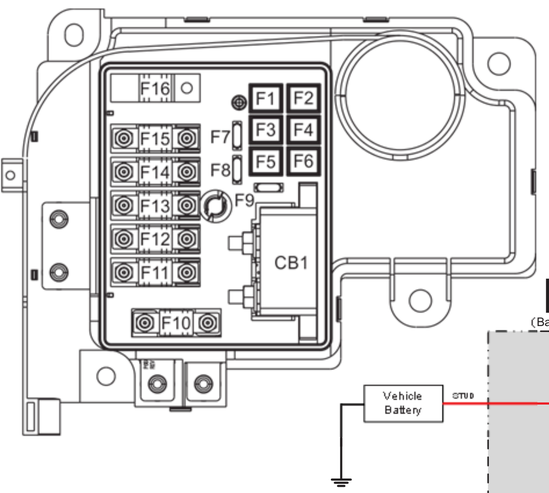
New Cascadia® – After Production Date 9/9/2019

VPDM Pin Layout

FREIGHTLINER Run Smart™

CASCADIA®



VPDM
(Vehicle Power Distribution Module)

BCA
(Battery Cable Access)

Vehicle Battery

F1 (30A) A/1 ECM / MCM, BAT
F5 (30A) B/2 ECA, BAT
F6 (50A) A/2 SAM, BAT 2
F2 (30A) B/4 Cab Loads, BAT
F3 (30A) B/1 TCU, BAT
F4 (30A) B/3 ACM, BAT
F7 (5A) C/2 Alternator Remote Sense, BAT
F8 (5A) C/1 SAM, LVD Sense, BAT 3
F9 (5A) Cut-Off Switch, BAT

CLDS
Battery Contactor Control (CLDS), Indicator D/4
Battery Contactor Control (CLDS), Power D/3
Battery Contactor Control (CLDS), Close D/2
Battery Contactor Control (CLDS), Return D/1

Battery Contactor Control Board

Battery Contactor

Relay and PCB Ground

F11 (125A) BCA/1 SAM, BAT 1
F12 (125A) BCA/2 VPDM, BAT 1
F13 (125A) BCA/3 VPDM, BAT 2
F10 (200A) S5 Inverter LVD, BAT
F14 (100A) S6 Expansion 1, BAT
F15 (100A) S7 Expansion 2, BAT
F16 (100A) S8 Expansion 3, BAT
CB1 (150A) S9 Hi Current TRLR RCPT, BAT

BCA – Full variant, Date: 01/13/16
Refer to Module 39E For Additional Information

sSAM
(Single Signal Activation Module)

ST2/1
X5/17
ST1/1

X3/2 Bi-Stable Relay 1 (House), Feedback J4/K8
X3/15 VPDM Cab Loads BAT, Feedback J4/C5
X3/16 Bi-Stable Relay, House Control, Close J4/C8
X3/13 Bi-Stable Relay, House Control, Open J4/C7
X3/5 Bi-Stable Relay 2 (House), Feedback J4/H1
X3/9 VPDM Power Supply 1, Feedback J4/A7
X3/12 VPDM Power Supply 2, Feedback J4/C6
X3/6 Bi-Stable Relay 3 (Basic), Feedback J4/H4
X3/18 Bi-Stable Relay, Basic Control, Close J4/A4
X3/17 Bi-Stable Relay, Basic Control, Open J4/A5
X3/8 Bi-Stable Relay 4 (Basic), Feedback J4/H3
X3/1 D+ Relay Control J4/A3
X3/4 Ignition (IGN_1), Relay Control J4/A8
X2/18 PT Early WakeUp J4/A6
X3/7 Trailer Option Power #1, Relay Control J4/C1
X3/10 Retained Accessory, Relay Control J4/C3
X3/3 Mirror Heating, Relay Control J4/C2

Note: All relays control logic from sSAM to vPDM are source grounds

cTP (common Telematic Platform), GND J6/B10

Lane Departure/Guidance, GND J6/A10
Camera/Video/Imaging System, GND J7/B7
Collision Avoidance/Obstacle Detection System, GND J7/B9
3PC (third party connector), GND J6/A11
ABS Power Return 1, GND_DE J6/B11
Instrument Cluster, GND_DE J6/B7
Diagnostics Connector, GND1 J6/D8
Diagnostics Connector, GND2 J6/E8
CGW, GND J6/B8
SRS Airbag, GND J6/E10
Fleet Management System, GND J6/A9
Tire Pressure Monitoring, GND J7/B11
Air Suspension (ECAS), GND J7/B6

