

PT2690D PUSH BACK TRACTOR

OPERATION, MAINTENANCE AND PARTS MANUAL



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APPLICABILITY OF THIS MANUAL

PT2690D Push Back Tractors with a Manufacture Year of 2022-2023-2024, Serial Numbers 222083856+.

If this manual does not correspond to the Manufacture Year (MY) of your Push Back Tractor, the correct manual can be obtained from AvroGSE using the contact details given inside the Front Cover of this manual.

Manual Part Number: PRPW03216

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LIST OF ABBREVIATIONS

A	Amp (Ampere)	LED	light emitting diode
C	Centigrade	Max	maximum
cc	cubic centimetres	MIL	Malfunction Indicator Lamp
c/w	complete with	mm	millimetres
DBP	Draw bar Pull	MPa	Megapascal (1 MPa = 1 Nmm ² = 1000 KPa = 145 lbs/in ²)
Deg	degree (temperature)	mph	miles per hour
Dia.	diameter	MY	manufacture year
D.T.C.	Diagnostic Trouble Code	N/A	Not Applicable
F	Fahrenheit	Nm	Newton Metre
ft/lbs	foot-pounds force	o.d.	outside diameter
GSE	ground support equipment	P/N	Part Number
kg	kilograms	PPE	Personal Protective Equipment
IATA	International Air Transport Association	psi	pounds per square inch (pressure)
i.d.	inside diameter	SAE	Society of Automotive Engineers (specification)
in.	Inches	SWL	Safe Working Load
kph	kilometres per hour	Temp	temperature
L	litre	Turbo	turbocharger
lbs	pounds		

SAFETY

Observe the following safety precautions.

LETHAL DANGER – AIRCRAFT TOWING USE ONLY



The PT2690D Tractor is designed for aircraft pushing and towing only. Do not exceed the PT2690D Tractors' towing capacity. It is dangerous to do so and an accident or damage to the PT2690D Tractor or the aircraft may result.

In addition to the driver, there is space for one passenger in the Cab. **DO NOT** allow people to ride elsewhere on the vehicle. It is unsafe to do so, and lethal injury may result.

LETHAL DANGER – DO NOT USE ON PUBLIC ROADS



The PT2690D Tractor is designed for use in airports. It is **NOT** suitable, or legal, for use on public roads. Attempting to use the PT2690D Tractor on a public road may result in a lethal accident.

DO NOT use the PT2690D Tractor for purposes for which it was not designed. **DO NOT** operate the PT2690D Tractor in a reckless manner. Lethal injury may result.

LETHAL DANGER – DO NOT ALTER FACTORY SETTINGS



DO NOT attempt to alter the PT2690D Tractor's factory settings. Lethal injury may result. The factory settings optimise both the safety and performance of the PT2690D Tractor.

Altering the factory settings invalidates the Warranty on the PT2690D Tractor.

WARNING – PETROLEUM – FIRE AND HEALTH HAZARD



Fuel expands when heated. Expanding fuel in an over full tank can cause spills and leaks. Do not overfill the fuel tank.

Do not eat, drink or smoke when refuelling the Tractor. If fuel is ingested, or comes into contact with your eyes, nose or mouth, seek medical assistance immediately.

Fuel spillages are a fire and slip hazard. Always clean up any spillages.

WARNING – BURN HAZARD



Hot coolant in the radiator will scald. Make sure that the engine has cooled down before removing the radiator cap. Wear Personal Protective Equipment (PPE) including eye shields or protective goggles, and suitable protective gloves.

WARNING – MAXIMUM SPEED



The maximum speed of the PT2690D Tractor is limited to 23 kph (14.3 mph). It is unsafe to exceed that speed.

Do not attempt to modify the PT2690D Tractor to exceed that speed. A fatal accident may result.

WARNING – ALCOHOL AND DRUG USE



The PT2690D Tractor must not be accessed or operated by anyone impaired by alcohol or drugs.

