Service Manual

ROBOT 160, 170, 180T

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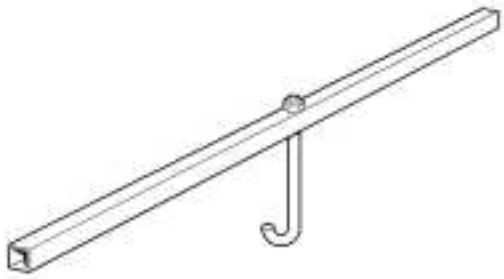
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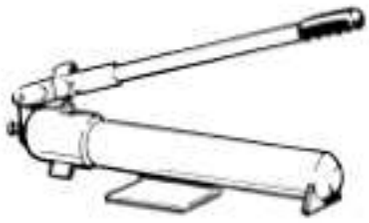
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Section E - Hydraulics



A215880

892/00858 Pump support bracket - for engine removal.



193850

Hand Pump Equipment

892/00223	Hand Pump
892/00137	Micro-bore Hose 1/4 in BSP x 5 metres
892/00274	Adapter 1/4 in M BSP x 3/8 in M BSP Taper
892/00262	1/4 in M BSP x 1/4 in F BSP x Test Point
892/00706	Test Probe
892/00278	Gauge 0 - 40 bar (0 - 600 lbf/in²)
892/00279	Gauge 0 - 400 bar (0 - 6000 lbf/in²)



188140

Bonded Washers

1406/0011	1/4 in BSP
1406/0018	1/2 in BSP
1406/0021	3/4 in BSP
1406/0029	1.1/4 in BSP



193860

Male Adapters - BSP x BSP

1606/0003	3/8 in x 1/4 in
1604/0003	3/8 in x 3/8 in
1606/0004	1/2 in x 1/4 in
1606/0007	1/2 in x 3/8 in
1604/0004	1/2 in x 1/2 in
1606/0008	3/4 in x 3/8 in
1606/0009	3/4 in x 1/2 in
1604/0006	3/4 in x 3/4 in



193870

Female Cone Blanking Plug

892/00055	1/4 in BSP
892/00056	3/8 in BSP
892/00057	1/2 in BSP
892/00059	3/4 in BSP
892/00060	1 in BSP'T'



193880

Male Cone Blanking Plug

816/00294	1/4 in BSP
816/00189	3/8 in BSP
816/00190	1/2 in BSP
816/00197	5/8 in BSP
816/00196	3/4 in BSP
816/00193	1 in BSP

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Symptom	Possible cause
Engine will not turn over	Check state of charge and voltage of battery
	Check integrity of 60 amp primary fuse
	Check battery leads are tightly fastened
	Ensure High-flow system (if fitted) is switched off
	Check connections on ignition switch
	Check connections on neutral start relay
	Check connection on starter motor solenoid
Engine will turn over but not run	Check fuse A4 (5 amp)
	Check connection on ESOS (engine shut off solenoid)
Loader arm will not move	Ensure ignition switch is on
	Ensure restraint is locked down
	Check fuse A1 (10 amp)
	Check connections at spool lock solenoids on valve block
Horn will not operate	Check integrity of 30 amp primary fuse
	Check fuse A9 (5 amp)
	Listen to relay to see if it clicks when the horn button is pressed
	Check relay connections
	Check horn connections
Front worklights will not operate	Ensure ignition switch is on
	Check fuse A5 (15 amp)
	Does small bar on switch illuminate when the switch is on? If so, check bulbs in worklights
	Check connections on back of worklight switch
Beacon will not operate	Check integrity of 30 amp primary fuse
	Check fuse A10 (10 amp) or, if fitted, check to see if interior light works
	Check connections on the back of the beacon switch
	Check connection on the back of the beacon socket
	Check if there is 12 volts at the beacon socket when the switch is on If so, try another beacon
* Brake Lights will not operate (see note)	Check integrity of 60 amp primary fuse
	Check fuse B8 (7.5 amp)
	Check connections on brake light switches on transmission pump
	Check brake light timer connections
	Check brake light timer relay connections
	Check if there is 12 volt supply to terminal 1 on brake light timer relay
	Check operation of brake light timer relay
	Check operation of brake light timer by substitution

Note: When the brake lights are activated, the timer keeps the lights on for a further 10 seconds. This prevents the lights flickering due to pressure fluctuations in the transmission circuit. Bear this in mind when checking the brake light circuit.