VPDM, GND, EXM J4/E1
VPDM, GND, EXM J4/E2
VPDM, GND Splice 1 J8/A2
VPDM, GND Splice 2 J8/B2
VPDM, GND Splice 3 J8/C2
VPDM, GND Splice 4 J8/D2
VPDM, GND VPMD, GND

VPDM, BAT 2
VPDM, BAT 1

F1 (3A)
F2 (50A) RE1 bR
F3 (50A) RE2 bR
F4 (50A) RE3 bR
F5 (50A) RE4 bR

RE5 HCR
RE6 Micro
RE7 HCR
RE8 HCR
RE9 Mini
RE10 Micro
RE 24 uMicro
RE25 Micro
RE12 Mini
RE13 uMicro
RE14 uMicro
RE15 uMicro
RE16 uMicro
RE17 uMicro
RE18 uMicro
RE19 uMicro
RE20 Micro
RE21 Micro
RE22 Mini
RE23 HCR

J8/A1 VPDM Cab Loads, BAT

F73 (5A) J5/A8 cTP (common Telematic Platform), PWR
F75 (10A) J5/A5 3PC (third party connector), PWR
F76 (10A) J6/E6 3PC (third party connector), BAT
F65 (5A) J7/B2 Collision Avoidance/Obstacle Detection System, BAT
F6 (10A) J7/A11 Methane Detect / CPC/DEF PUMP, PWR
F7 (5A) J7/A9 Predictive Cruise Control (IPPC), PWR
J5/A11 Clock / Telematics, PWR
F8 (20A) J4/J3 Spot Light, BAT
F9 (20A) J4/J4 12V Power Receptacle 3 (Sleeper, Cigar), BAT
F10 (3A) J4/J5 12V Power Receptacle 4 (Sleeper, Cigar), BAT (Unused)
J4/H8 Reading Lamp Front, BAT
F11 (10A) J4/H6 Auxiliary Circulation Fan, Sleeper, BAT
J4/H7 Sleeper Lighting, BAT
F12 (20A) J5/B2 12V Power Receptacle 5, BAT
F13 (20A) J5/C2 Power Feed Spare Output 4, BAT
F14 (20A) J5/D2 Expansion Fuse 7 / Lane Departure/Guidance, BAT
F15 (20A) J5/E2 Power Feed Spare Output 6/ Lift Axle, BAT
F16A (20A) J6/A12 Radio/C5 & Displays, BAT/PWR
F16B (20A) J6/A12 Radio/C5 & Displays, BAT/PWR
F17B (10A) J6/E2 Fleet Management System, BAT/PWR
F17A (10A) J6/E2 Fleet Management System, BAT/PWR
F18B (20A) J6/D2 12V Power Receptacle 1 (Dash, Cigar), BAT/IGN
F18A (20A) J6/D2 12V Power Receptacle 1 (Dash, Cigar), BAT/IGN
F19A (25A) J6/B2 CB Radio, BAT/IGN
J6/C2 12V Power Receptacle 2 (Dash, Phone), BAT/IGN
F19B (25A) J6/B2 CB Radio, BAT/IGN
J6/C2 12V Power Receptacle 2 (Dash, Phone), BAT/IGN
F20 (20A) J4/G1 12V Power Receptacle 6, (refrigerator), BAT
F21 (20A) J5/B11 Power Feed Spare Output 1, BAT
F22 (20A) J5/C11 Power Feed Spare Output 2, BAT
F23 (20A) J5/B9 Power Feed Spare Output 3, BAT
F24 (20A) J7/F2 Heated Seats, IGN
F25 (25A) J6/B12 ABS Power Feed 2, BAT
J6/E11 Cabin HVAC Controller, BAT
F27 (3A) J4/H5 Sleeper HVAC Controller, BAT
F28 (30A) J8/B1 Cabin HVAC Fan Motor, BAT
F29 (30A) J4/F1 Sleeper HVAC Fan Motor, BAT
J7/F12 Auxiliary Coolant Heater, BAT
F30 (20A) J4/B3 Auxiliary Cab Heater, BAT
F31 (5A) J5/D11 Tire Pressure Monitoring, BAT
J5/D10 Transmission Shift Control Panel, BAT
F32 (5A) J5/E11 Instrument Cluster, BAT
J5/E10 Central Gateway (CGW), BAT
F33 (5A) J5/C9 Exp Fuse 3/Mirror Camera, BAT
F34 (10A) J5/D9 Air Suspension (ECAS), BAT
