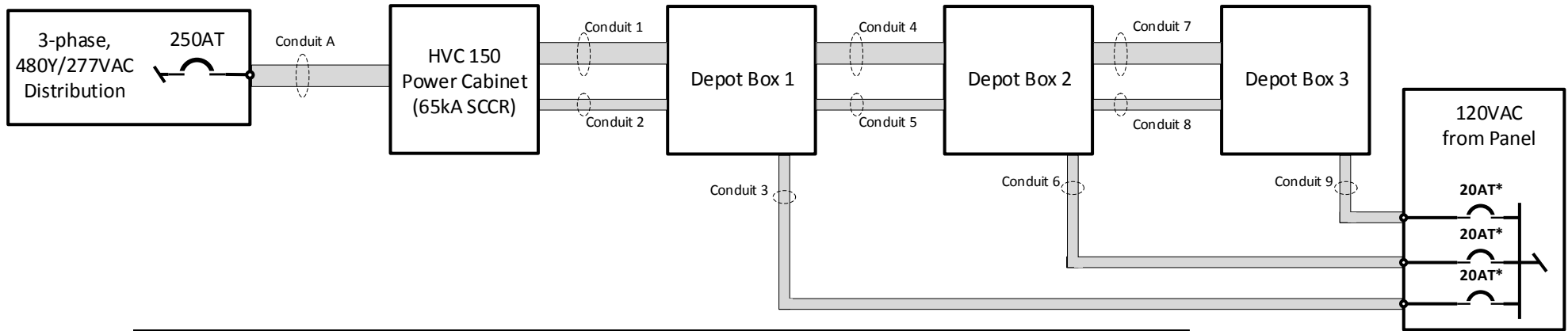


PRELIMINARY (FOR INFORMATION ONLY)

ABB is not liable for information contained herein which contradicts local codes, permitting requirements, and other requirements. ABB highly recommends a qualified design engineering firm to be responsible for the charging installation to ensure all of these requirements are met. See the ABB product installation manual for more details.



CONDUIT IDs	FUNCTION OF INTERNAL CABLES	CABLE SELECTION
A	AC PRIMARY POWER	(3) 250 MCM TO 500 MCM (CU, 75°C, 600V) + (1) #4 AWG (CU, 75°C, 600V, EGC)
1	DC POWER (200A)	(2) 3/0 AWG TO 350 MCM (CU, 75°C, 1KV) + (3) #2 AWG (CU, 75°C, 600V, EGC)
4	DC POWER (200A)	(2) 3/0 AWG TO 350 MCM (CU, 75°C, 1KV) + (2) #2 AWG (CU, 75°C, 600V, EGC)
7	DC POWER (200A)	(2) 3/0 AWG TO 350 MCM (CU, 75°C, 1KV) + (1) #2 AWG (CU, 75°C, 600V, EGC)
2	INTERLOCK	(1) CABLE THAT HAS (1) TWISTED PAIR OF #18 AWG (SHIELDED, 600V, 120Ω CHAR. IMPEDANCE)
	FIBER CAN	(1) MULTIMODE FIBER (OM3, 8 STRANDS, PCF OR FIBERGLASS, WITH ST CONNECTORS, SEE MANUAL)
	FIBER ETHERNET	
5, 8	FIBER CAN	(1) MULTIMODE FIBER (OM3, 4 STRANDS, PCF OR FIBERGLASS, WITH ST CONNECTORS, SEE MANUAL)
	ETHERNET	(1) ETHERNET (S/FTP, CAT6/CAT5e, 600V, 100Ω CHAR. IMPEDANCE, WITH RJ45 CONNECTORS)
	INTERLOCK	(1) CABLE THAT HAS (2) TWISTED PAIRS OF #18 AWG (SHIELDED, 600V, 120Ω CHAR. IMPEDANCE); EACH PAIR SHOULD HAVE TWO WIRES AND THE CABLE SHOULD HAVE FOUR TOTAL WIRES
	DC GUARD	
3, 6, 9	120VAC CONTROL POWER	(1) CABLE THAT HAS (2) #12 AWG (CU, 75°C, 600V) + (1) #12 AWG (CU, 75°C, 600V, EGC)

* Control power feeds to depot boxes must have 30mA Ground Fault Circuit Interrupter and support max inrush current of 100A for < 5ms

N1. Equipment enclosures must be externally labeled according to local codes by the installing contractor to notify service personnel to verify absence of voltage from more than one power source.