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160, 170 Panel Harness up to machine no. 681581

PA	MAINFRAME CONN			K
TERM	WIRE	SIZE	DEST	TYPE
A	310A	4.0	PB 1	L
B	310B	4.0	PB 2	L
C	-	-	-	-
D	004	4.0	PB 7	L
E	003F	4.0	SB	L
F	003G	4.0	SB	L
G	600J	4.0	SD	L
H	-	-	-	-
I	001B	4.0	PB 5	L
J	-	-	-	-
K	-	-	-	-
L	-	-	-	-
1	001A	1.0	PB 6	M
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-
5	117	1.4	PJ 5	N
6	116	1.4	PJ 2	N
7	106J	1.4	SA	N
8	-	-	-	-
9	406	1.0	PX 2	M
10	407	1.0	PD 3	M
11	402	1.0	PY 2	M
12	403	1.0	PW 2	M
13	414	1.0	PZ 2	M
14	415	1.0	PA 2	M
15	408	1.0	PE 3	M
16	871	1.4	PT 1	N
17	303	1.4	PL 2	N
18	630L	1.0	PF 1	M
19	855C	1.0	SC	M

PB	IGNITION SWITCH			S,T
TERM	WIRE	SIZE	DEST	TYPE
1	310A	4.0	PA A	Y
2	310B	4.0	PA B	Y
3	003	3.0	SB	Y
4	003B	3.0	SB	Y
5	001B	4.0	PA 1	X
6	001A	1.0	PA 1	U
7	004	4.0	PA D	X
8	003C	3.0	SB	X
9	003D	3.0	SB	X
10	-	-	-	-

PC	INTERIOR LIGHT			
TERM	WIRE	SIZE	DEST	TYPE
1	303A	1.0	PL 2	Z,AA
2	600AJ	1.0	SD	Z,AA

PD	HOURMETER			
TERM	WIRE	SIZE	DEST	TYPE
1	106D	1.0	SA	W,AK
2	600H5	1.0	SD	W,AK
3	407	1.0	PA 10	W,AK
	407A	1.0	PM 2	

PE	FUEL GAUGE			R
TERM	WIRE	SIZE	DEST	TYPE
1	106V	1.0	SA	U
2	600JA	1.0	SD	U
3	408	1.0	PA 15	U

PF	FUEL GAU ILLUM			
TERM	WIRE	SIZE	DEST	TYPE
1	630L	1.0	PA 18	Z,AA
2	600HT	1.0	SD	Z,AA

PG	DIODE PACK			H,J
TERM	WIRE	SIZE	DEST	TYPE
1	411	1.0	PB 4	A,B
2	434B	1.0	PV 2	A,B
3	414A	0.8	PZ 2	A,B
4	403C	0.8	PW 2	A,B
5	415A	0.8	PA 2	A,B
6	406A	0.8	PX 2	A,B

PJ	FRONT W/LIGHTS			P
TERM	WIRE	SIZE	DEST	TYPE
2	116	1.4	PA 6	V
3	855	1.4	SC	V
5	117	1.4	PA 5	V
6	881	1.0	PN 1	U
7	600CJ	1.0	SD	U
8	106L	1.0	SA	U

PL	BEACON SWITCH			P
TERM	WIRE	SIZE	DEST	TYPE
	303	1.4	PA 17	V
2	303A	1.0	PC 1	
3	894	1.4	PU 1	V
7	600DY	1.0	SD	U
8	106N	1.0	SA	U