LETHAL WARNING – SIZE AND WEIGHT OF PUSH BACK TRACTOR



The PT2690D Push Back Tractor is 5.66 m (18 ft 6.8 in.) long and weighs 16,500 kg (36,376 lbs). If working underneath Tractor, always use a Service Lift with a Safe Working Load (SWL) of at least 20,000 kg (20 Tons). When using a Service Lift, make sure that all four wheels of the Tractor are wedged so that the Tractor cannot move, and obey the operating procedures for the Service Lift.

If lifting the PT2690D Tractor, always use a crane and a four-leg lifting sling or chain with a SWL of at least 20,000 kg (20 Tons). Always attach all four legs of the lifting sling or chain to the four lifting points on the Tractor.

Before commencing a lifting operation, make sure that:

- (1) The lifting equipment is in good condition. Do not use lifting equipment whose condition is suspect.
- (2) The lifting equipment has been regularly inspected, maintained, and certified, in accordance with the applicable National and Local regulations and codes. Do not use lifting equipment that does not meet this requirement, or which has exceeded the mandated time between inspections.

The Tractor must always be towed or moved using a suitable vehicle.

WARNING – LIFTING OPERATIONS



Lifting operations must **ONLY** be done by personnel who are trained and authorised to perform lifting operations.

DO NOT reach or stand beneath a Tractor that is suspended by a crane.

Wear a hard hat, high visibility clothing, and suitable footwear during lifting operations.

LEATHAL WARNING – USE CORRECT LIFTING POINTS



When lifting the PT2690D Push Back Tractor, always use the four lifting points provided on the body of the Tractor. **NEVER** use the lifting points on top of the Cab, they are only for fitting and removing the Cab, and are not capable of holding the weight of the Tractor.

WARNING – DO NOT LIFT TRACTOR WITH A FORKLIFT



The PT2690D Push Back Tractor is 5.66 m (18 ft 6.8 in.) long and weighs 16,500 kg (36,376 lbs). Due to the size and weight of the Tractor, **DO NOT** attempt to use a forklift truck to lift the Tractor.

The Tractor is not designed to be lifted with a forklift.

WARNING – HEAVY ITEMS



Always use correct manual handling techniques. For items positioned below mid-lower leg height, safe lifting capacity is 10 kg (5 kg if not close to your feet) for an able-bodied man and 7kg (3 kg if not close to your feet) for an able-bodied woman.

WARNING – PETROLEUM, OILS AND LUBRICANTS



Do not eat, drink or smoke when applying oil or lubricant. Do not allow the lubricant to come into contact with your eyes, mouth or nose. Wear Personal Protective Equipment (PPE), for example suitable gloves, eye shields, and overalls. If lubricant is ingested, or comes into contact with your eyes, seek medical assistance immediately.

Oil and lubricants are a slip hazard. Always clean up any spillages, or excess oil or lubricant.

WARNING – DAMAGE TO HYDRAULIC SYSTEM



Before using the vehicle, at the start of every shift, check the Oil Return Filter pressure gauge. Make sure that the pressure gauge needle is in the green area. If the needle is NOT in the green area DO NOT use the vehicle, SWITCH OFF the vehicle, and report the problem. The filter element located inside the Oil Return Filter, MUST be removed, cleaned, and refitted BEFORE using the vehicle.

WARNING – DIESEL EXHAUST FLUID SYSTEM



It is unlawful to tamper with or remove any component of the engine aftertreatment system. It is also unlawful to use a Diesel Exhaust Fluid (DEF) that does not meet the required specifications, or to operate this vehicle with no Diesel Exhaust Fluid (DEF).

WARNING – DIESEL EXHAUST FLUID



Diesel Exhaust Fluid (DEF) contains Urea. Do not eat, drink or smoke when filling the DEF Tank. Do not allow the DEF to come into contact with your eyes, mouth or nose. Wear Personal Protective Equipment (PPE), for example suitable gloves, eye shields, and overalls. If DEF is ingested, or comes into contact with your eyes, seek medical assistance immediately. If DEF gets in your eyes, immediately flush eyes with water for a minimum of 15 minutes.

PRECAUTION – PERSONAL PROTECTIVE EQUIPMENT



When operating, moving, lifting, servicing, repairing, or transporting the Tractor, always wear suitable Personal Protective Equipment (PPE) to prevent crushing of hands, feet, or other body parts. For example, wear protective footwear, safety glasses, hard hat, protective gloves, and high-visibility clothing.

