

# Schematic

## 120H, 135H, Motor Grader (NA Version) 120H Motor Grader (Australian Version) Electrical System

120H:  
4MK404-UP  
2AN104-UP  
6YN1-UP

135H:  
BDJ1-UP  
3YK261-UP

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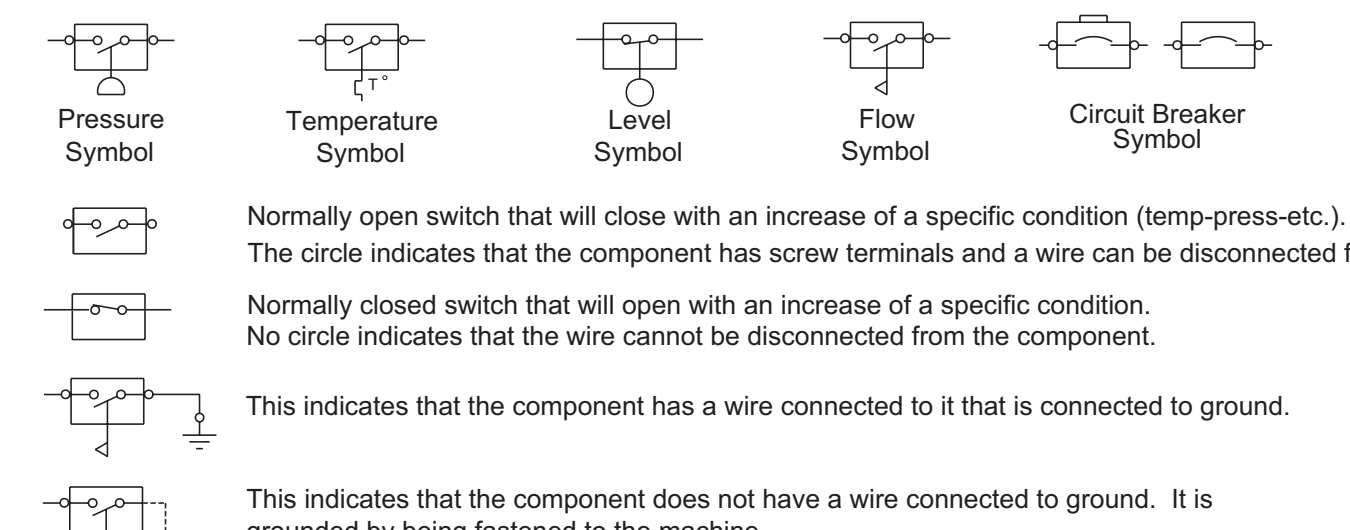
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Part No.	Function	Actuate	Deactuate	Contact Position
8T-9793	Engine Coolant Temperature	107.0 ± 3.0°C (224.6 ± 5.4°F)	93.00°C (199.4°F)	Normally Closed
3E-2033	Brake/Park Brake Air Pressure	640 kPa MAX (92.0 psi MAX)	550 ± 40 kPa (77.0 ± 6.0 psi)	Normally Open
8C-3569	Coolant Temperature (Start Aid)	38.3°C (100.4 ± 5.4°F)	(80.6°F MIN)	Normally Closed
8T-8540	Steering Pressure	1208 kPa MAX (175 psi MAX)	700 ± 103 kPa (101.5 ± 15 psi)	1-2 NC 1-3 NC
9X-0378	Engine Oil Pressure	62.0 kPa MAX (9.0 psi MAX)	38 ± 20 kPa (5.5 ± 3.0 psi)	Normally Open
115-7103	Fuel Pressure (EMS)	13.5 ± 3.0 (psi)	10.0 ± 3.0 (psi)	Normally Closed
111-7088	Inching Pedal Pressure	75.0 kPa MAX (10.8 psi MAX)	50.0 kPa MIN (7.3 psi MIN)	Normally Open
114-5334	Refrigerant Pressure (A/C)	2780/1750 Pa* (40/10.25 psi)	1023°C 90°C	Normally Open*
125-9352	Stop Lamp Pressure	48 ± 20 kPa MAX (7 ± 3 psi MAX)	30°C (86.0°F)	Normally Open
131-4135	Hydraulic Oil Temperature	102.3°C (215.6 ± 5.4°F)	90°C (194.0°F)	Normally Closed

\* With increasing pressure the closed condition can be maintained up to 2800 kpa (405 psi), with decreasing pressure the closed condition can be maintained down to 170 kpa (25psi).