PM	DIODE PACK			F,G
TERM	WIRE	SIZE	DEST	TYPE
1	434	1.0	PV 2	A,B
2	407A	1.0	PD 3	A,B

PN	REAR WORKLIGHT			AG,AH
TERM	WIRE	SIZE	DEST	TYPE
1	861	1.0	PJ 6	U
2	600AY	1.0	SD	U

PR	L/H FR W/LIGHT			F,G
TERM	WIRE	SIZE	DEST	TYPE
1	855B	1.0	SC	A,B
2	600AS	1.0	SD	A,B

PS	R/H FR W/LIGHT			AG,AH
TERM	WIRE	SIZE	DEST	TYPE
1	855A	1.0	SC	U
2	600AR	1.0	SD	U

PT	HORN			AC,AD
TERM	WIRE	SIZE	DEST	TYPE
1	871	1.4	PA 16	AE,AF
2	600CY	1.4	SD	AE,AF

PU	BEACON			AB
TERM	WIRE	SIZE	DEST	TYPE
1	894	1.4	PL 3	V
2	600AP	1.4	SD	V

PV	ALT WARN LIGHT			AL
TERM	WIRE	SIZE	DEST	TYPE
1	106AA	1.0	SA	U
2	434	1.0	PM 1	V
	434B	1.0	PG 2	

PW	ENG OIL WARN			AL
TERM	WIRE	SIZE	DEST	TYPE
1	106AD	1.0	SA	U
2	403	1.0	PA 12	V
	403C	0.8	PG 4	

PX	ENG WATER TEMP			AL
TERM	WIRE	SIZE	DEST	TYPE
1	106AB	1.0	SA	U
2	406	1.0	PA 9	V
	406A	0.8	PG 6	

PY	AIR FILTER LIGHT			AL
TERM	WIRE	SIZE	DEST	TYPE
1	106AE	1.0	SA	U
2	402	1.0	PA 11	U

PZ	HYD TEMP LIGHT			AL
TERM	WIRE	SIZE	DEST	TYPE
1	106AC	1.0	SA	U
2	414	1.0	PA 13	V
	414A	0.8	PG 3	

RA	CHRG PUMP WARN			AL
TERM	WIRE	SIZE	DEST	TYPE
1	106AF	1.0	SA	U
2	415	1.0	PA 14	V
	415A	0.8	PG 5	

RB	BUZZER			AM
TERM	WIRE	SIZE	DEST	TYPE
1	106C	1.0	SA	U
2	-	-	-	-
3	-	-	-	-
4	411	1.0	PB 1	U
5	-	-	-	-

ILLUMINATION		
SA		AJ,AK
WIRE	SIZE	DEST
106J	1.4	PA 7
106N	1.0	PL 8
106C	1.0	RB 1
106D	1.0	PD 1
106V	1.0	PE 1
106L	1.0	PJ 8
106AA	1.0	PV 1
106AB	1.0	PX 1
106AC	1.0	PZ 1
106AD	1.0	PW 1
106AE	1.0	PY 1
106AF	1.0	RA 1

GLOW PLUGS		
SB		AJ,AK
WIRE	SIZE	DEST
003	3.0	PB 3
003B	3.0	PB 4
003C	3.0	PB 8
003D	3.0	PB 9
003F	4.0	PA E
003G	4.0	PA F

FRONT WORKLIGHT		
SC		AJ,AK
WIRE	SIZE	DEST
855	1.4	PJ 3
855A	1.0	PS 1
855B	1.0	PR 1
855C	1.0	PA 18

EARTH 1		
SD		AJ,AK
WIRE	SIZE	DEST
600J	4.0	PA G
600AJ	1.0	PC 2
600AS	1.0	PR 2
600AR	1.0	PS 2
600CY	1.4	PT 2
600AP	1.4	PU 2
600H5	1.0	PD 2
600CJ	1.0	PJ 7
600DY	1.0	PL 7
600AY	1.0	PN 2
600JA	1.0	PE 2
600HT	1.0	PF 2

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Self Level Valve

The optional self level valve diverts a small amount of oil to the Quickhitch tilt ram to give self levelling of the Quickhitch as the loader arm is raised. A solenoid valve allows the self level circuit to be switched in or out as required by the operator.