N2. Customer must ensure wire sizes for main AC input (in conduit A), DC power (in conduits 1, 4, & 7), and control power (in conduits 3, 6, & 9) maintain an acceptable voltage drop based on their lengths and account for other application specific requirements. There shall be no greater than 2% voltage drop on the complete DC cabling between the HVC power cabinet and the depot box which has the farthest total DC cable distance from the HVC power cabinet. Voltage drop calculations for the DC cable runs shall be performed using 200ADC and the lowest expected electric vehicle battery voltage from the HVC power cabinet output as assumptions. Typically 300VDC is a sufficient worst case assumption for the low est expected electric vehicle battery voltage, however, it is the customer's responsibility to ensure this is sufficient for each specific application. Voltage drop assumptions and calculations for the AC cables must be defined by the customer.

N3. Each depot box must have an equipment ground conductor directly connected to the HVC 150 power cabinet. As a result conduit IDs 1 & 4 show more than one equipment ground conductor.

N4. It is recommended to consider installing conduits for the future use case if applicable. For example, if on Day One only one or two depot boxes are installed and there is a possibility the site owner would want two or three depot boxes installed in the future, consider installing the conduits for the future possible depot boxes on Day One also. See ABB's conduit and cable concept for the future use case scenario if applicable.

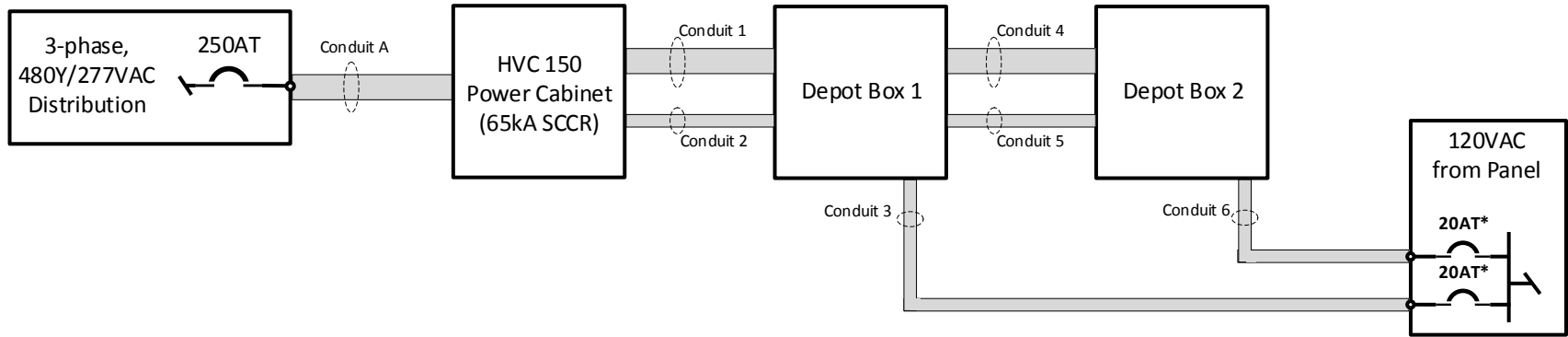
N5. This concept does not show the presence of ground electrodes. It is the responsibility of the customer to determine if a ground electrode per each HVC power cabinet and depot box is required. See the product installation manual for more details.