\* Contact position at the contacts of the harness connector.

### Electrical Schematic Symbols And Definitions



This indicates that the component has a wire connected to it that is connected to ground.

This indicates that the component does not have a wire connected to ground. It is grounded by being fastened to the machine.

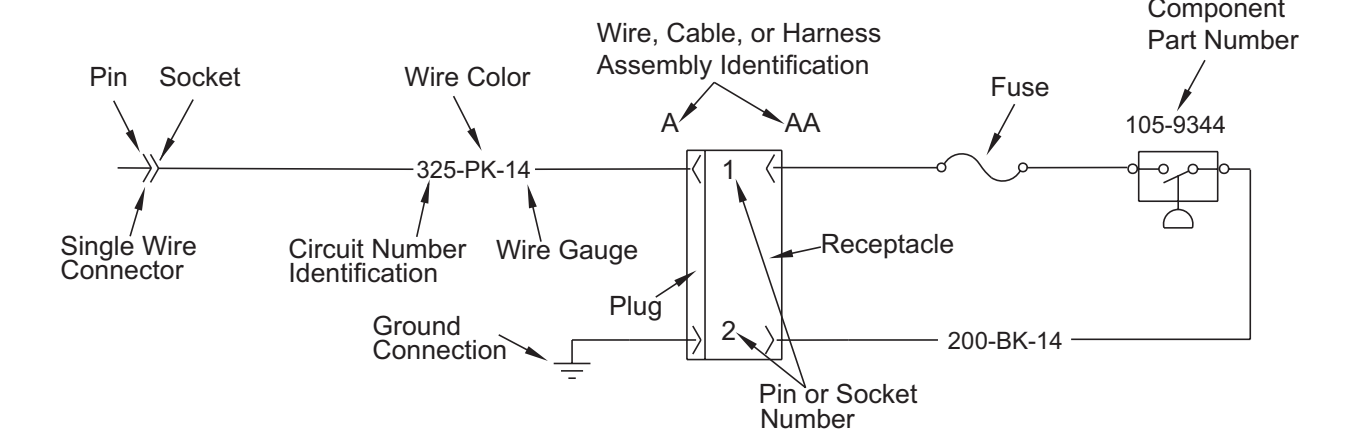
Reed Switch - A switch whose contacts are controlled by a magnet. A magnet closes the contacts of a normally open reed switch; it opens the contacts of a normally closed reed switch.

Sender - A component that is used with a temperature or pressure gauge. The sender measures the temperature or pressure. Its resistance changes to give an indication to the gauge of the temperature or pressure.

Relay (Magnetic Switch) - A relay is an electrical component that is activated by electricity. It has a coil that makes an electromagnet when current flows through it. The electromagnet can open or close the switch part of the relay.

Solenoid - A solenoid is an electrical component that is activated by electricity. It has a coil that makes an electromagnet when current flows through it. The electromagnet can open or close a valve or move a piece of metal that can do work.

### Harness And Wire Symbols



Typical representation of a Deutsch connector. The plug contains all sockets and the receptacle contains all pins.

Typical representation of a Sure-Seal connector. The plug and receptacle contain both pins and sockets.

Code	FI	MI	Description
11	N/A		No diagnostics active
12	N/A		No logged diagnostic codes
21-28	641-648F05		Transmission Solenoid* open circuit
31-38	641-648F06		Transmission Solenoid* short to ground
41-48	641-648F03		Transmission Solenoid* short to battery
52	637 F06		Backup alarm short to ground
58	688 F06		VHP solenoid short to ground
59	688 F03		VHP solenoid short to battery
61	688 F02		Shift lever input invalid
62	688 F03		Shift lever open circuit/short to +battery
63	269 F00		Sensor supply voltage above normal
64	269 F01		Sensor supply voltage below normal
65	701F02		Transmission Output Speed Signal (TOS) incorrect
68	168 F01		System voltage below normal
71	520 F02		Invalid transmission configuration code
72	268 F02		Check programmable parameters
73	764 F05		Transmission indicator lamp open circuit
74	764 F06		Transmission indicator lamp short to ground
75	764 F03		Transmission indicator lamp short to +battery
80	162 F01		Transmission of temperature sender short to +battery or open circuit
76	177 F04		Transmission of temperature sender short to ground
81	868 F05		Auto/Manual lamp open circuit
82	868 F06		Auto/Manual lamp short to ground
83	868 F03		Auto/Manual lamp short to +battery

The last digit in the CID number identifies the solenoid.  
Solenoid 1 is Solenoid A, Solenoid 2 is Solenoid B, etc.

