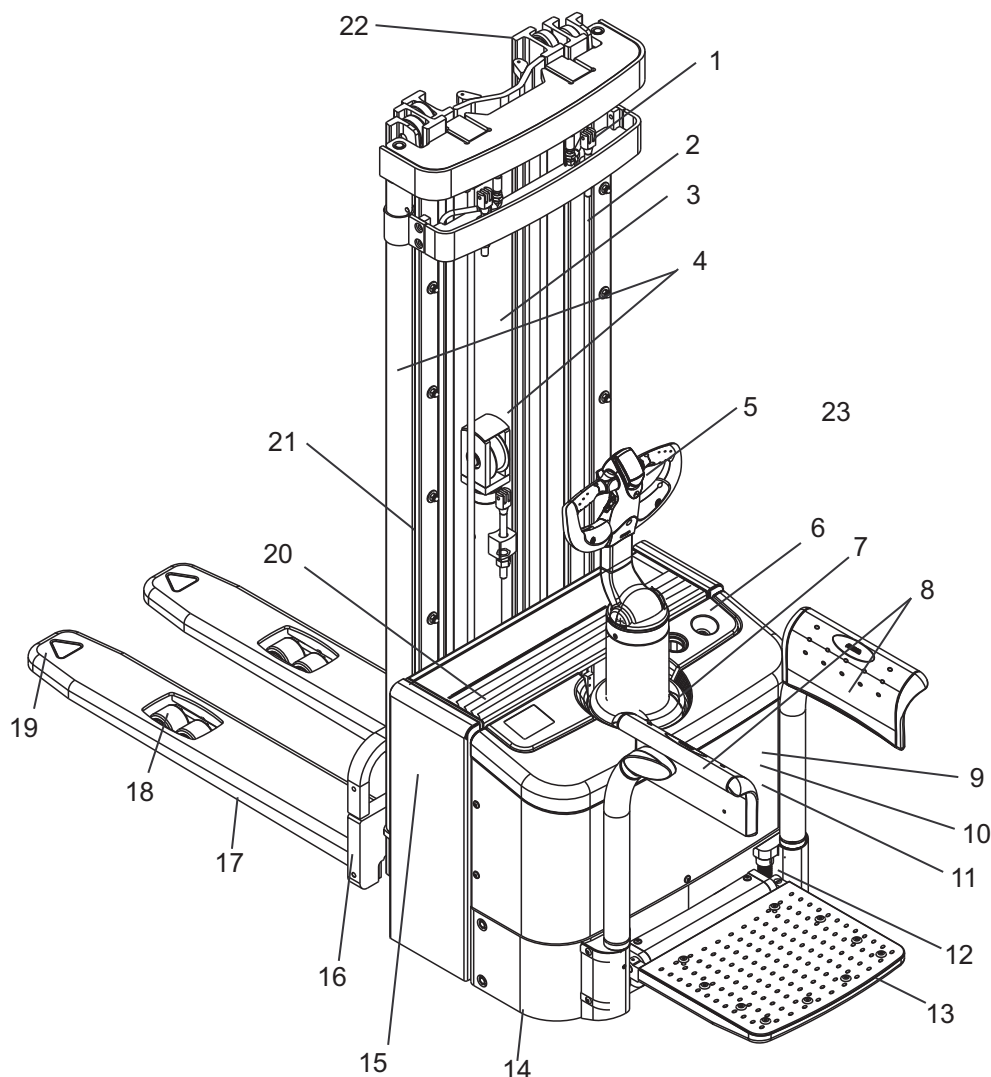


LUBRICATION & ADJUSTMENT

Component Access



MS-4223-042

- | | | | |
|----|--------------------------------------|----|--------------------------------|
| 1 | Lift chain | 2 | Mast limit switch |
| 3 | Safety shield | 4 | Lift cylinders |
| 5 | Control handle | 6 | Display panel |
| 7 | Control handle knuckle | 8 | Side restraints ⁽¹⁾ |
| 9 | Pump unit & hydraulic manifold block | 10 | Controller and contactors |
| 11 | Drive unit / brake | 12 | Castor wheel |
| 13 | Platform ⁽¹⁾ | 14 | Drive wheel |
| 15 | Battery compartment | 16 | Fork carriage |
| 17 | Outrigger | 18 | Load wheel |
| 19 | Fork | 20 | Battery / battery connector |
| 21 | 1st mast stage | 22 | 2nd mast stage |

⁽¹⁾ Folding platform trucks only

Component Access

From serial no. 5A134882

The following is a list of covers, panels etc. which must be removed before carrying out repairs and / or maintenance in order to access the components.



WARNING

Before starting work read the safety notices and instructions in the relevant sections of this manual.

Drive Unit Cover

Provides access to:

- Traction motor (TM)
- Drive unit
- Brake
- Pump motor (PM), lift contactor (P), valves (PV, SVCL, SVH, SVA1, SVA2)
- Hydraulic oil reservoir
- Horn (HN)
- Traction control module (TCM)
- Direction contactor (F / R)
- Fuse FU1 (travel power fuse)
- Fuse FU3 (raise)
- Hydraulic control module (HCM)
- Unigage (TT/BDI)
- Key switch (KYS)
- Fuse 2, FU2 (control circuit)
- Fuse 4, FU4 (discharge indicator)
- Fuse 5, FU5 (option F/C cold store)
- Platform module (PLM2)
- Distributor PCB
- On-board charger

Control Handle

Provides access to:

- Horn switches (HNS1, HNS2)
- Main Lift – lower switches (LOS1, LOS2)
- Main Lift – lift switch (RAS)
- Fast / slow travel switch (HSS)
- Safety reverse switch (SAS)
- Potentiometer (POT)
- Forward switch (FS),
- Reverse switch (RS)
- Auxiliary hydraulic switches

Control Handle Knuckle

Provides access to:

