Service Manual

Compact loaders

701s / 701sp



Machine models	**701s/sp**
Edition	**2.0**
Language	**English**
Item no.	**1000164190**

WACKER NEUSON

MidWestTech | Wacker Neuson 701s, 701sp Compact Loader Service Manual | Publication 1000164190

Order the manual at mid-west-tech.com >

Table of contents

Operation

Important information on this service manual 1-1
Identification of warnings and dangers 1-2
Designated use and exemption from liability 1-3
Type labels and component numbers 1-4
Machine overview 1-6
Cab overview 1-7
Cab (legend) 1-7
Round indicating instrument overview 1-8
Round indicating instrument (legend) 1-8
Engine compartment overview 1-9
701s 1-9
701sp 1-10
Engine cover (open): overview 1-11
701s 1-11
701sp 1-12
Chassis overview 1-13
Tilting the cab 1-14

Specifications

Chassis 2-1
Engine 2-1
Fuel injection pump 2-3
Capacity 2-3
Tightening torque 2-3
Travelling drive 2-4
Brakes 2-4
Work hydraulics 2-4
Pilot control 2-5
Additional control circuit + 3rd control circuit 2-5
Electric units 2-6
Fuse box in instrument panel 2-6
Main fuse box with relays 2-6
Relays 2-6
Tyres 2-7
Noise levels 2-7
Vibration 2-7
Coolant compound table 2-7
Dimensions 2-8
Model-specific tightening torques 2-9
General tightening torques 2-9
Tightening torques for hydraulic screw connections (dry assembly) 2-9
Tightening torques for high-resistance screw connections 2-11
Fluids and lubricants 3-1
Additional oil change and filter replacement (hydraulics) 3-2
Maintenance label 3-3
Explanation of symbols on the maintenance label 3-3
Maintenance plan (overview) 3-5
Introduction 3-8
Fuel system 3-9
Specific safety instructions 3-9
Refuelling 3-9
Stationary fuel pumps 3-10
Diesel fuel specification 3-10
Bleeding the fuel system 3-10

MidWestTech | Wacker Neuson 701s, 701sp Compact Loader Service Manual | Public...
Order the manual at mid-west-tech.com >

Emptying the fuel tank ... 3-11
Fuel prefilter with water separator ... 3-11
Replacing the fuel filter ... 3-12
Engine lubrication system ... 3-13
Checking the oil level ... 3-13
Filling up engine oil ... 3-14
Changing engine oil ... 3-14
Replacing the engine oil filter cartridge ... 3-16
Cooling system ... 3-17
Specific safety instructions ... 3-17
Checking/filling up coolant ... 3-18
Draining coolant ... 3-19
Air filter ... 3-20
Replacing the filter ... 3-21
Functional check once a week of the dust valve ... 3-22
V-belt ... 3-23
Checking V-belt tension ... 3-23
Retightening V-belt ... 3-24
Pressure check ... 3-25
General ... 3-25
Standard micro ports ... 3-25
Variable displacement pump measuring points ... 3-26
Preparatory work ... 3-28
Main pressure check (P1 & P2) ... 3-28
Boost pressure check of pump and pilot control pressure check of work hydraulics ... 3-29
Work hydraulics pressure check ... 3-30
Checking the pilot control pressure of the drive hydraulics ... 3-31
Checking the parking brake release pressure ... 3-31
Checking the speed-sensitive control pressure ... 3-32
Checking the pressure of the 3rd control circuit (Power Flow option 701sp) ... 3-32
Test report 701s ... 3-33
Test report 701sp ... 3-35
Hydraulic system ... 3-38
Specific safety instructions ... 3-38
Checking the hydraulic oil level ... 3-39
Bleeding the hydraulic pump ... 3-40
Filling up hydraulic oil ... 3-40
After changing the hydraulic oil ... 3-41
Changing hydraulic oil ... 3-41
Monitoring the hydraulic oil reflux filter ... 3-42
Replacing the reflux filter ... 3-42
Checking hydraulic pressure lines ... 3-43
Travelling drive ... 3-44
Checking the oil level and filling up oil ... 3-44
Draining oil ... 3-44
Tyre maintenance ... 3-45
Tyre check ... 3-45
Wheel change ... 3-45
Raising and jacking up the machine ... 3-46
Removing the wheels ... 3-46
Mounting the wheels ... 3-46
Lubrication work ... 3-47
Loader unit ... 3-47
Lubrication points on the bucket ... 3-47
Maintenance of attachments ... 3-47