F35 (10A) J5/D12 Dash Splicepack, BAT
F66 (5A) J6/F12 D+ Expansion, Signal 1
J6/F11 D+ Expansion, Signal 2
F37 (20A) J7/D9 Air Dryer, CTRL
F38 (10A) J7/E9 Air Dryer, Spitter Valve/Heated Drain, CTRL
F39 (30A) J7/E10 Lube System, CTRL
J7/C9 Fuel Water Separator Heater Element, CTRL
F40B (3A)
F40A (3A) J4/G4 Auxiliary Coolant Heater, Enable/BAT
J4/G5 Auxiliary Cab Heater, Enable/BAT
F41 (5A) J5/E1 Fleet Mgt Sys, cTP, ABB, IGN
F26 (30A) J5/D1 ABS Power Feed 1/ Fuel Water Separator HTR, BAT
F43 (30A) J7/C1 Trailer ABS Connector (7)/ABS ECU, IGN
PLC FILTER
F44 (10A) J6/B4 Dash Switch / Splicepack, IGN
F45 (5A) J6/D5 PTO/Expansion Fuse 4, IGN
F63 (10A) J7/F5 Lane Departure/Guidance, IGN
F81 (10A) J6/E5 Collision Avoidance/Obstacle Detection System, IGN
J6/D1 Cabin HVAC Controller, IGN
F46 (5A) J6/E1 Instrument Cluster, IGN
J6/F1 SRS Airbag, IGN
F48 (15A) J7/E1 Expansion Fuse 9, IGN
F64 (5A) J7/B1 Camera/Video/Imaging System, IGN
F50 (10A) J7/D1 Bdy Bldr / Opt Idle Alarm / Lockout Sol / Fuel Sender, IGN
F51 (15A) J7/A1 ICM / Electric Fan, IGN
F74 (10A) J6/F3 3PC (third party connector)/MMI/WSPC, IGN
F67 (5A) J6/F2 Driver Camera/Common Telematic Platform (cTP), IGN
F77 (7.5A) J7/E8 LED Headlamp, Driver side
F78 (7.5A) J7/E5 LED Headlamp, Passenger side
F61B (20A) J7/A10 Trailer Option Power #1, CTRL/BAT
F61A (20A) J7/A10 Trailer Option Power #1, CTRL/BAT
F52 (25A) J5/B12 ABS/Expansion Fuse 1, BAT
F53 (30A) J5/C12 DEFLine Heater 3/Expansion Fuse 2, BAT
F54 (15A) J7/D12 DEF Line Heater #1
J7/A12 DEF Line Heater #2
J7/B10 DEF Line Heater #3
F71 (10A) J5/E9 OBD J1939, BAT
F47 (10A) J7/E2 TCU, IGN
F49 (5A) J7/D2 CPC/MCM/ACM/TCM/ECM, IGN
F79 (15A) J7/F1 DEF Pump, CTRL
F69A (25A) J4/J2 Door Control, Driver, BAT/PWR
F69B (25A) J4/J2 Door Control, Driver, BAT/PWR
F70A (25A) J4/J1 Door Control, Passenger, BAT/PWR
F70B (25A) J4/J1 Door Control, Passenger, BAT/PWR
F68 (5A) J6/D11 Expansion Fuse 5, ACC
J6/D12 Expansion Fuse 6, ACC
F56 (5A) J6/C12 Radio, ACC
F57 (20A) J6/E12 Amplifier, ACC
F58 (15A) J7/E11 Auxiliary Mirror Heating, Driver
J7/F11 Auxiliary Mirror Heating, Passenger
J7/F8 DEF Pump / Auto Neutral, Terminal 30
J7/F10 DEF Pump / Auto Neutral, Terminal 87
J7/F9 DEF Pump/ Auto Neutral, Terminal 85
J7/A2 DEF Pump/ Auto Neutral, Terminal 86
J7/F6 PTO #1, Terminal 30
J7/F7 PTO #1, Terminal 87
J7/F6 PTO #1, Terminal 85
J7/B3 PTO #1, Terminal 86
J7/D3 PTO #2, Terminal 30
J7/C4 PTO #2, Terminal 87
J7/C3 PTO #2, Terminal 85
J7/D4 PTO #2, Terminal 86
F60 (15A) J7/E7 ATS, PWR

VPDM – 43T Full variant, 12FEB2020
Refer to Module 285 For Additional Information