TITLE					
HVC-C 150kW Charging System - Conduits & Cables for (3) Depot Boxes					
REV	DATE	BY	DESCRIPTION	DRAWING	REV
A	28/AUG/20		PRELIMINARY FOR DISCUSSION		
-	-	-	-	-	-
-	-	-	-	-	-

PRELIMINARY (FOR INFORMATION ONLY)

ABB is not liable for information contained herein which contradicts local codes, permitting requirements, and other requirements. ABB highly recommends a qualified design engineering firm to be responsible for the charging installation to ensure all of these requirements are met. See the ABB product installation manual for more details.



* Control power feeds to depot boxes must have 30mA Ground Fault Circuit Interrupter and support max inrush current of 100A for < 5ms

CONDUIT IDs	FUNCTION OF INTERNAL CABLES	CABLE SELECTION
A	AC PRIMARY POWER	(3) 250 MCM TO 500 MCM (CU, 75°C, 600V) + (1) #4 AWG (CU, 75°C, 600V, EGC)
1	DC POWER (200A)	(2) 3/0 AWG TO 350 MCM (CU, 75°C, 1KV) + (2) #2 AWG (CU, 75°C, 600V, EGC)
4	DC POWER (200A)	(2) 3/0 AWG TO 350 MCM (CU, 75°C, 1KV) + (1) #2 AWG (CU, 75°C, 600V, EGC)
2	INTERLOCK	(1) CABLE THAT HAS (1) TWISTED PAIR OF #18 AWG (SHIELDED, 600V, 120Ω CHAR. IMPEDANCE)
	FIBER CAN	(1) MULTIMODE FIBER (OM3, 8 STRANDS, PCF OR FIBERGLASS, WITH ST CONNECTORS, SEE MANUAL)
	FIBER ETHERNET	
5	FIBER CAN	(1) MULTIMODE FIBER (OM3, 4 STRANDS, PCF OR FIBERGLASS, WITH ST CONNECTORS, SEE MANUAL)
	ETHERNET	(1) ETHERNET (S/FTP, CAT6/CAT5e, 600V, 100Ω CHAR. IMPEDANCE, WITH RJ45 CONNECTORS)
	INTERLOCK	(1) CABLE THAT HAS (2) TWISTED PAIRS OF #18 AWG (SHIELDED, 600V, 120Ω CHAR. IMPEDANCE); EACH PAIR SHOULD HAVE TWO WIRES AND THE CABLE SHOULD HAVE FOUR TOTAL WIRES
	DC GUARD	
3, 6	120VAC CONTROL POWER	(1) CABLE THAT HAS (2) #12 AWG (CU, 75°C, 600V) + (1) #12 AWG (CU, 75°C, 600V, EGC)

N1. Equipment enclosures must be externally labeled according to local codes by the installing contractor to notify service personnel to verify absence of voltage from more than one power source.

N2. Customer must ensure wire sizes for main AC input (in conduit A), DC power (in conduits 1, 4, & 7), and control power (in conduits 3, 6, & 9) maintain an acceptable voltage drop based on their lengths and account for other application specific requirements. There shall be no greater than 2% voltage drop on the complete DC cabling between the HVC power cabinet and the depot box which has the farthest total DC cable distance from the HVC power cabinet. Voltage drop calculations for the DC cable runs shall be performed using 200ADC and the lowest expected electric vehicle battery voltage from the HVC power cabinet output as assumptions. Typically 300VDC is a sufficient worst case assumption for the low est expected electric vehicle battery voltage, however, it is the customer's responsibility to ensure this is sufficient for each specific application. Voltage drop assumptions and calculations for the AC cables must be defined by the customer.

N3. Each depot box must have an equipment ground conductor directly connected to the HVC 150 power cabinet. As a result conduit IDs 1 & 4 show more than one equipment ground conductor.

N4. It is recommended to consider installing conduits for the future use case if applicable. For example, if on Day One only one or two depot boxes are installed and there is a possibility the site owner would want two or three depot boxes installed in the future, consider installing the conduits for the future possible depot boxes on Day One also. See ABB's conduit and cable concept for the future use case scenario if applicable.