MidWestTech | Wacker Neuson 701s, 701sp Compact Loader Service Manual | Public... Order the manual at mid-west-tech.com >

Electrical system 3-48
Specific safety instructions 3-48
Service and maintenance work at regular intervals 3-48
Instructions concerning specific components 3-49
Alternator 3-49
Battery 3-50
Jump-starting the engine 3-50
General maintenance work 3-51
Cleaning 3-51
General instructions for all areas of the machine 3-51
Inside the cab 3-52
Exterior of the machine 3-52
Engine compartment 3-52
Screw connections and attachments 3-52
Pivots and hinges 3-52
Engine 4-1
Turbocharged engine 4TNV84T-XNSS Power Flow (up to serial no. DB00708) 4-1
Engine 4TNV88-XNSS (up to serial no. DB00708) 4-3
Fuel system 4-5
Checking and adjusting valve clearance 4-6
Valve clearance 4TNV88-XNSS (8 valves) 4-6
Valve clearance 4TNV84T-XNSS (16 valves) 4-7
Tightening order for cylinder head bolts 4-8
Checking the injection nozzles 4-9
Pressure check 4-9
Injection nozzle 4TNV88-XNSS (8 valves) 4-9
Injection nozzle 4TNV84T-XNSS (16 valves) 4-9
Checking the nozzle jet 4-10
Injection time 4-10
Checking injection time 4-10
Setting injection time 4-11
Replacement of fuel injection pump 4-12
..... 4-12
Manual/pedal throttle 4-13
Adjusting engine speed 4-13
Compression 4-14
Checking the coolant thermostat 4-14
Checking the thermal switch 4-15
Oil pressure switch 4-15
Checking the coolant circuit 4-15
Turbocharger RHB 31 4-16
Tolerance values 4-17
Engine (tier 3) 4-18
4TNV88-BKNSS (from serial no. DC00713) 4-18
Turbocharged engine 4TNV84T-ZKNSS (from serial no. DC00713) 4-20
Fuel system 4-22
Removing the valve cover 4-23
Checking and adjusting valve clearance 4-23
Valve clearance 4TNV88-BKNSS (8 valves) 4-23
Valve clearance 4TNV84T-ZKNSS (16 valves) 4-24
Tightening order for cylinder head bolts 4-25
Checking the injection nozzles 4-26
Pressure check 4-26
Injection nozzle 4TNV88-BKNSS (8 valves) 4-26
Injection nozzle 4TNV84T-ZKNSS (16 valves) 4-26

MidWestTech | Wacker Neuson 701s, 701sp Compact Loader Service Manual | Public... Order the manual at mid-west-tech.com >

Pressure switch for engine oil pump	0.5 ± 0.1 bar			
Thermostat opening temperature	69.5 – 72.5 °C (157.1 – 162.5 °F)			
Thermal switch	107 – 113 °C (224.6 – 235.4 °F)			
Firing order	1 – 3 – 4 – 2			
Direction of rotation	Counterclockwise (as seen from the flywheel)			
Starting aid	Glow plug (preheating time 10 – 15 s)		Preheater (preheating time 10 – 15 s)	
Max. inclined position (engine no longer supplied with oil):	30 ° in all directions Observe the machine's tilting limit (20° laterally)!			
Max. engine droop	1920 ± 50 rpm	2000 ± 50 rpm	1920 ± 50 rpm	2000 ± 50 rpm
Specific fuel consumption	260 g/kWh (0.427 lbs./hph)	249 g/kWh (0.409 lbs./hph)	260 g/kWh (0.427 lbs./hph)	249 g/kWh (0.409 lbs./hph)
Exhaust values according to	97/68/EC Tier II EPA Tier II		97/68/EC Tier 3A EPA Tier 4 interim	