Loader Arm Raise - Self Levelling (upper diagram)

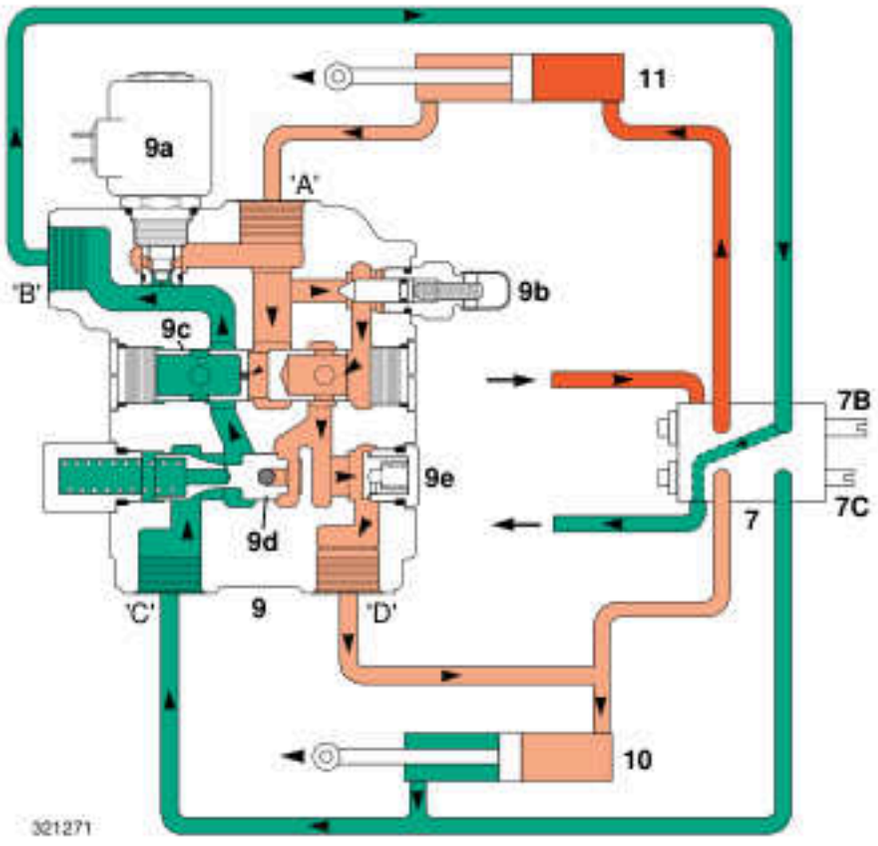
* With the Quickhitch tilt spool **7C** in neutral and the loader arm spool **7B** selected to 'raise', oil from the loader valve **7** enters the head side of the loader arm ram **11**. As the ram extends, flow from the rod side is directed to port 'A' on the self level valve **9**. When the self level function is switched on, solenoid valve **9a** is de-energised (closed) so oil passes through the adjustable orifice **9b** and also the fixed orifice in the flow divider spool **9c**. The proportion of the flow split is determined by the size of the adjustable orifice. The remainder of the flow passes through the fixed orifice and out of port 'B', returning to the loader valve and back to tank. The oil passing through the adjustable orifice **9b** lifts check valve **9e**, flows out of port 'D' and is fed to the head side of the tilt ram **10**. The resistance to movement of the tilt ram creates enough pressure to open the unloading spool **9d** in the self level valve.