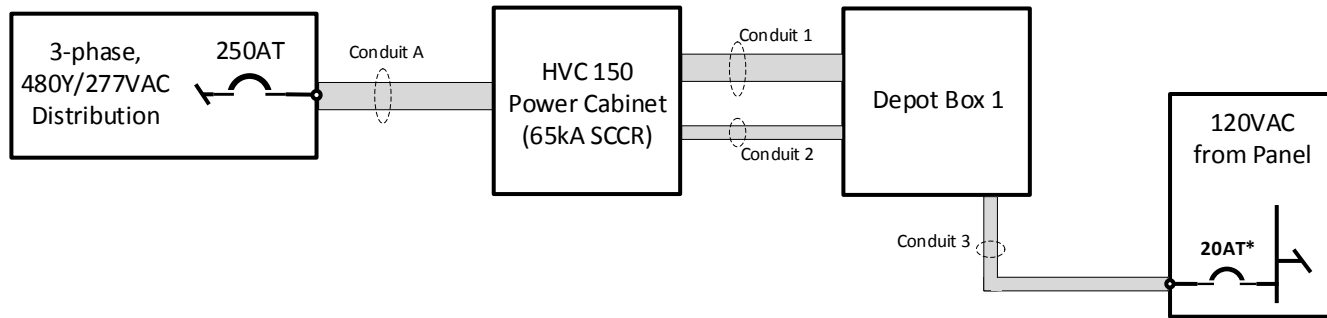
N5. This concept does not show the presence of ground electrodes. It is the responsibility of the customer to determine if a ground electrode per each HVC power cabinet and depot box is required. See the product installation manual for more details.



TITLE					
HVC-C 150kW Charging System - Conduits & Cables for (2) Depot Boxes					
REV	DATE	BY	DESCRIPTION	DRAWING	REV
A	28/AUG/20	-	PRELIMINARY FOR DISCUSSION	-	A
-	-	-	-	-	-
-	-	-	-	-	-

PRELIMINARY (FOR INFORMATION ONLY)

ABB is not liable for information contained herein which contradicts local codes, permitting requirements, and other requirements. ABB highly recommends a qualified design engineering firm to be responsible for the charging installation to ensure all of these requirements are met. See the ABB product installation manual for more details.



* Control power feeds to depot boxes must have 30mA Ground Fault Circuit Interrupter and support max inrush current of 100A for < 5ms

CONDUIT IDs	FUNCTION OF INTERNAL CABLES	CABLE SELECTION
A	AC PRIMARY POWER	(3) 250 MCM TO 500 MCM (CU, 75°C, 600V) + (1) #4 AWG (CU, 75°C, 600V, EGC)
1	DC POWER (200A)	(2) 3/0 AWG TO 350 MCM (CU, 75°C, 1KV) + (1) #2 AWG (CU, 75°C, 600V, EGC)
2	INTERLOCK	(1) CABLE THAT HAS (1) TWISTED PAIR OF #18 AWG (SHIELDED, 600V, 120Ω CHAR. IMPEDANCE)
	FIBER CAN FIBER ETHERNET	(1) MULTIMODE FIBER (OM3, 8 STRANDS, PCF OR FIBERGLASS, WITH ST CONNECTORS, SEE MANUAL)
3	120VAC CONTROL POWER	(1) CABLE THAT HAS (2) #12 AWG (CU, 75°C, 600V) + (1) #12 AWG (CU, 75°C, 600V, EGC)

N1. Equipment enclosures must be externally labeled according to local codes by the installing contractor to notify service personnel to verify absence of voltage from more than one power source.