- Brake switch (BRS)
- Brake override switch⁽¹⁾

Mast

Provides access to mast switches:

- Lift speed reduction switch (LMS)
- Lift switch (LMS2)⁽²⁾

Platform and side restraints⁽²⁾

Provides access to:

Travel mode switches (GCSL, GCSR, PLS)

⁽¹⁾ Non-platform trucks only

⁽²⁾ Folding platform trucks only

LUBRICATION & ADJUSTMENT

Test and Maintenance Interval Chart

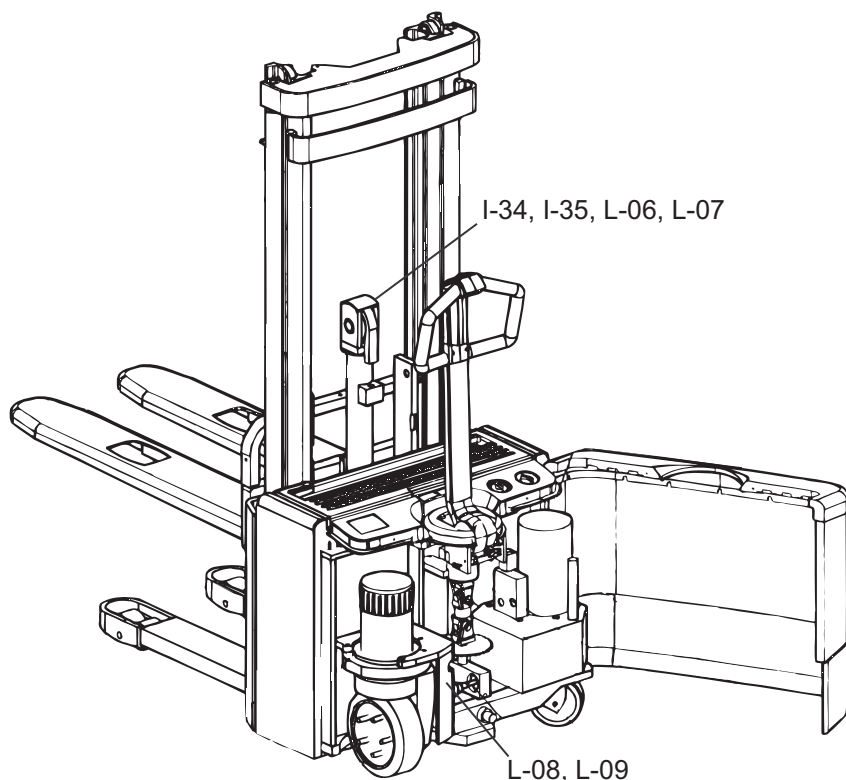


Abbreviations

M Months
I Inspection
X Standard

h Service hours
L Lubrication
C Cold Store

B - H, BB - GG see lubricant table on page 22



MS-4223-047

Position	Lubri- cant	Action	3 M	6 M	12 M	24 M
			100 h	500 h	1000 h	1000 h
I-34		Check pulleys, pulley yoke, hose rollers and mast limit cushioning for wear, damage and slack.		X / C		
L-06	H	Lubricate hose rollers.		X / C		
L-07	G / GG	Lubricate chain pulleys.		X / C		
L-08	A / AA	Check transmission oil level, replenish if necessary.		X / C		
L-09	A / AA	Replace transmission oil				X / C
I-35		Check hydraulic cylinder piston rods for damage and ensure cylinder is sealed. Check cylinder attachment fuses.		X / C		

Relief Valve

(Up to serial no. 5A134880)

Removal

(see Fig. M0439)

1. Remove entire relief valve assembly, unscrew nut and relief valve (4).
2. Remove O ring and strainer

Assembly

1. Apply a thin layer of hydraulic oil to O ring.
2. Position O ring and strainer in valve seat.
3. Apply hydraulic oil to the relief valve (4), insert it into the valve seat and tighten.

4. Tighten the relief valve.
5. Insert hydraulic unit and adjust relief valve (4).

Relief Valve Setting

NOTE

The relief valve (4) protects the hydraulic system and the lifting mechanism from overloading.



WARNING

Never operate the hydraulic unit unless it is properly attached.

The amount of torque will twist the unit. This can result in short circuits and damage.

Model	Capacity	Minimum test weight	Maximum test weight	Setting
WE2300 1.25 t	1250 kg (2756 lbs.)	1350 kg (2976 lbs.)	1450 kg (3197 lbs.)	170 MPa (2465 psi)
WE2300 1.35 t	1350 kg (2976 lbs.)	1450 kg (3197 lbs.)	1550 kg (3417 lbs.)	170 MPa (2465 psi)
WE2300 1.4 t	1400 kg (3086 lbs.)	1500 kg (3307 lbs.)	1600 kg (3527 lbs.)	180 MPa (2610 psi)
WE2300 1.6 t	1600 kg (3527 lbs.)	1700 kg (3748 lbs.)	1800 kg (3968 lbs.)	180 MPa (2610 psi)
WE2300 1.8 t	1800 kg (3968 lbs.)	1900 kg (4189 lbs.)	2000 kg (4409 lbs.)	180 MPa (2610 psi)