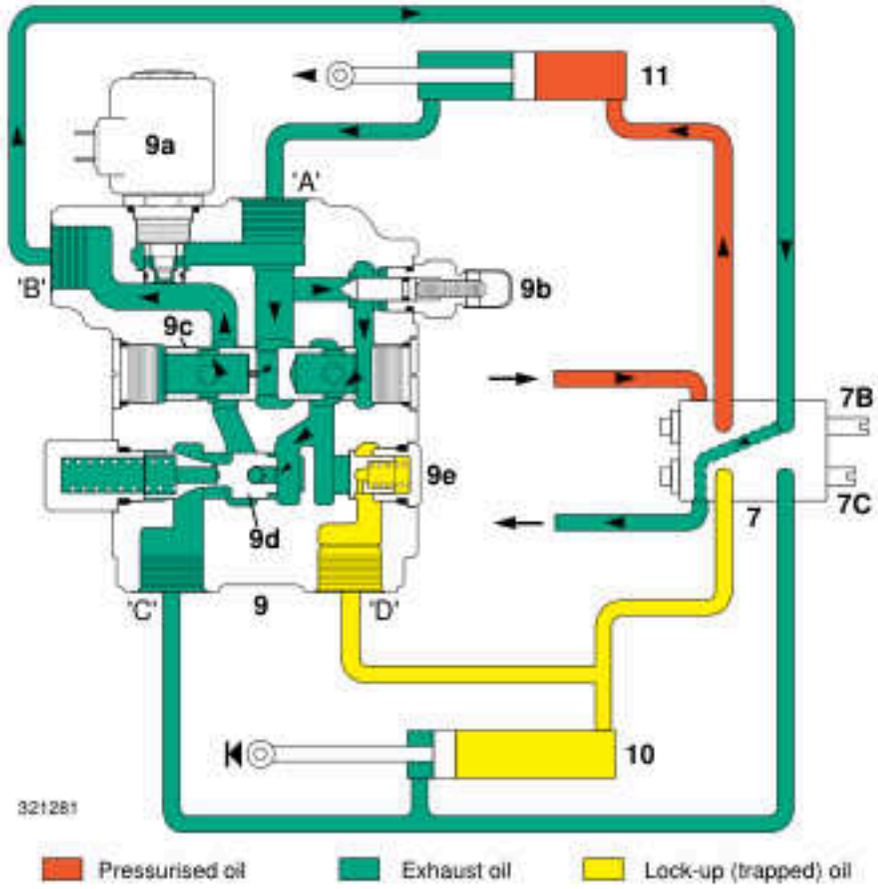
As the tilt ram extends the flow from the rod side enters port 'C' past the open unloading spool **9d**, around the flow divider spool **9c** and out of port 'B' back to the loader valve **7** and to tank. The purpose of the unloading spool **9d** is to prevent the tilt ram from dumping oil during the self level cycle.

If the solenoid valve **9a** is not energised (open), the flow from the rod side of the lift ram is allowed to pass via port 'B' to the loader valve **7** and back to tank. Thus the self level circuit does not operate.

Tilt Ram Fully Extended (lower diagram)

* If the Quickhitch tilt ram **10** reaches the end of its stroke during the self level cycle, or the operator selects the tilt ram service, the loader arm will continue to raise. The unloading spool **9d** will shift to the left and unload the flow going to the tilt ram head side. The oil flows back to tank thus preventing the loader arm ram from stopping during the 'raise' function. Check valve **9e** closes to prevent pressure loss from the tilt ram.





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Types of Rubber Track Damage (cont'd)

2.4 Steel Cord - Sticking Out

Cause:

A Strands of the steel cord may sometimes stick out of the rubber track. This is caused by the friction of the sprocket against the edges of the track sprocket holes.

Additional Notes:

Individual strands of steel cord sticking out of the track does not necessarily mean the track needs to be replaced. Individual strands can be cut off (the number of steel cord strands is always over specified), however exposed strands should be repaired immediately (see recommended repair procedures).



430000



430010

3.1 Outer Track Rubber - Tearing/Cuts

Cause:

A Cuts on the lug are often due to particularly sharp materials such as stones, the problem is particularly evident if using sharp driving techniques on demolition type ground (e.g. stones, debris etc).

Prevention:

A The life expectancy of a track is greatly reduced by working on a site where sharp and pointed materials are numerous. Operate the machine with attention to the ground's surface in rough terrain, e.g. demolition sites, rocky ground etc.

Additional Notes:

You can do less damage by driving slowly on hard surfaces. Small cuts on the lug do not prevent the track from being used. When the cut goes deeper down and reaches the steel cord or the core bar, the track must be repaired. If a lug is pulled out, the track can be used but the grip on muddy surfaces will be greatly reduced.



411850

3.2 Outer Track Rubber - Fast Abrasion

Cause:

A Sharp driving on hard and abrasive surfaces, for example concrete, asphalt etc.

B Operation on surfaces where the temperature is unusually high, for instance, travelling over freshly laid asphalt.

Prevention:

A Operate the machine with care, avoid making quick and repeated turns.