When preparing the PT2690D Tractor for transport by air, road, or rail, make sure it is securely packed. Safeguard the PT2690D Tractor against movement or break-away during transport by applying the brake, and securely strapping the PT2690D Tractor in place.

PRECAUTION - READ THIS MANUAL



Read and understand this manual before operating, cleaning, repairing, or servicing the PT2690D Tractor.

A copy of this manual will have been provided with each PT2690D Tractor when it was delivered.

Familiarize yourself with the location and correct use of all controls, indicators, and safety devices before operating the PT2690D Tractor.

PRECAUTION – OPERATOR TRAINING



ONLY people who have been FULLY TRAINED AND AUTHORIZED to operate this type of PT2690D Tractor are permitted to start, operate , and shut down the PT2690D Tractor.

Anyone operating or maintaining the PT2690D Tractor must understand the potential risks and hazards associated with it BEFORE they operate the PT2690D Tractor.

Anyone operating or maintaining the PT2690D Tractor must be familiar with all the required safety devices and procedures.

PRECAUTION – SAFE WORKING PRACTICES



Be aware of the PT2690D Tractor's working parts. Keep hands, feet, and loose clothing away from the PT2690D Tractor's moving parts.

DO NOT operate a PT2690D Tractor that is need of repair. Perform scheduled maintenance in accordance with the maintenance procedures given in this manual.

Only operate the PT2690D Tractor when:

- (1) All safety devices and guards are in place and in full working order.**
- (2) All controls, gauges, lights, and indicators operate correctly.**
- (3) The PT2690D Tractor is set-up correctly in accordance with this manual.**

WARNINGS AND PRECAUTIONS – WELDING, GRINDING, AND CUTTING



WELDING ARC. A welding arc is bright enough to damage eyesight and cause flash burns. Never look directly at a welding arc with unprotected eyes. Always use an approved welding screen or visor. Cover all exposed skin before welding.



PROTECTIVE CLOTHING. Always wear protective clothing and gloves appropriate for welding work.



HOT WELDS. Always allow a weld to cool before removing welding slag.

Make sure that there is no combustible material within 4 Meters (13 feet) of grinding, welding, or slag chipping.



GRINDING, CHIPPING, AND CUTTING. Always wear eye protection (e.g. protective goggles) when using grinding and cutting tools, and when chipping off welding slag. Always wear eye protection when within 4 Meters (13 feet) of grinding, slag chipping, or cutting with power tools.



DAMAGE TO ELECTRICAL EQUIPMENT. To prevent damage to the vehicle electrical system, before performing any welding, remove or disconnect all vehicle batteries, and disconnect all electrical connections to the vehicle electronics.



TRAINING, AUTHORIZATION AND CERTIFICATION OF WELDERS. Welding must only be performed by people who have been **FULLY TRAINED IN WELDING AND ARE AUTHORIZED** to perform welding operations. Welders must be **CERTIFIED** by their respective national association of welders, such as CWB and/or AWS.

Grinding, chipping, and cutting with power tools must only be performed by people who have been **FULLY TRAINED IN USING THE POWER TOOLS AND ARE AUTHORIZED** to perform those operations.

Before performing any welding, grinding or chipping operations, make sure that any necessary Hot Work Permits have been obtained.

INTRODUCTION

The function of the PT2690D Push Back Tractor is to tow and “push back” small and medium sized aircraft.



Figure 1 – PT2690D Push Back Tractor

The PT2690D is a 4 wheel-drive vehicle, powered by a 3.8 Litre 4-stroke, water cooled diesel engine. The PT2690D has power steering and a dual circuit hydraulic brake system.