Relief Valve Test and Setting

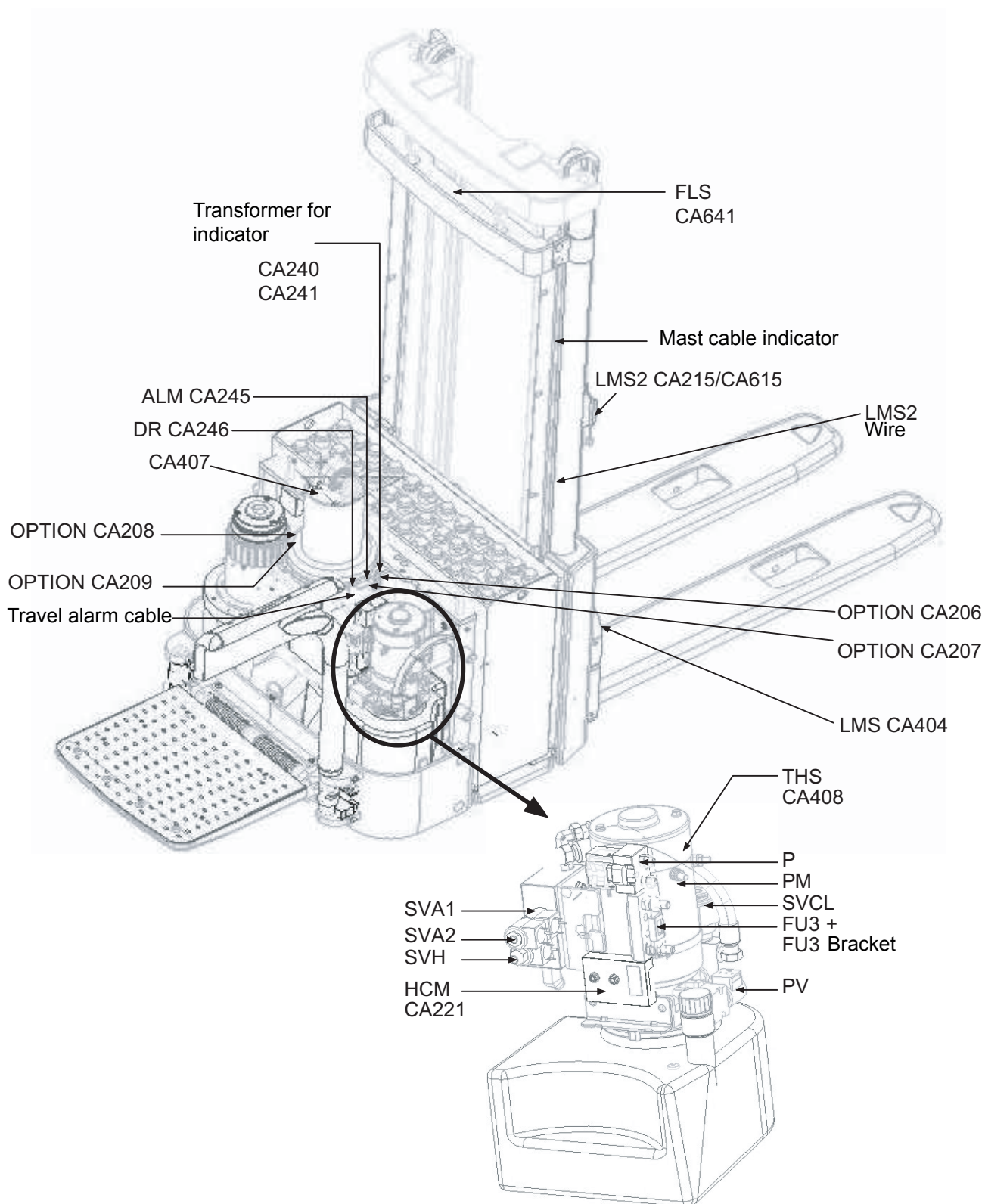
1. With the hydraulic system at operating temperature, place a test load corresponding to 110% of rated capacity (= minimum load) in the centre of the forks.
The load should lift easily.
2. Raise a test load corresponding to 110% of the rated capacity +100 kg (220 lbs.) [=maximum load].
It should not be possible to raise this load (relief valve opens).

If necessary, adjust the relief valve:

1. Hold the relief valve with a screwdriver and undo the counter nut.
2. Turn the relief valve clockwise to increase the pressure at which the valve opens.
3. Turn the relief valve anticlockwise to reduce the pressure.

4. Counter-fix the relief valve again with the nut.

From serial no. 5A134882



MS-4223-017

Battery Discharge Indicator Setting (BDI)

The acid density is a very reliable indicator of the charge status of a lead acid battery.

However, since it is unrealistic to continually measure the acid density of a truck battery to an industrial standard, the battery voltage is used to determine the charge status over longer journeys.

To adapt the BDI to the battery used and the truck's specific application profile, you need the battery manufacturer's data sheet. The values you require are the density of the electrolyte for an 80% discharged battery (20% battery residual capacity) and for a fully charged battery (100% battery capacity).

Finally, via the potentiometer on the back of the BDI the display is set to the actual discharge terminal voltage of the battery at 20% residual capacity.

The factory default setting of the battery discharge indicator is "N" (any setting from K to U is possible).

Calibration

- Fully charge the battery as indicated by the battery manufacturer in the operating instructions. Measure the acid density in accordance with the battery manufacturer's maintenance instructions to check

if the battery is actually 100% charged. Faulty battery cells will make calibration impossible.

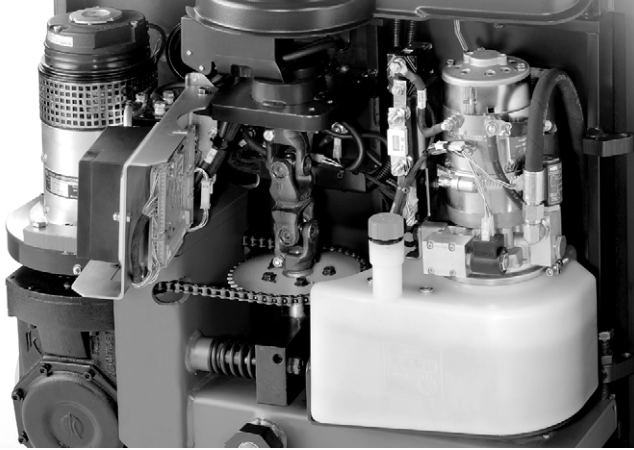
- Operate the truck as usual under normal operating conditions until the battery is empty: both LEDs of the BDI will flash and the lift cutout system will be triggered.
- Leave the battery for at least 10 to 12 hours (one hour at the very minimum).
- After this interval measure the acid density on at least three different battery cells. The smallest recorded value is the one you need.
- Compare the recorded density with the density specified by the manufacturer for an 80% discharged battery (20% residual capacity).
- If the battery is more than 80% discharged (less than 20% residual capacity), set the potentiometer on the back of the BDI to direction K.
- If the battery is less than 80% discharged (more than 20% residual capacity), set the potentiometer on the back of the BDI to direction U.
- Re-charge the battery and check the calibration. Repeat the process if necessary.