Wire Number	Wire Color	Description	Wire Number	Wire Color	Description
<b>Power Distribution Circuits</b>					
101	RD	Bat (+)	500	BR	Wiper - Front (Park)
102	BU	H/L Lmp	501	GN	Wiper - Front (Low)
103	YL	Tail Lamp	502	GN	Wiper - Front (Hi)
105	BR	Key Sw	503	BR	Wiper - Rear (Park)
107	WH	Eng Shut	504	YL	Wiper - Rear (Low)
108	BU	Dome Lamp	505	BU	Wiper - Rear (Hi)
109	OR	Air Outlet (1 Term)	506	PJ	Washer - Front
112	PJ	Main Power Fly Output	507	WH	Washer - Rear
113	OR	Qtr Mon Panel B- Switched	508	PJ	Radio Speaker - Left
114	GN	Warning Horn (Forward)	509	WH	Radio Speaker - Left (Common)
115	PK	Light Bar	511	BR	Radio Speaker - Right
116	BR	Rear Floods	512	OR	Radio Speaker - Right (Common)
118	GY	Upper Wiper/Washer	513	OR	A/C Compressor/Refrigerant Pressure SW
119	PK	Rear Wiper/Washer	515	GY	Blower Motor (Low)
122	BU	Air Dryer	518	GN	Blower Motor (Medium)
124	GN	A/C	517	BU	Blower Motor (Low)
126	PK	Kornn Ckt	521	YL	A/C SW To Refrigerant SW
129	BU	Cigar Lighter	522	WH	A/C Clutch To Throttle SW
130	GN	Stop Lamps	537	GN	Turn Signal SW To Flasher
134	YL	Suppl Steer	556	WH	Differential Lock
135	BU	Converter To Radio	570	BU	Brake Cushion Sol
136	GN	Suppl Steer	575	YL	Wiper - Aux (Park)
141	PK	Front Defroster	576	PK	Wiper - Aux (Low)
144	GN	Beacon	577	PJ	Wiper - Aux (Hi)
147	PJ	Converter	578	BU	Washer - Aux
149	PJ	Brake Floods	584	YL	Wiper SW Jumper
151	GN	Rear Defroster	582	BU	DC/DC Converter Power Output
152	BU	Lower Wiper/Washer	583	GN	Condenser Fan Relay To Motors
158	BR	A/C Condenser Motors	597	PJ	A/C Hi Press. Output SW To Low Press. SW
160	PK	Front Lamp	A503	PK	Front Defroster Fan (Low)
165	YL	D/R Lamp	A504	GN	Rear Defroster Fan (Low)
169	PK	Blade Control	A506	OR	Front Defroster Fan (Hi)
173	YL	Turn Signals	A507	YL	Rear Defroster Fan (Hi)
176	OR	Converter	A513	PK	DC/DC Converter Memory Output
<b>Ground Circuits</b>					
200	BK	Main Chassis	600	BR	Dash Lamp Basic
201	BK	Operator Monitor Return	601	GY	Dash Lamp Hi
202	BK	KMSN Ckt	603	PK	Releay Beacon
276	BK	KMSN Ckt Ident Code 0	604	PK	Stop Lamp
277	BK	KMSN Ckt Ident Code 1	605	YL	Turn Lamp - Left
278	BK	KMSN Ckt Ident Code 2	606	GY	Turn Lamp - Right
<b>Basic Machine Circuits</b>					
301	BU	Starter No. 1 Sol	609	YL	Front Lamp - Side
304	WH	Starter Relay No. 1 Output	611	PJ	Head Lamp Hi