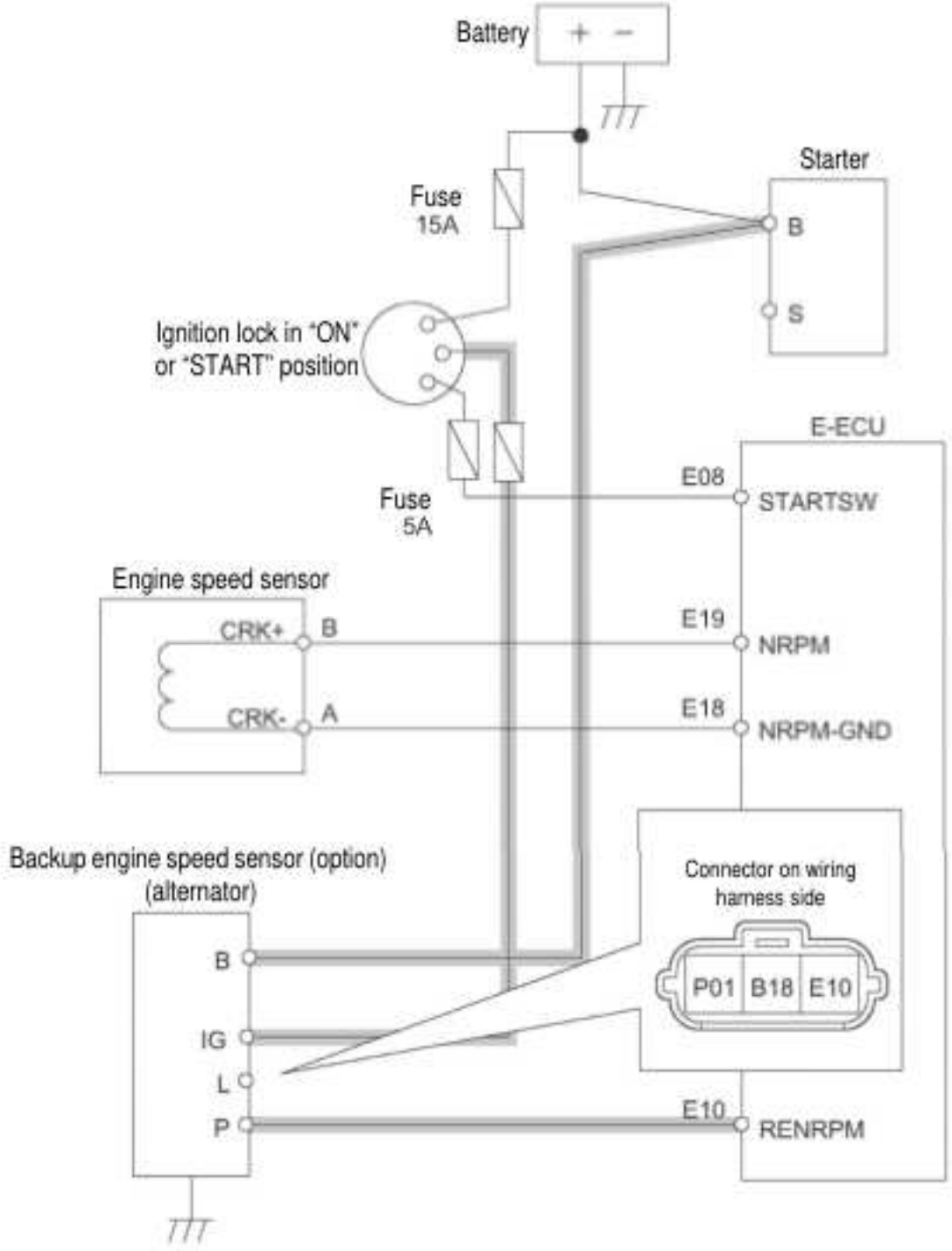
MidWestTech | Wacker Neuson 701s, 701sp Compact Loader Service Manual | Public...
Order the manual at mid-west-tech.com >