Setting the discharge terminal voltage in volts/cell

K	L	M	N	O	P	Q	R	S	T	U
1.57	1.63	1.68	1.73	1.78	1.82	1.84	1.86	1.89	1.91	1.93

Pump Motor

From serial no. 5A134882



MS-4223-038

Removal



WARNING

Risk of serious injury

Avoid accidents by:

- Switching off the truck
- Disconnecting the battery
- Preventing the truck from being switched on again
- Jacking up the truck and preventing it from rolling away

For further details refer to the Safety chapter.

1. Remove all electrical connections from the pump motor.
2. Remove the clamp attaching the hydraulic unit to the chassis.
3. Tilt the hydraulic unit until the two mounting screws on top of the motor can be reached.
4. Remove the motor mounting screws.
5. Lift the motor out from the top.

Assembly

Assembly is the reverse of disassembly.

Maintenance

Accessing brushes



WARNING

Risk of serious injury

Avoid accidents by:

- Switching off the truck
- Disconnecting the battery
- Preventing the truck from being switched on again
- Jacking up the truck and preventing it from rolling away
- For further details refer to the Safety chapter.

1. Remove the tensioning belt from the pump motor.
2. Apply low pressurised air to remove dust from the motor.
3. Remove the brushes and dispose of them.
4. Remove and discard the springs.
5. Check the commutator for wear **Refer to the instructions on page 129.**

Brushes (WE/WS 1.25, 1.3)

- Length of a new brush: 25 mm
- Brush wear limit: 14 mm

Brushes (WE/WS 1.4, 1.6, 1.8)

- Length of a new brush: 23 mm
- Brush wear limit: 15 mm

Armatures (WE/WS 1.25, 1.3)

1. Turn the commutator and check for signs of burning or other damage. Replace the armature if necessary.

NOTE

New commutators have a 45 mm diameter. The wear limit is 44 mm.

The commutator must not be overwound. Instead it must be replaced when the wear limit is reached.

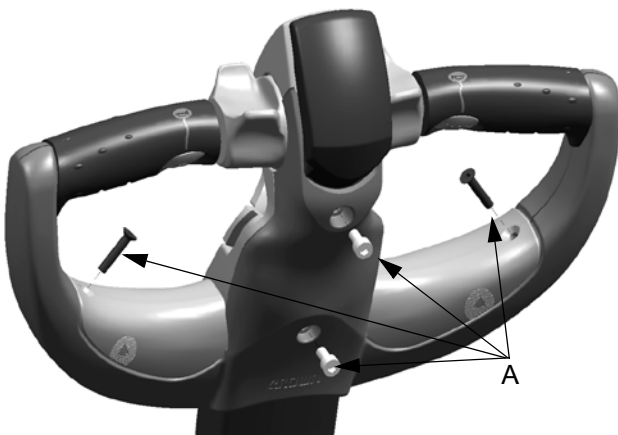
Switch Unit

Removal

The switch unit contains the:

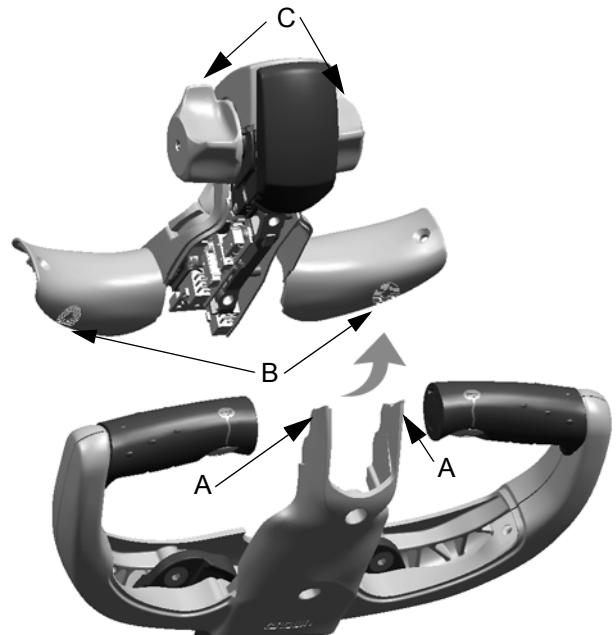
- Safety reverse switch
- Travel switch / traction potentiometer
- “Rabbit/Turtle” toggle switch
- Main PC board
- Hydraulic PC board
Hydraulic PCB = Lift / lower switches

Replacing any of these components requires the switch unit to be replaced.



MS-4223-021

- Remove the screws (A, Fig. MS-4223-021).



MS-4223-022

- Press the thumb markings (B, Fig. MS-4223-022) on the switch unit or pull on the thumbwheels (C). The switch unit will slide up out of the bottom shell.
- Remove the plug connections of the tiller wire harness and the horn switches from the switch unit PC boards.

Assembly

NOTE

Make sure you re-connect the tiller wire harness and the horn wiring. The connectors cannot be interchanged and are protected against incorrect polarity.

Assembly is always the reverse of disassembly.