Engine Controller

DEF Line Heater, LS Control J7/B5
DEF Pump Relay, HC Control J7/C2
ATS PWR, LS Control J7/B4

Remote Start Stop, Terminal 30 J7/F3
Remote Start Stop, Terminal 87 J4/E4
Remote Start Stop, Terminal 85 J7/E3
Remote Start Stop, Terminal 86 J7/F4
DEF LINE Heater 3/Spare Relay 1, Terminal 30 J5/C3
DEF LINE Heater 3/Spare Relay 1, Terminal 87 J5/B4
DEF LINE Heater 3/Spare Relay 1, Terminal 85 J5/B3
DEF LINE Heater 3/Spare Relay 1, Terminal 86 J5/C4
Spare Relay 2, Terminal 30 J5/E3
Spare Relay 2, Terminal 87 J5/D4
Spare Relay 2, Terminal 85 J5/D3
Spare Relay 2, Terminal 86 J5/E4
Spare Relay 3, Terminal 30 J5/A12
Spare Relay 3, Terminal 87a J5/F11
Spare Relay 3, Terminal 87 J5/E12
Spare Relay 3, Terminal 85 J5/F9
Spare Relay 3, Terminal 86 J5/F8
Spare Relay 4, Terminal 30 J6/A2
Spare Relay 4, Terminal 87a J6/C1
Spare Relay 4, Terminal 87 J6/A1
Spare Relay 4, Terminal 85 J5/F4
Spare Relay 4, Terminal 86 J5/F5
Spare Relay 5, Terminal 30 J6/D9
Spare Relay 5, Terminal 87a J6/C9
Spare Relay 5, Terminal 87 J6/B9
Spare Relay 5, Terminal 85 J6/C8
Spare Relay 5, Terminal 86 J6/C10
Spare Relay 6, Terminal 30 J8/D1
Spare Relay 6, Terminal 87 J8/C1
Spare Relay 6, Terminal 85 J6/A5
Spare Relay 6, Terminal 86 J6/A7