Problem		Possible causes
Engine does not run on all cylinders		Injection line leaks
		Defective fuel injector
Insufficient or no engine oil pressure		Oil level too low
		Defective engine oil pump
		Machine inclination too high
		Clogged engine oil intake filter
		Wrong SAE grade of engine lubrication oil
Engine oil consumption too high		Oil level too high
		Machine inclination too high
Engine smoke	Blue	Oil level too high
		Machine inclination too high
		Engine oil combustion (defective cylinder-head gasket)
	White	Engine starting temperature too low
		Fuel grade does not comply with specifications
		Defective fuel injector
		Wrong valve clearance
		Coolant combustion (defective cylinder-head gasket)
		Extreme misalignment of injection time
	Black	Dirty air filter
		Wrong valve clearance
		Defective fuel injector (drips)
		Wrong fuel injection pump setting

MidWestTech | Wacker Neuson 701s, 701sp Compact Loader Service Manual | Public... Order the manual at mid-west-tech.com >

Wiring diagram

	: Check points

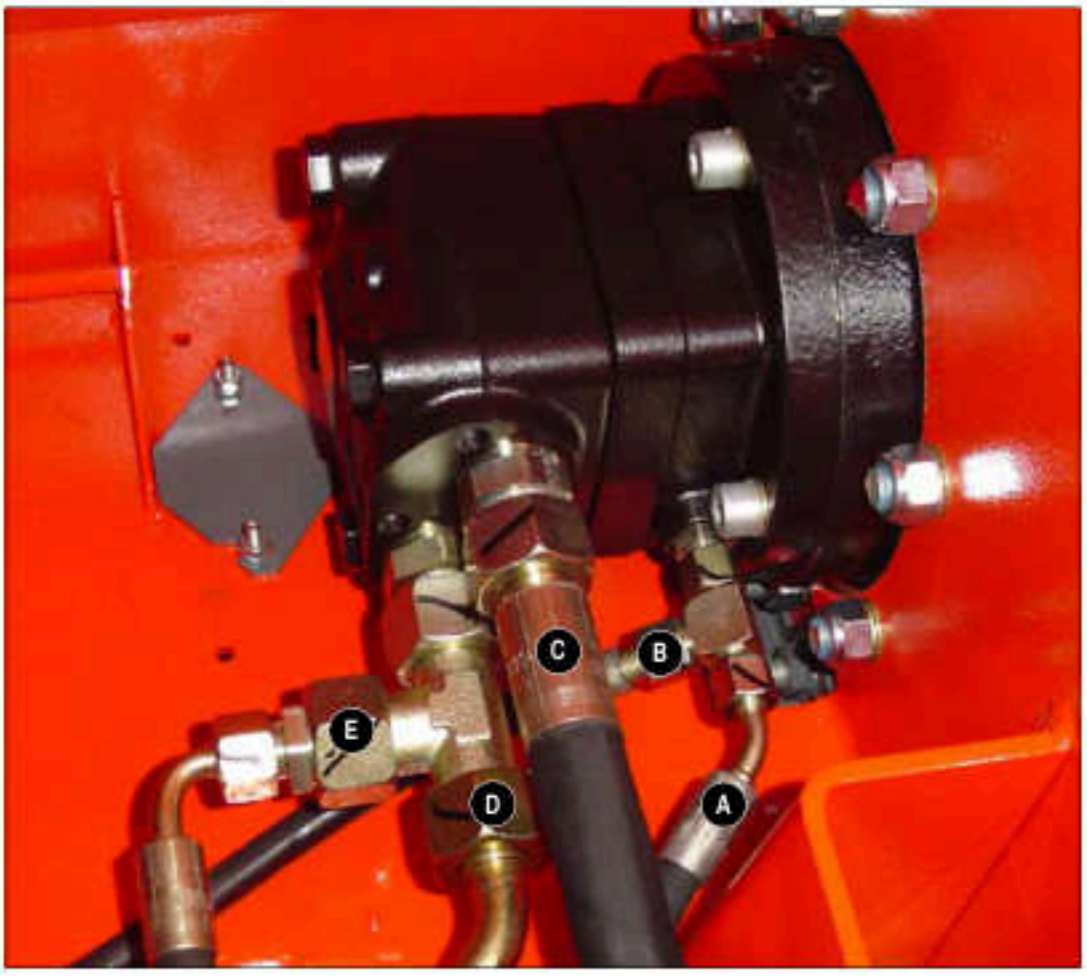


*E-ECU connector assignment – *see E-ECU connector assignment* on page 4-43.

MidWestTech | Wacker Neuson 701s, 701sp Compact Loader Service Manual | Public...

Order the manual at mid-west-tech.com >

Example: front right hydraulic motor



For hydraulic motors on left side of machine	
Pos.	**Description**
A	Brake pressure line to rear hydraulic motor
B	Brake pressure line to right-hand side hydraulic motor
C	Connection with rear hydraulic motor
D	Pressure line from pump 1
E	Pressure line from flush valve

For hydraulic motors on right side of machine	
Pos.	**Description**
A	Brake pressure line to rear hydraulic motor
B	Brake pressure line to left-hand side hydraulic motor
C	Connection with rear hydraulic motor
D	Pressure line from pump 2
E	Pressure line from flush valve

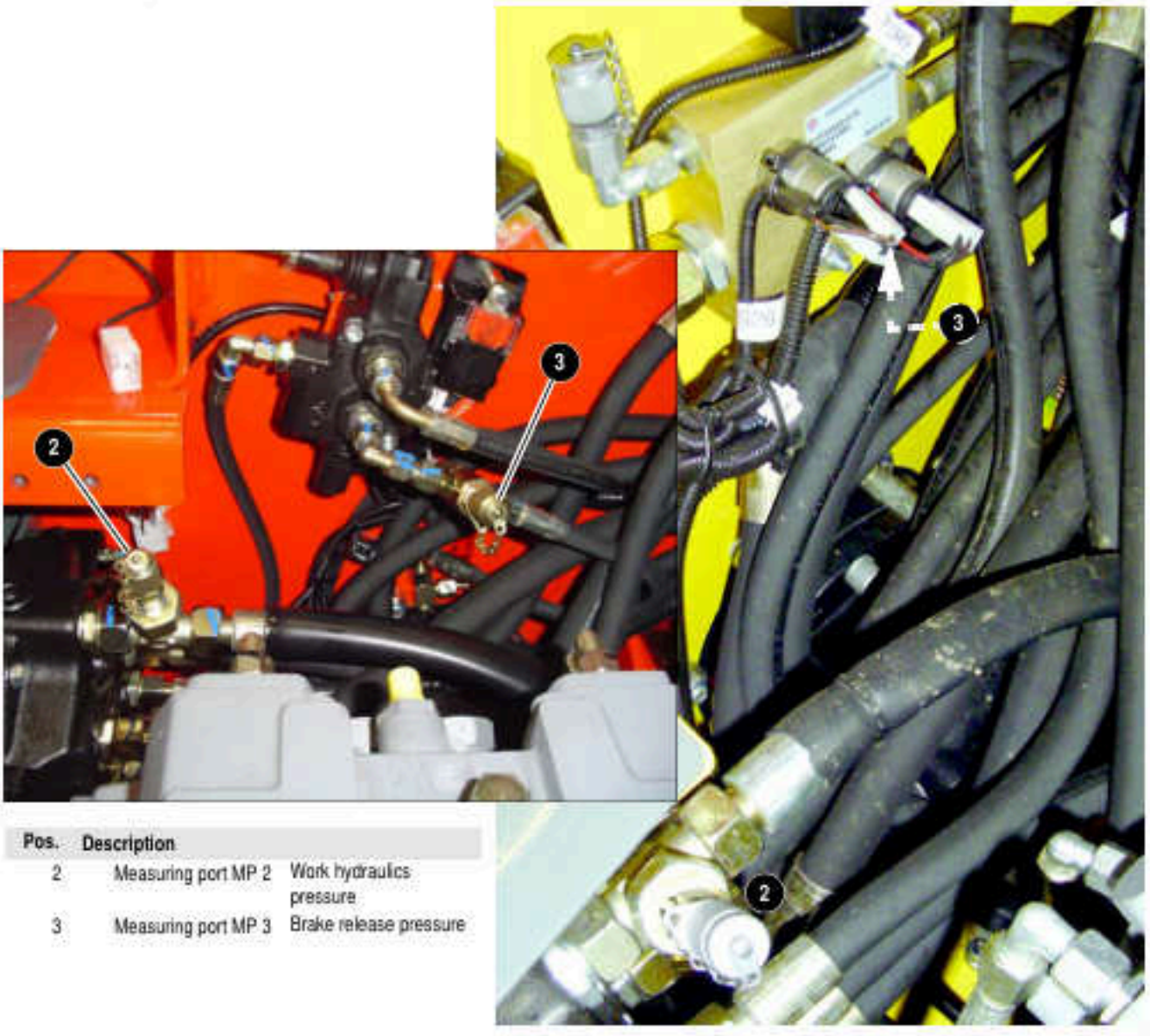
MidWestTech | Wacker Neuson 701s, 701sp Compact Loader Service Manual | Public...
Order the manual at mid-west-tech.com >