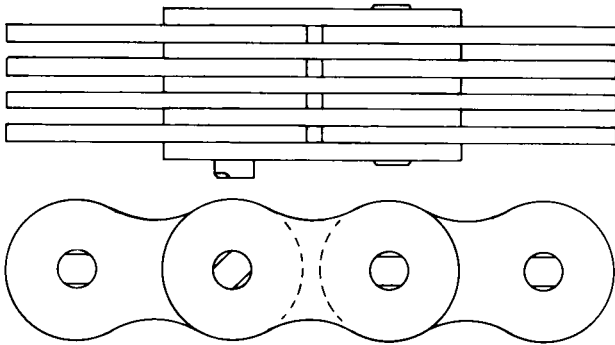
- Push the switch unit over the two side panels (A, Fig. MS-4223-022). Guide the switch unit down and to the front.
- Tighten the screws (A, Fig. MS-4223-021).
- Connect the battery and test all functions.

Protruding or Turned Chain Pins



DANGER

Never attempt to repair the chain by driving pins back into the chain. This can result in accidents with severe or even fatal injuries if the chain tears. Fit new chains.



2776S

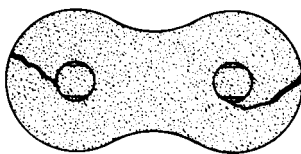
Considerable frictional forces between the connection plates and the pins occur when lifting heavy loads with an insufficient or non-existent film of oil.

In extreme cases the frictional torque in the joints can be such that the pins turn and gradually work out of the chain (see Fig. 2776S). This can result in chain failure.

Turned pins can be rapidly identified if the flat ends are not all pointing in the same direction.

Chains with twisted or protruding pins must be replaced immediately. If 2 chains are used paired, replace in pair.

Corrosion



2773si

The chains used on fork lift trucks are highly stressed precision components. It is particularly important to maintain the original fatigue strength throughout its useful life.

Corrosion considerably reduces the capacity of a lift chain. It results in cracking in the side plates.

Lift chains must therefore be protected from corrosion. The layer of grease applied in the factory hot dip galvanizing process is an excellent protection and fully penetrates the joints.

Do not remove this initial layer. After commissioning the chain supplement the factory lubrication through a regular lubrication schedule.

Rust *film* on lift chains can be removed and neutralised by cleaning with chain oil. **Always replace heavily corroded and rusting chains. The risk of cracking as a result of rust is too great.**

Chain Lateral Wear

Wear traces along a stretch of the chain on the pin heads and the outer plates indicate misalignment. This can have one of two causes: uneven chain tension or misalignment between the pulleys and the chain anchors.

Uneven Chain Tension

When fitting or adjusting the chains make sure that they are evenly charged. If for example the fork heel height or the platform height are changed, the chain anchors must be loosened until both forks touch the ground.

Both chains must have equal amounts of air or tension at this point. The lower chain anchor nuts must be tightened by the same number of turns. When the required height has been reached, fix the setting with the top (chain side) lock nut and its respective lock washer.

Misaligned Lift Components

Misalignment of the chain pinion and the chain due to the wrong number of washers on the mast or a damaged mast or cylinder components can also contribute to wearing of the chain sides.

To test whether this is the case, proceed as follows: Place the truck on a horizontal surface in the service station. Support the fork carriage and/or platform and detach both ends of the lift chain from the chain anchor and visually inspect the alignment with the anchor slots.