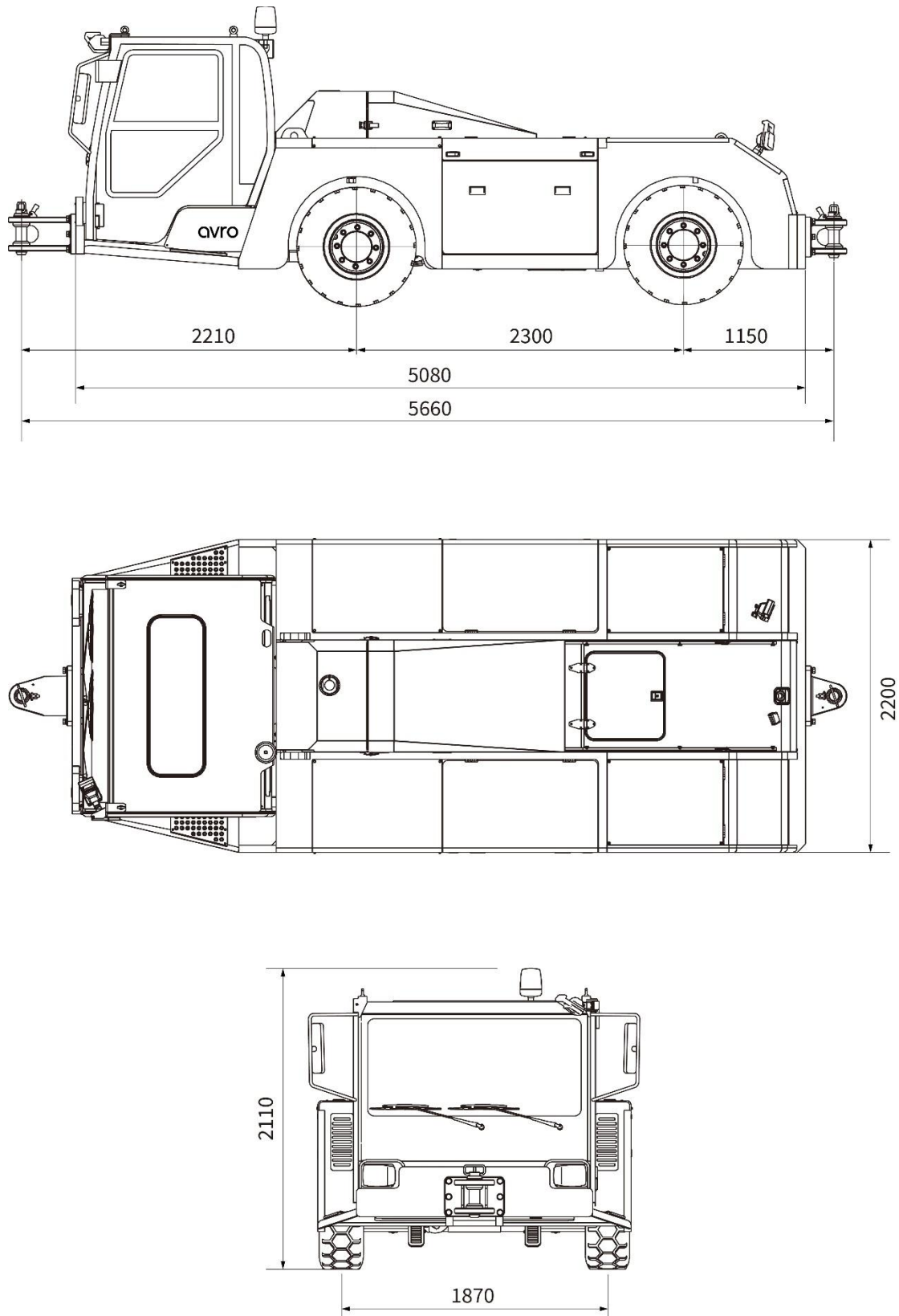
SPECIFICATION

The specification of the PT2690D Push Back Tractor is given in the following Table.