B Do not stay too long on very hot surfaces. On the other hand, the track is safe if you just go across this area.

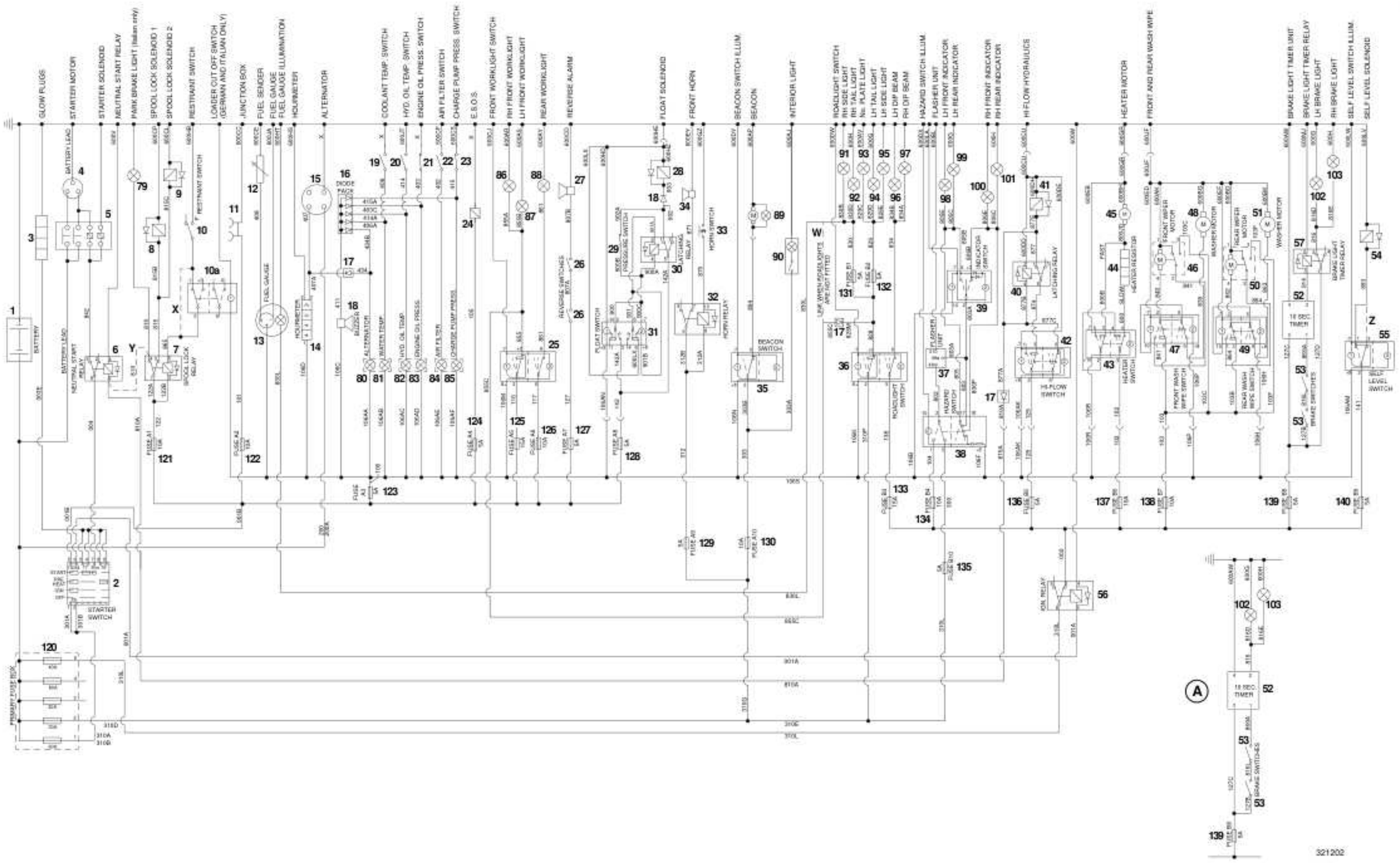
Additional Notes:

A track can still be used if the lug is higher than 5mm, otherwise the track must be replaced. Refer also to warranty pro-rata use scale.



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