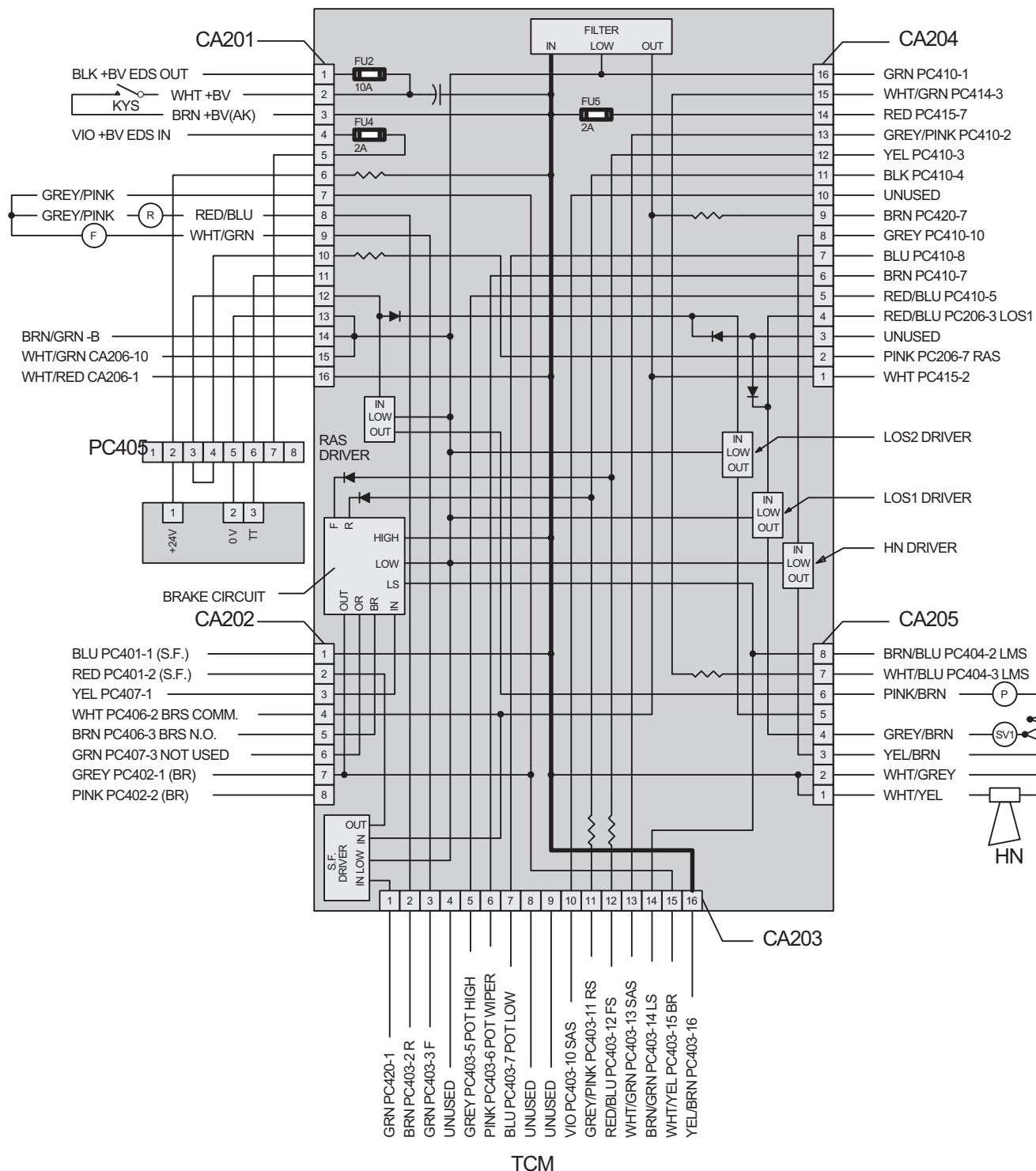
CROWN

SCHEMATIC DIAGRAMS

WE S / WS S up to serial no. 5A132186



Distribution Panel, Standard



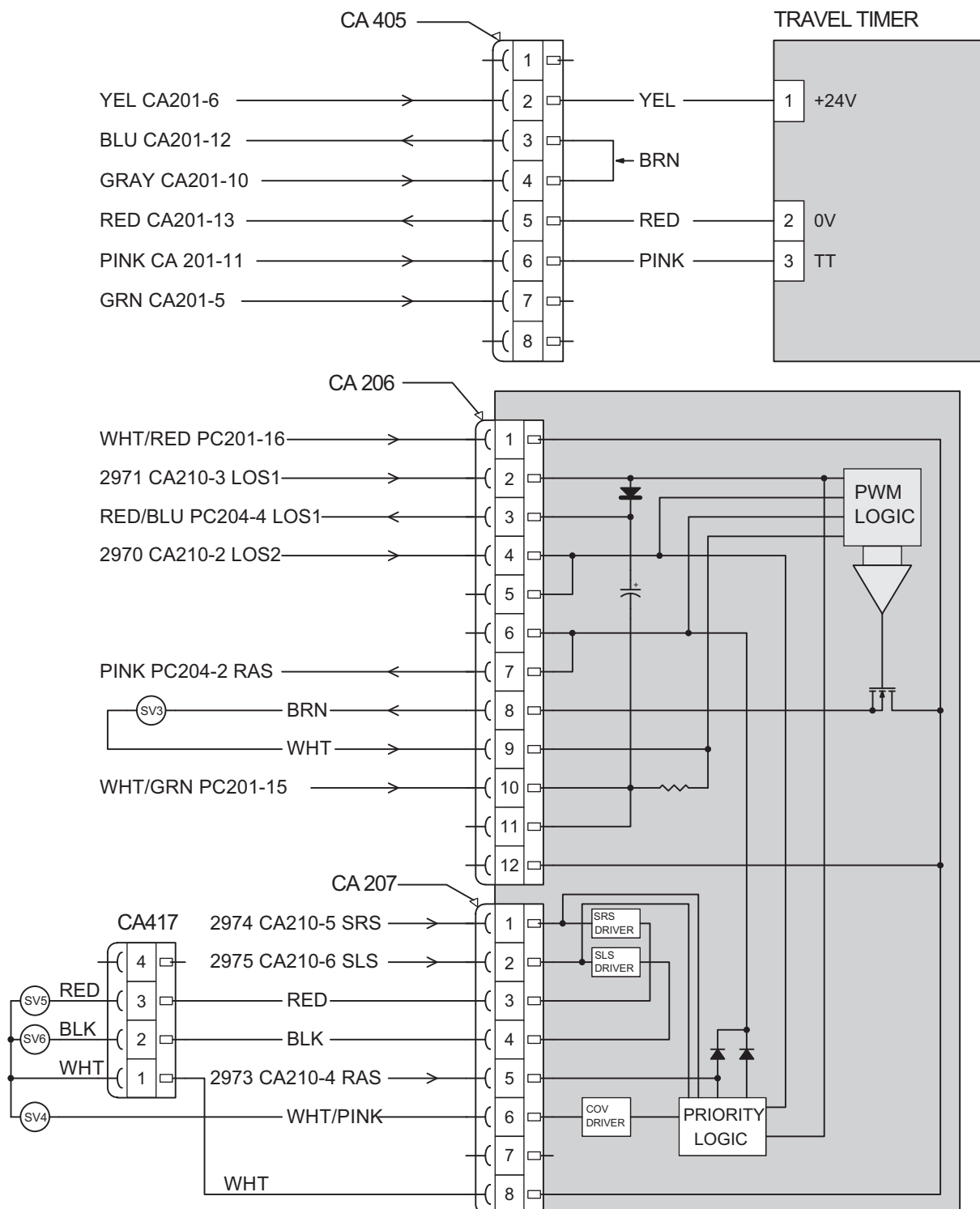
813519_2B_2

SCHEMATIC DIAGRAMS

WE S / WS S up to serial no. 5A132186