3.10 Pressure check

General

- Run the machine warm before checking the pressure. Hydraulic oil temperature: 50 °C/ 122 °F min. (operating temperature).
- Set the primary pressure limiting valves (PPLV) at maximum engine speed.
- Bleed the hydraulic pump whenever you reconnect or reroute hydraulic hoses – *see chapter Bleeding the hydraulic pump* on page 3-39.
- Pressure measurements may be carried out by trained staff only.
- **Ensure utmost cleanliness of all measuring points and ports, micro measuring lines and pressure gauges that are connected for checking pressure => even the slightest traces of dirt, e.g. a grain of sand, can impair tightness and cause leaks!**
- Pressure settings:
  – *see Work hydraulics* on page 2-4 and
  – *see Test report 701sp* on page 3-35
  – *see Test report 701s* on page 3-33

Standard micro ports



Pos.	Description	
2	Measuring port MP 2	Work hydraulics pressure
3	Measuring port MP 3	Brake release pressure

MidWestTech | Wacker Neuson 701s, 701sp Compact Loader Service Manual | Public... Order the manual at mid-west-tech.com >

6.39 Switches wiring harness 1000139289 up to serial no. DB00708 (legend)

No.	Up to	To	Colour	
3	X1/A engine/chassis connection	S1/1 preheating start switch	red	4
4	X1/A engine/chassis connection	F8 hazard warning system	red	4
7	X1/C engine/chassis connection	S1/1 preheating start switch	brn	4
7A	S1/4 preheating start switch	S1/9 preheating start switch	brn	2.5
7B	S1/8 preheating start switch	K6 preheating time lag relay	brn	1
8	X1/D engine/chassis connection	K9/87 cutoff solenoid switching relay	wh/red	2.5
10	X1/1 engine/chassis connection	K6 preheating time lag relay	wht	1
10A	X7/4 terminal strip connection	K6 preheating time lag relay	wht	1
10B	X7/8 terminal strip connection	S1/7 preheating start switch	wht	1
10C	X7.1/4 terminal strip connection	X7.1/8 terminal strip connection	wht	1
11	X1/2 engine/chassis connection	B14/5 warning buzzer unit diodes	pnk	1
11A	X10/8 round indicating instrument connection	B14/5 warning buzzer unit diodes	pnk	1
12	X1/3 engine/chassis connection	B14/9 warning buzzer unit diodes	blk/grn	1
12A	X10/14 round indicating instrument connection	B14/4 warning buzzer unit diodes	blk/grn	1
13	X1/4 engine/chassis connection	B14/6 warning buzzer unit diodes	wht/grn	1
13A	X10/10 round indicating instrument connection	B14/1 warning buzzer unit diodes	wht/grn	1
14	X1/5 engine/chassis connection	XS 5	org/wht	1
16	X1/6 engine/chassis connection	XS 5	org/blu	1
16 A	X10/7 round indicating instrument connection	XS 5	org/blk	1
18	X1/7 engine/chassis connection	X10/11 round indicating instrument connection	vio/blk	1
19	X1/8 engine/chassis connection	X8/5 lights connection	org	1
20	X1/9 engine/chassis connection	S32/5 parallel lift switch	gry/yel	1