Approved Fuse/CB Type & Description

FU/CB POS	FU/CB TYPE	RATING (Amps)	Standard (S) Optional (O)	FUSE LABEL DESCRIPTION
F01	FU	3A	S	VPDM,RELAY COIL, BAT1
F02	JCASE	50A	S	HOUSE LOAD 1, BAT1
F03	JCASE	50A	S	HOUSE LOAD 2, BAT1
F04	JCASE	50A	S	BASIC LOAD 1, BAT1
F05	JCASE	50A	S	BASIC LOAD 2, BAT1
F06	FU	10A	S	METHANE DETECT/CPC/DEF PUMP, PWR
F07	FU	5A	S	IPPC/CLOCK/TELEMATICS, PWR
F08	FU,T2,T3	10/20A	O	SPOT LAMP, BAT1
F09	FU,T2,T3	20A	S	12V PWR RCPT 3&4 SLPR, BAT1
F10	FU,T2,T3	3A/5A	S	READING LAMP FRONT, BAT1
F11	FU,T2,T3	10A	O	SLEEPER LAMP/AUX CIRC FAN, BAT1
F12	FU,T2,T3	20A	S	12V PWR RCPT 5 SLPR, BAT1
F13	FU,T2,T3	10/20A	O	PWR FEED OUTPUT 4, BAT1
F14	FU,T2,T3	10A	O	EXP. FUSE 7/LANE DEP/GUIDANCE, BAT1
F15	FU,T2,T3	20A	O	PWR FEED OUTPUT 6/LIFT AXLE, BAT1
F16A/B	FU	20A	S	RADIO/CONNECT-5, BAT1/PWR
F17A/B	FU,T2,T3	10A	O	FLEET MGT SYS, BAT1/PWR
F18A/B	FU,T2	20A	S	12V PWR RCPT 1,DASH/CIGAR, BAT1/IGN
F19A/B	FU,T2	25A	S	CB RAD/12V PWR RCPT 2,DASH, BAT1/IGN
F20	FU,T2,T3	20A	O	12V PWR RCPT 6, FRIG, BAT1
F21	FU,T2,T3	10/20A	O	PWR FEED OUTPUT 1, BAT1
F22	FU,T2,T3	10/20A	O	PWR FEED OUTPUT 2, BAT1
F23	FU,T2,T3	10/20A	O	PWR FEED OUTPUT 3, BAT1
F24	FU	20A	O	HEATED SEAT, IGN
F25	FU,T2,T3	25A	S	ABS POWER FEED 2, BAT1
F26/F26A	FU,T2,T3	30A	S	ABS POWER FEED 1 / FUEL WATER SEP HTR, BAT1
F27	FU	3A	S	FCU/ACU HVAC CTRLR, BAT1
F28	JCASE	30A	S	CAB HVAC FAN MOTOR, BAT1
F29	JCASE	30A	S	SLEEPER HVAC FAN MOTOR, BAT1
F30	FU,T2,T3	20A	S	AUX CAB/AUX COLNT HTR, BAT1
F31	FU	5A	O	TIRE PRESS/TRANS SHFT CTRL, BAT1
F32	FU	5A	S	CGW/INST CLUSTER, BAT1
F33	FU,T2,T3	5A	O	EXP FUSE 3/MIRROR CAMERA, BAT1
F34	FU,T2,T3	10A	O	AIR SUSPENSION (ECAS), BAT1
F35	FU,T2,T3	10A	S	DASH SPLICEPACK, BAT1
F37	FU,T2,T3	20A	S	AIR DRYER CONTROL, D+
F38	FU,T2,T3	10A	O	LUBE/AIR DRYER/SPIT VLV/HTD DRAIN CTRL, D+
F39	FU,T2,T3	30A	S	FUEL WATER SEP HTR ELEMENT CTRL, D+
F40A/B	FU	3A	O	AUX CAB/AUX COLNT HTR, ENABLE/BAT1
F41	FU,T2,T3	5A	O	FLEET MGT SYS / ABB / COMTEL PLATF, IGN
F43	FU,T2,T3	30A	S	TRAILER ABS CONN (7) & ABS ECU, IGN
F44	FU,T2,T3	10A	S	DASH SWITCH/SPLICEPACK, IGN
F45	FU,T2,T3	5A	O	PTO/EXPANSION FUSE 4, IGN
F46	FU	5A	S	INST CLSTR/SRS/CAB HVAC CTRLR, IGN
F47	FU,T2	10A	O	TRANS CTRL UNIT (TCU), IGN
F48	FU	15A	O	EXPANSION FUSE 9, IGN
F49	FU,T2	5A	S	CPC / MCM / ACM / TCM / ECM, IGN
F50	FU	10A	O	BDY BLDR/OI ALM/LKOUT SOL/FL SNDR, IGN
F51	FU	15A	O	ICM/ELECTRIC FAN, IGN
F52	FU,T2,T3	25A	S	ABS / EXPANSION FUSE 1, BAT2
F53	FU,T2,T3	30A	O	DEF HTR 3/EXPANSION FUSE 2, BAT2
F54	FU,T2,T3	30A	S	DEF LINE HEATER #1/#2/#3 CTRL
F56	FU	5A	S	RADIO, ACC
F57	FU,T2,T3	20A	O	AMPLIFIER, ACC
F58	FU,T2,T3	15A	O	AUX MIR HEAT,DRIVER/PASS CTRL
F60	FU,T2,T3	15A	S	AFTER TREATMENT SYS (ATS) CTRL
F61A/B	FU,T2,T3	20A	O	TRAILER OPTION POWER #1, CTRL/BAT2
F63	FU	10A	O	LANE DEPARTURE/ GUIDANCE, IGN
F64	FU	5A	O	CAMERA/VIDEO/IMAGING SYS, IGN
F65	FU	5A	S	COLL AVOID/OBSTACLE DET SYS, BAT1
F66	FU,T2,T3	5A	O	D+ EXPANSION, SIGNAL 1 & 2
F67	FU	5A	O	DRIVER CAMERA / COM TELEMATIC PLATF, IGN
F68	FU,T2,T3	5A	O	EXPANSION FUSE 5/6, ACC
F69A/B	FU	25A	S	DOOR CONTROL, DRIVER, BAT1/PWR
F70A/B	FU	25A	S	DOOR CONTROL, PASS, BAT1/PWR
F71	FU,T2	10A	S	OBD J1939, BAT1
F73	FU,T2,T3	5A	O	COM TELEMATIC PLATF (CTP), PWR
F74	FU	10A	O	THIRD PARTY CONN / WSPC /MMI, IGN
F75	FU,T2,T3	10A	O	THIRD PARTY CONN (3PC), PWR
F76	FU	10A	O	THIRD PARTY CONN (3PC), BAT1
F77	T2	7.5A	S	LED HEADLAMP DRIVER, BAT1
F78	T2	7.5A	S	LED HEADLAMP PASSENGER, BAT1
F79	FU	15A	O	DEF PUMP CTRL
F81	FU	10A	S	COLL AVOID/OBSTACLE DET SYS, IGN