N2. Customer must ensure wire sizes for main AC input (in conduit A), DC power (in conduits 1, 4, & 7), and control power (in conduits 3, 6, & 9) maintain an acceptable voltage drop based on their lengths and account for other application specific requirements. There shall be no greater than 2% voltage drop on the complete DC cabling between the HVC power cabinet and the depot box which has the farthest total DC cable distance from the HVC power cabinet. Voltage drop calculations for the DC cable runs shall be performed using 200ADC and the lowest expected electric vehicle battery voltage from the HVC power cabinet output as assumptions. Typically 300VDC is a sufficient worst case assumption for the lowest expected electric vehicle battery voltage, however, it is the customer's responsibility to ensure this is sufficient for each specific application. Voltage drop assumptions and calculations for the AC cables must be defined by the customer.

N3. Each depot box must have an equipment ground conductor directly connected to the HVC 150 power cabinet. As a result conduit IDs 1 & 4 show more than one equipment ground conductor.

N4. It is recommended to consider installing conduits for the future use case if applicable. For example, if on Day One only one or two depot boxes are installed and there is a possibility the site owner would want two or three depot boxes installed in the future, consider installing the conduits for the future possible depot boxes on Day One also. See ABB's conduit and cable concept for the future use case scenario if applicable.

N5. This concept does not show the presence of ground electrodes. It is the responsibility of the customer to determine if a ground electrode per each HVC power cabinet and depot box is required. See the product installation manual for more details.

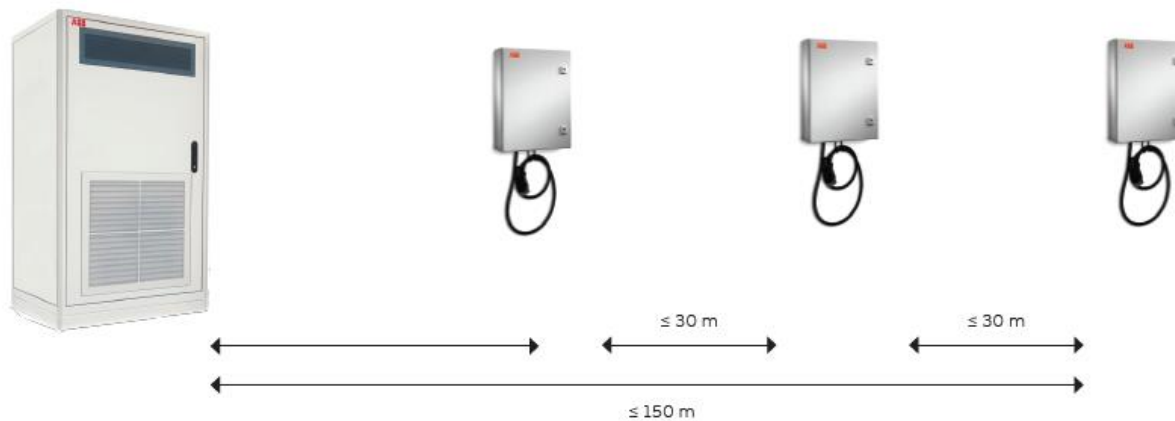


TITLE					
HVC-C 150kW Charging System - Conduits & Cables for (1) Depot Box					
REV	DATE	BY	DESCRIPTION	DRAWING	REV
A	28/AUG/20		PRELIMINARY FOR DISCUSSION		
-	-	-	-	-	-
-	-	-	-	-	-

PRELIMINARY (FOR INFORMATION ONLY)

ABB is not liable for information contained herein which contradicts local codes, permitting requirements, and other requirements. ABB highly recommends a qualified design engineering firm to be responsible for the charging installation to ensure all of these requirements are met. See the ABB product installation manual for more details.

Distance limitation



More details on cable entry into the depot box coming soon...



TITLE					
HVC-C 150kW Charging System – Misc. Install Considerations					
REV	DATE	BY	DESCRIPTION	DRAWING	REV
A	28/AUG/20	-	PRELIMINARY FOR DISCUSSION		A
-	-	-	-		
-	-	-	-		