22	X1/10 engine/chassis connection	S10/7 parking brake switch	blk/red	1
24	X1/11 engine/chassis connection	X10/9 round indicating instrument connection	blk/red	1
26	X1/12 engine/chassis connection	S33/5 Power Flow switch	gry/brn	1
29	X1/13 engine/chassis connection	X10/3 round indicating instrument connection	gry/blu	1
30	S29 safety switch	X7/1 terminal strip connection	gry	1
30A	F4 valves	X7/6 terminal strip connection	gry	1
30B	X7.1/1 terminal strip connection	X7.1/6 terminal strip connection	gry	1
31	X1/H engine/chassis connection	S29 safety switch	gry	1
33	X1/I engine/chassis connection	F2 alternator, fuel level sensor, indicators, start relay fuse	blu	1
36	X1/J engine/chassis connection	X7/9 terminal strip connection	blu/red	1
36A	V1 diode	X7/9 terminal strip connection	blu/red	1
36B	V1 diode	K8 cutoff solenoid timer	blu/red	1
40	X1/G engine/chassis connection	K10/C turn indicator relay	brn/yel	1
40A	S19/1 hazard warning system switch	K10/C turn indicator relay	brn/yel	1
40B	S19/1 hazard warning system switch	S12 turn indicator switch	brn/yel	1
41	X1/15 engine/chassis connection	S19/3 hazard warning system	grn/blk	1
41A	X8/1 lights switch	S19/3 hazard warning system	grn/blk	1
41B	X8/1 lights switch	S12 turn indicator switch	grn/blk	1
43	X1/16 engine/chassis connection	S19/5 hazard warning system	grn/red	1
43A	X8/2 lights connection	S19/5 hazard warning system	grn/red	1
43B	X8/2 lights connection	S12 turn indicator switch	grn/red	1
45	X1/14 engine/chassis connection	S14/6 light switch	yel/blk	1
45A	X10/2 round indicating instrument connection	S14/6 light switch	yel/blk	1
50	X1/E engine/chassis connection	GND1	blk	1.5
51	X1/F engine/chassis connection	GND1	blk	1
52	X10/2 round indicating instrument connection	S29 safety switch	brn/wht	1
52A	X1/17 engine/chassis connection	S29 safety switch	brn/wht	1
53	X1/18 engine/chassis connection	B14/8 warning buzzer unit diodes	brn/blk	1
53A	X10/6 round indicating instrument connection	B14/2 warning buzzer unit diodes	brn/blk	1
54	S14/8 light switch	X8/3 lights connection	yel/blk	1
55	S14/3 light switch	X8/4 lights connection	yel/grn	1
56	S16/5 working light switch	X9/1 rear lights connection	yel/red	1
57	S18/5	X9/2 rear lights connection	vio	1
58	X10/12 round indicating instrument connection	K6 preheating time lag relay	gry/red	1
60	F8 hazard warning system fuse	K9/30 cutoff solenoid switching relay	red	2.5
61	K9/85 cutoff solenoid switching relay	K8 cutoff solenoid time lag relay	blu/red	1
62	K9/86 cutoff solenoid switching relay	K8 cutoff solenoid time lag relay	blu/red	1
63	S1/5 preheating start switch	F3 cutoff solenoid fuse	blu/red	1
64	F2 indicator fuse	X10/1 round indicating instrument connection	blu	1
65	F3 indicators and engine relay fuse	X7/5 terminal strip connection	blu/red	1