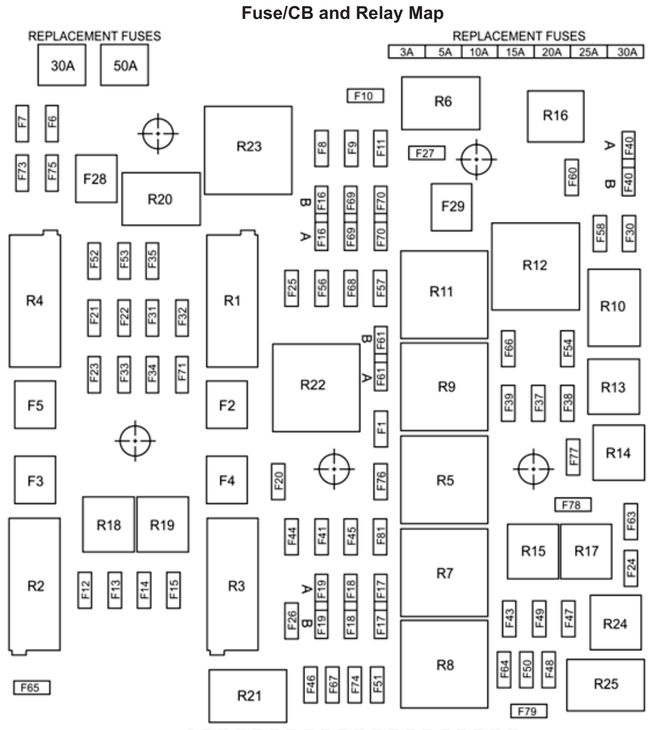
Fuse Legend

2A
3A
5A
7.5A CB
10A
15A
20A
25A
30A
30A J-CASE
40A J-CASE
50A J-CASE

Relay Type & Description

RELAY POS	RELAY TYPE	Standard (S) Optional (O)	RELAY LABEL DESCRIPTION
RE1	Bi-Stable	S	HOUSE LOAD 1
RE2	Bi-Stable	S	HOUSE LOAD 2
RE3	Bi-Stable	S	BASIC LOAD 1
RE4	Bi-Stable	S	BASIC LOAD 2
RE5	HCR	S	D+/ ALTERNATOR CHARGING
RE6	Micro	O	AUX CAB/AUX COLNT HTR
RE7	HCR	S	IGNITION
RE8	HCR	S	IGNITION
RE9	Mini	O	TRAILER
RE10	Micro	S	DEF LINE HEATER
RE11	HCR	S	ACCESSORY
RE12	Mini	O	MIRROR HEAT
RE13	U-Micro	O	DEF PUMP/AUTO NEUTRAL
RE14	U-Micro	O	POWER TAKE OFF #1
RE15	U-Micro	O	POWER TAKE OFF #2
RE16	U-Micro	S	AFTER TREAT SYS (ATS)
RE17	U-Micro	O	SPARE RELAY 9
RE18	U-Micro	O	DEF LINE HTR/ SPARE RELAY 1
RE19	U-Micro	O	SPARE RELAY 2
RE20	micro	O	SPARE RELAY 3
RE21	micro	O	SPARE RELAY 4
RE22	mini	O	SPARE RELAY 5
RE23	HCR	O	SPARE RELAY 6
RE24	U-Micro	S	IGN/PTEARLY WAKE UP
RE25	Micro	O	DEF PUMP

Fuse/CB and Relay Map



Key Position Legend

PWR => 24 keep alive powered

BAT => Powered during key off

IGN => Powered during key on/crank

ACC => Powered during key on

GND => See 28G GND architecture

Relay Legend

bR => Bistable relay

HCR => High Curret relay

Mini => ISO mini relay

Micro => ISO micro relay

uMicro => ISO ultra micro relay

Spare relay trace sizing

uMicro => 20A

Micro => 30A

Mini => 50A

HCR => 80A

Control => 5A for all relays

NOTE BR: Bistable relays magnetically latch in either the open or closed state with a pulse from the SAM as battery charge levels are reached. SAM will check the state of the relay on ignition transition. The ignition switch should be cycled after replacing a bistable relay.

Daimler Trucks North America
Title: NGC sSAM, VPDM & BCA - Wall Chart
Author: Mechatronics - Body Control Systems
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