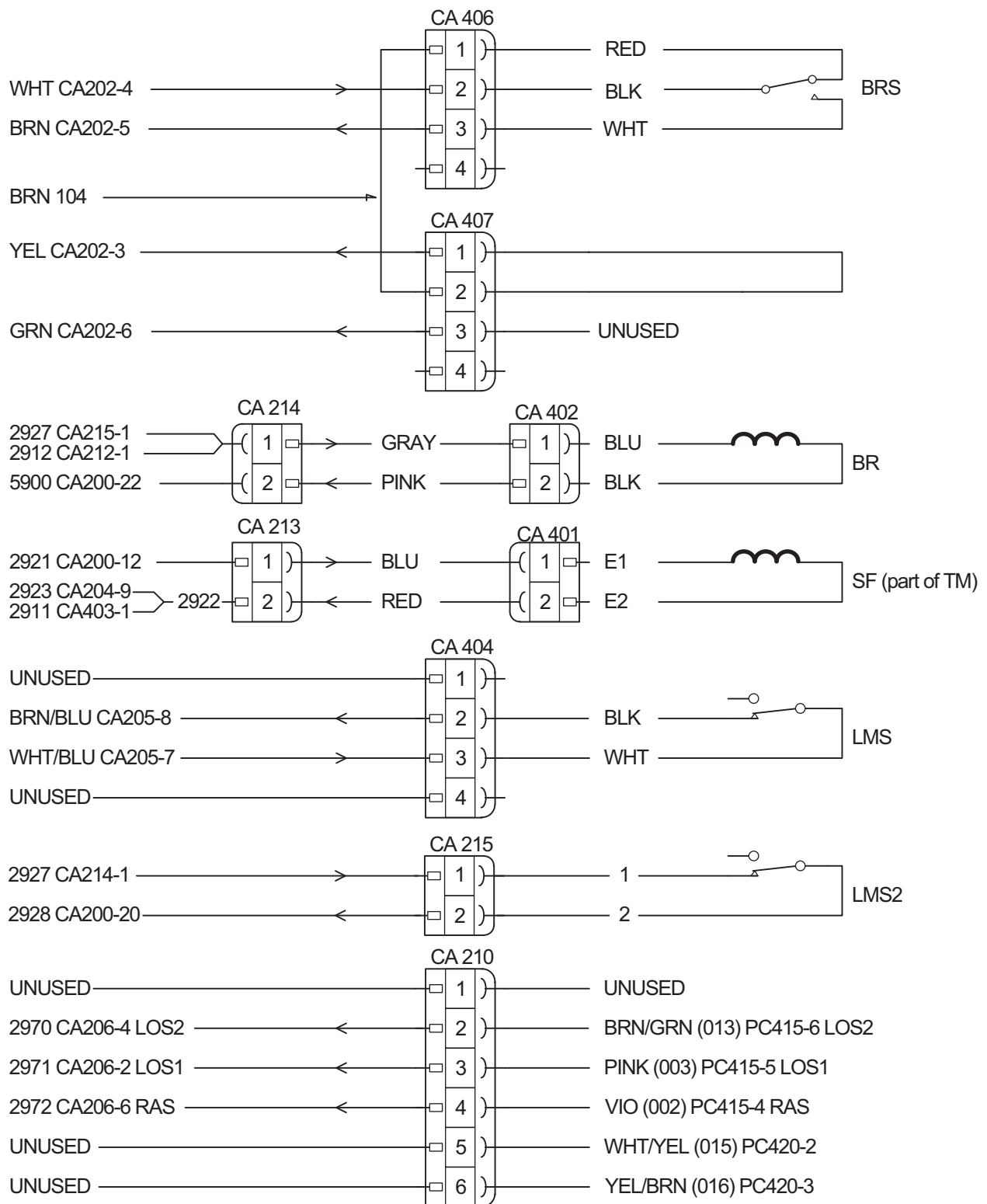


Instrument & Prop. Electronics & Sideshift Circuit, Auxiliary Hydraulics



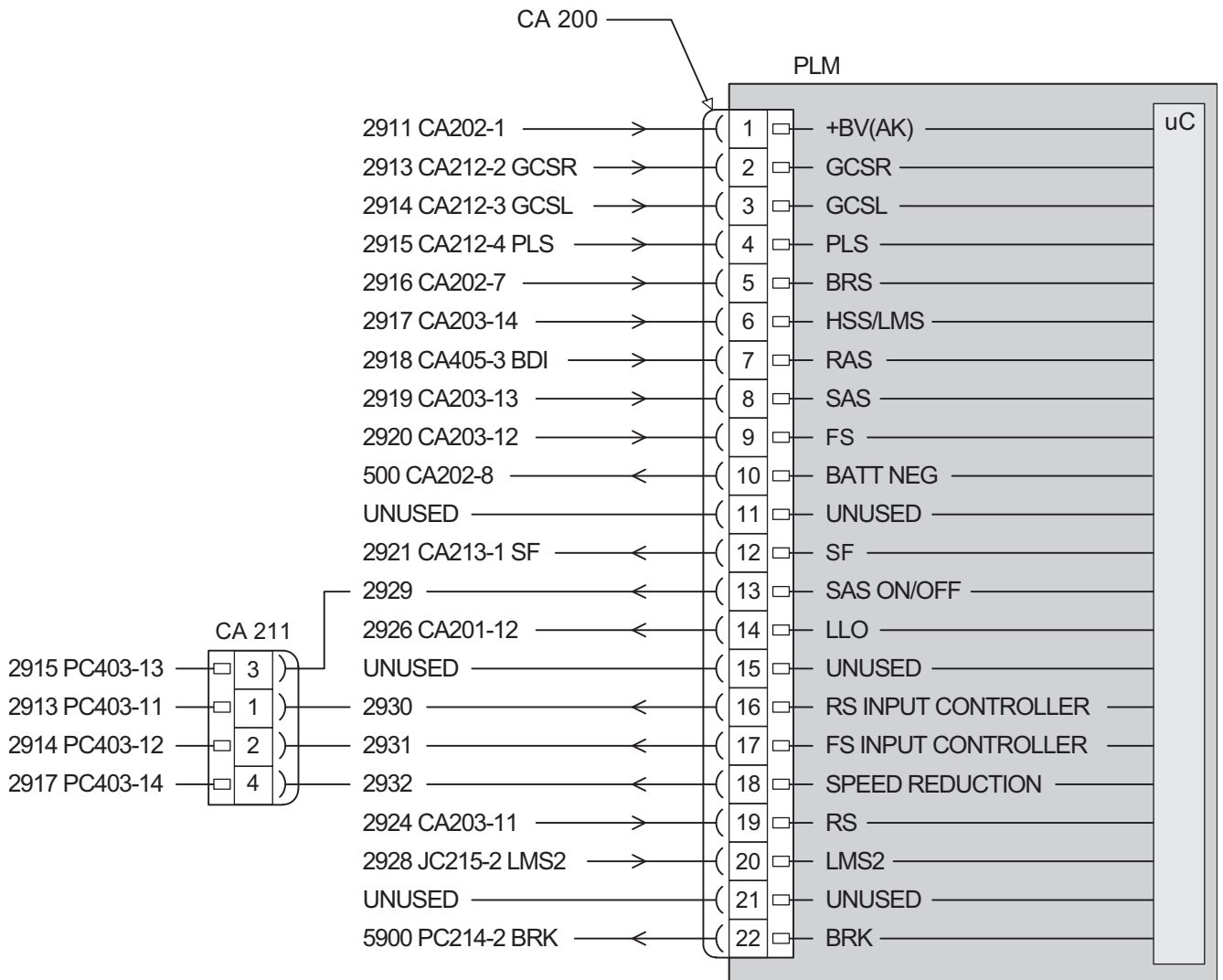
813716_2B_6

Brake Circuit, Standard



816157_2C_4