306	GN	Starter Relay Coil To Next Start SW Or Key SW	614	PJ	Brk/Tail/Dash/Lamp
307	OR	Key SW To Next Start SW	619	GN	Head Lamp Lo
308	YL	Main Power Relay Coil	629	PK	Aux Head Lamp
310	PJ	Start Aid SW To Start Aid Sol	<b>Control Circuits</b>		
311	WH	Start Aid Sol To Relay SW	727	GN	Suppl Steer Motor Relay
321	BR	Backup Alarm Lamp Travel Alarm	728	BU	Suppl Steer Cont SW
322	GY	Warning Horn (Forward)	751	GN	KMSN Shift Sol No. 1 Or 3
326	PJ	Key SW (12 Term)	752	YL	KMSN Shift Sol No. 2
327	PK	Shutdown Sol	754	BU	KMSN Shift Sol No. 3 Or 1
334	BU	Start Aid Sol #2	755	OR	KMSN Shift Sol No. 4 Or 5
373	GN	Start Aid Switch To Timer	755	YL	Dual Hp Sol
<b>Monitoring Circuits</b>					
403	GN	Alternator (Hi Term)	F759	BU	AWD To Inch Pedal SW
404	YL	Qtr Mon Hyd Oil Temp	F759	BU	Centralized Solenoid
405	GY	Qtr Mon Oil Press. (Low Setting)	882	BR	Start Mod Right (-) Port/CAT Data Link (-)
406	PJ	Qtr Mon Coolant Temp	883	GN	Start Mod Right (+) Port/CAT Data Link (+)
408	WH	Qtr Mon System Air Press	F843	YL	Inching Pedal
409	OR	Qtr Mon Heat	G858	OR	AWD Approximate Ckt Lever
410	WH	Qtr Mon Action Alarm	900	PJ	KMSN Shift Sol No. 4
411	PK	Qtr Mon Master	901	WH	KMSN Shift Sol No. 6
413	BR	Qtr Mon Fuel Press	902	BR	KMSN Shift Sol No. 7
415	OR	Qtr Mon Test SW	903	GY	KMSN Shift Sol No. 8
417	GY	Primary Star SW	921	WH	KMSN Sol No. 1 Or 3 Return
419	YL	Qtr Mon Parking Brake	E937	PJ	MG MESH CNTL - Redundant Neutral
439	YL	Lamp Indicator	E938	OR	MG MESH CNTL - First Gear
441	OR	Eng Coolant Temp Gauge	E938	WH	MG MESH CNTL - Second Gear
447	PK	Fuel Level Gauge	E940	BU	MG MESH CNTL - Third Gear
449	BU	Spotom Sender (Signal No. 1)	E941	YL	MG MESH CNTL - Fourth Gear
450	YL	Tach Sender (+)	E942	GN	MG MESH CNTL - Fifth Gear
462	YL	Suppl Steer Motor Indicator	E943	BR	MG MESH CNTL - Sixth Gear
467	WH	System Fault (Open)	E944	GY	MG MESH CNTL - Seventh Gear
485	YL	Qtr Mon Panel AWD Fault	E945	PJ	MG MESH CNTL - Eighth Gear
488	WH	Air SW To Air SW Jumper	E946	OR	MG MESH CNTL - Forward Direct
488	WH	D/R Lock Indicator	E947	WH	MG MESH CNTL - Reverse Direct
A29	YL	Activation Indicator	E948	BU	MG MESH CNTL - Park
G434	BU	AWD Hydraulic Temp Sensor (w/6 B28)	E949	YL	MG MESH CNTL - Neutral
G460	GN	Transmission Temperature SW	E975	PJ	MESH Lamp
			M917	PK	TDS Sensor +
			M918	GN	TDS Sensor -
			M958	OR	Transmission Autoshift Mode