65A	X7/7 terminal strip connection	X7/5 terminal strip connection	blu/red	1
65B	X7.1/9 terminal strip connection	X7.1/5 terminal strip connection	blu/red	1
66	F4 valve fuse	S33/1 Power Flow switch	gry	1
67	S33/9 Power Flow switch	S33/1 Power Flow switch	gry	1
68	S33/9 Power Flow switch	S32/1 parallel lift switch	gry	1
69	S32/9 parallel lift switch	S32/1 parallel lift switch	gry	1
70	S32/9 parallel lift switch	S10/5 parking brake switch	gry	1
71	S10/9 parking brake switch	S10/5 parking brake switch	gry	1
73	F5 interior light fuse	S16/1 working light switch	blu/yel	1
74	S16/9 working light switch	S16/1 working light switch	blu/yel	1
75	S16/9 working light switch	S18/9 rotating beacon switch	blu/yel	1
76	F5 interior light fuse	E14 interior light	blu/yel	1
77	F6 front lights fuse	S14/1 light switch	yel	1
78	S14/2 light switch	S14/1 light switch	yel	1
79	S14/2 light switch	S14/9 light switch	yel	1
80	F7 turn indicator fuse	S19/7 hazard warning system switch	grn	1
81	S19/8 hazard warning system switch	S19/7 hazard warning system switch	grn	1
82	F8 hazard warning system fuse	S19/2 hazard warning system switch	red/blu	1
83	S19/4 hazard warning system switch	S19/6 hazard warning system switch	grn/blu	1
84	S19/4 hazard warning system switch	K10/+ turn indicator relay	grn/blu	1
85	K10/P turn indicator relay	X10/15 round indicating instrument connection	grn/yel	1
86	F9 socket fuse	X19 socket	red	1
87	F9 socket fuse	S18/1 rotating beacon switch	red	1
88	F8 hazard warning system fuse	X7/2 terminal strip connection	red	1
90	GND1 earth	S33/10 Power Flow switch	blk	1
91	S32/10 parallel lift switch	S33/10 Power Flow switch	blk	1
92	S32/10 parallel lift switch	S18/1 rotating beacon switch	blk	1
93	S16/10 rear working light switch	S18/10 rotating beacon switch	blk	1
94	S16/10 rear working light switch	S19/10 hazard warning system switch	blk	1
95	S14/10 light switch	S19/10 hazard warning system switch	blk	1
96	S14/10 light switch	S10/10 parking brake switch	blk	1
97	X10/5 round indicating instrument connection	S10/10 parking brake switch	blk	1
98	DNG1 earth	X19 socket	blk	1
99	GND1 earth	X8/7 lights connection	blk	1
100	GND1 earth	E14 interior light	blk	1
101	GND1 earth	K8 cutoff solenoid time lag relay	blk	1
102	K6 preheating time lag relay	K8 cutoff solenoid time lag relay	blk	1
103	K6 preheating time lag relay	V1 diode	blk	1
104	X7/3 terminal strip connection	V1 diode	blk	1
105	GND1 earth	X9/3 rear lights connection	blk	1
106	X9/4 rear lights connection	X9/3 rear lights connection	blk	1
107	GND1 earth	K10/87 turn indicator relay	blk	1

Wiring harness 1000139289 switches (legend)

MidWestTech | Wacker Neuson 701s, 701sp Compact Loader Service Manual | Publication 1000164190

Order the manual at mid-west-tech.com >