Platform Logic, Auxiliary Hydraulics



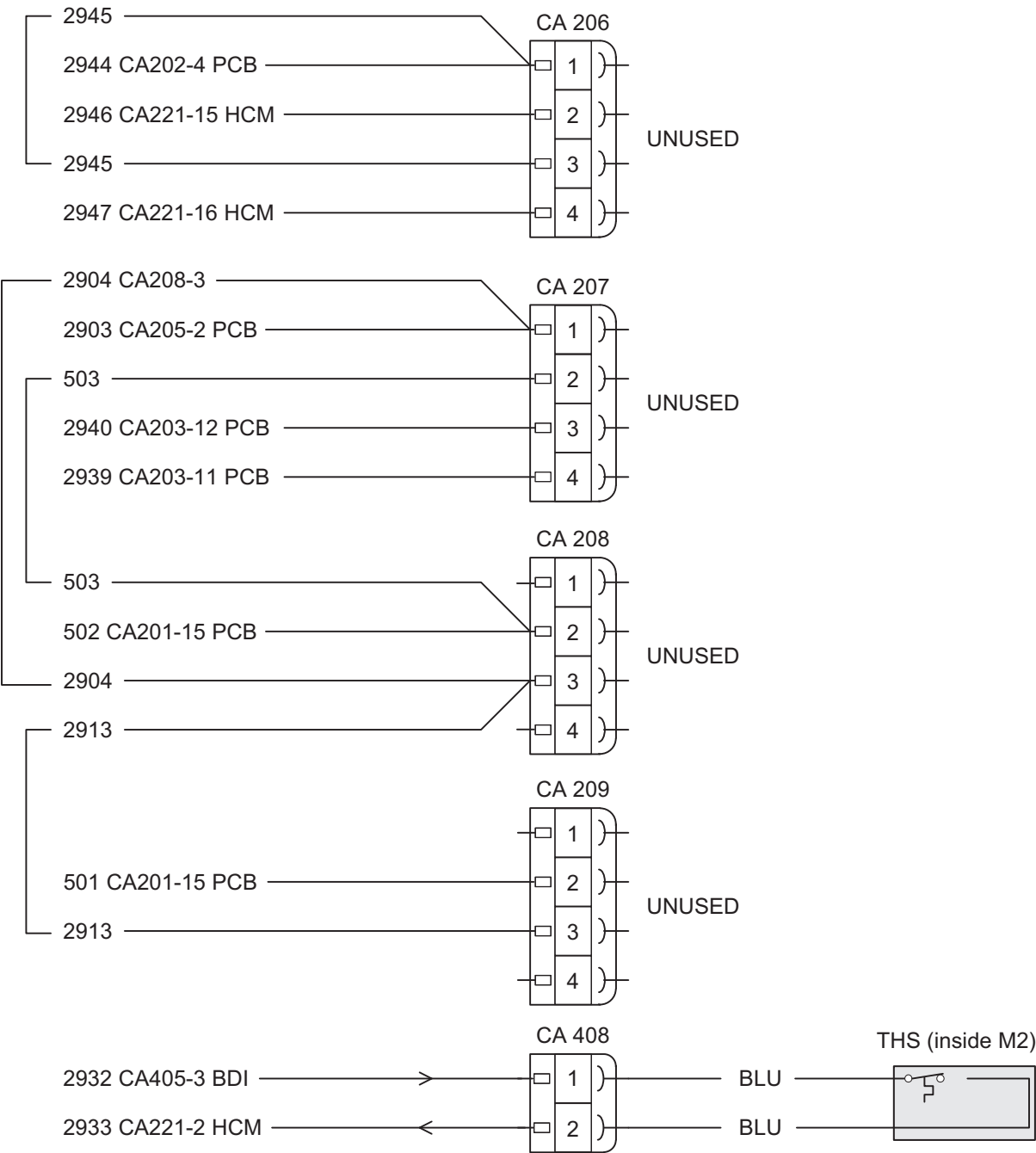
816550_2B_8

SCHEMATIC DIAGRAMS

WE / WS from serial no. 5A134882



Option Connection, Thermal Switch, Standard



818163_2C_8

NOTE

For WE 1.25 t a jumper is used instead of THS