Title	Form Number
Alternator (N4-9294 35A): STD	SEN4978
Consist No. 3T-6352	SEN2082
Consist No. 7N-9720	SEN4130
Consist No. 9G-4574	SEN2082
Alternator (100-5047 50A): ATT	SEN2083
Electronic Monitoring System	SEN2945
Electronic Transmission Shift Control	SEN9167
Starting Aid Charging Systems	SEN2947
Starter Motor (106-6504)	SEN3381
Consist No. 6V-5207	SEN3381
Consist No. 6V-5203	SEN3381
Consist No. 6V-5226	SEN4975

FMI No.	Failure Description
0	Data valid but above normal operational range.
1	Data valid but below normal operational range.
2	Data erratic, intermittent, or incorrect.
3	Voltage above normal or shorted high.
4	Voltage below normal or shorted low.
5	Current below normal or open circuit.
6	Current above normal or grounded circuit.
7	Mechanical system not responding properly.
8	Abnormal frequency, pulse width, or period.
9	Abnormal update.
10	Abnormal rate of change.
11	Failure mode not identifiable.
12	Bad device or component.
13	Out of calibration.

\*The FMI is a diagnostic code that indicates what type of failure has occurred.

Component	Schematic Location	Machine Location	Component	Schematic Location	Machine Location
Alarm - Action	B-6	C	Resistor - Panel Lamp Dimmer	E-9	B
Alarm - Backup	F-6	1	Sender - Activation	C-12	29
Alternator (35A STD)	D-14	2	Senders-Engine Coolant Temp	A-14	24
Arc - Suppressor	E-14	3	Sender - Fuel Level	A-13	25
Battery	C-14	5,6	Sensor-Engine Speed	B-14	26
Beacon	C-10	7	Sensor - Transmission Oil Temp	E-15	27
Breaker - Alternator (35A)	A-12	7	Sensor - Transmission Speed	D-15	28
Breaker - Converter (15A)	D-13	8	Solenoid - A/C Clutch - Rear	A-13	22
Breaker - Converter (15A)	F-11	13	Solenoid - Centershift	B-3	29
Breaker - Headlamp (15A)	D-10	8	Solenoid - Differential Lock	E-14	4
Breaker - Lighter (15A)	D-10	8	Solenoid - Dual Horsepower	A-13	22
Control - A/H Timer	D-9	8	Solenoid - Dual HP/Shutdown	A-12	22
Control - Engine Shutdown	E-13	9	Solenoid - Forward Horn	F-3	10
Control - Neutral Start	A-6	10	Solenoid - Park Brake	B-11	10
Control - Supplemental Steer	E-13	9	Solenoid - Start Aid	A-13	25
Control - Transmission	A-7	11	Solenoids - Blade Cushion	E-2	30
Converter - Voltage	F-8, F-10	12	Solenoids - Transmission Valve (B)	D-15, E-15	27
Converter - Voltage	F-12	13	Switch - A/C Refrigeration	A-13	22
Flasher	E-10	8	Switch - Air Dryer	F-14	31
Fuses	D-9	8	Switch - Autoshift	A-9	C
Fuses (10A)	B-5	C	Switch - Beacon	B-5	C
Gauge - Activation	F-5	A	Switch - Beacon	B-10	C
Gauge - Engine Coolant Temperature	F-5	A	Switch - Blower (A/C)	B-10	C
Gauge - Fuel Level	E-5	A	Switch - Blower (Heater)	A-10	C
Gauge - Speedometer	F-5	A	Switch - Brake Air Pressure	A-2	11
Gauge - System Air Pressure (Left)	E-5	A	Switch - Brake Air Pressure	A-2	11
Gauge - System Air Pressure (Right)	E-5	A	Switch - Centershift Indicator	B-3	29
Headlamp - Defroster Fan (Low)	E-5	A	Switch - Centershift Pin	B-9	C
Lamp - A/H Indicator	D-5	A	Switch - Cushion Blade	B-9	C
Lamp - C Shift Pin	E-5	A	Switch - Defroster (Front)	A-9	C
Lamp - Cold Temperature	E-5	A	Switch - Defroster (Rear)	B-5	C
Lamp - D/R Unlock	E-5	A	Switch - Differential Lock	D-9	B
Lamp - High Beam Indicator	D-6	A	Switch - Disconnector	C-14	6
Lamp - Master Action	E-5	A	Switch - Engine Coolant Temp (Monitor)	B-14	24
Lamp - Transmission A/H	D-6	A	Switch - Engine Coolant Temp (Start Aid)	A-14	24
Lamp - Turn Indicator (Left)	E-5	A	Switch - Engine Oil Pressure	C-13	32
Lamp - Turn Indicator (Right)	E-4	A	Switch - Flood Lamps	D-8	B
Motor - Service	E-10	B	Switch - Forward Horn	E-9	B
Monitor - Electronic Monitoring System (EMS)	E-5	A	Switch - Fuel Pressure	B-13	24
Motor - Blower	A-12	15	Switch - Head/Tail Lamp	E-8	B