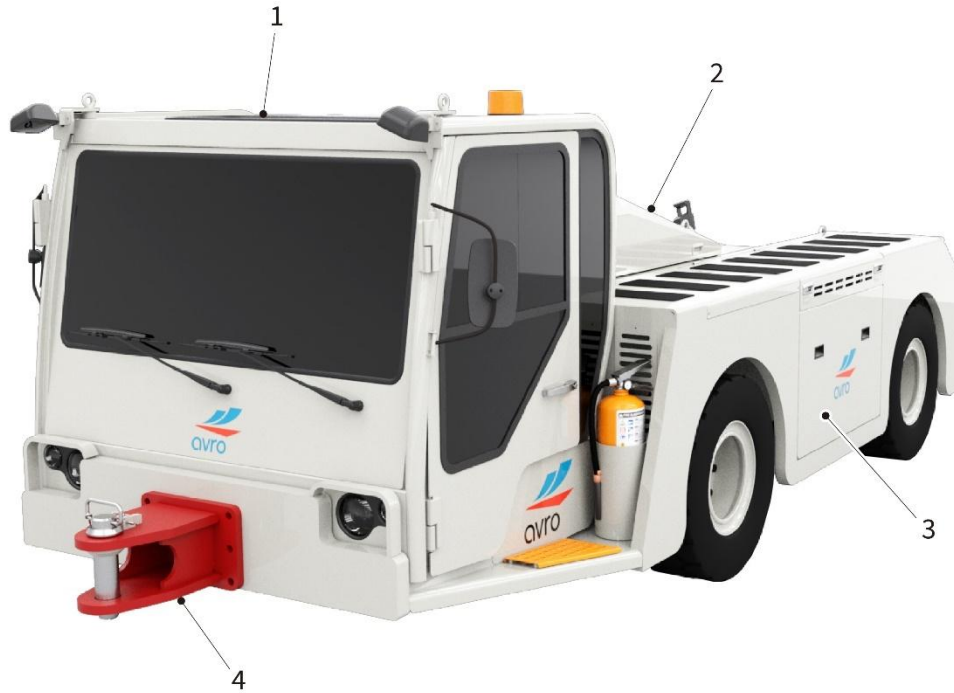
Table 1 PT2690D Push Back Tractor specification

PT2690DTractor	Value	Units	Notes
Dimensions			
Length (overall)	5660 222.8	mm in.	
Width (not including mirrors)	2200 86.6	mm in.	
Width (including mirrors)	2700 106.3	mm in.	With mirrors folded out
Height (to top of warning beacon on drivers' cab)	2110 83.1	mm in.	
Wheelbase	2300 90.6	mm in.	
Minimum Ground Clearance	230 9.0	mm in.	
Front overhang	2210 87.0	mm in.	
Rear overhang	1150 45.3	mm in.	
Towing Coupler Height (Front)	427 16.8	mm in.	
Towing Coupler Height (Rear)	430 16.9	mm in.	
Front Approach Angle (maximum)	9.5	degrees	
Rear Departure Angle (maximum)	18	degrees	
Service Weight	14,800 32,628	kg lbs	
Maximum Travel Speed	15.5 25.0	mph kph	Forward speed, no load.
Front axle load	7,400 16,314	kg lbs	
Rear axle load	7,400 16,314	kg lbs	
Rated Traction	25,000 55116	kg lbs	

PT2690DTractor		Value	Units	Notes
Maximum drawbar pull		120 26,900	kN lbf	
Maximum drawbar pull at 6 km/hr		25 5,620	kN lbf	
Maximum gradient (that can be climbed)		8	%	
Engine type		Diesel		Cummins Model QSF3.8-C120T4
Number of cylinders		4		Inline, 4-stroke, water cooled
Engine Total Displacement		3.8	L	
Engine Rated Power Output and Speed		89.5/2200 120/2200	kW/rpm HP/rpm	
Engine Rated Torque and Speed		488/1500 360/1500	Nm/rpm lbf ft/rpm	
Throttle control				Electronic throttle
Emission stage		Tier 4		
Transmission Type		T12000	Model No.	Automatic Manufacturer: Dana
No. of Gears	Forward	4		
	Reverse	3		
Steering				Front axle hydraulic power steering
Foot Brake				Vacuum assisted hydraulic brakes
Park Brake				Hydraulic cylinder on rear axle
Operating temperature range		-30 to +50 -22 to +122	deg C deg F	Ambient temperature
Storage temperature range		-10 to +40 +14 to +104	deg C deg F	Ambient temperature Storage indoors recommended
Humidity range		0 to 95	%	Relative humidity
Front Tires		315/70R15		
Rear Tires		315/70R15		
Tire pressures (all tires)		10 ± 0.35 145 ± 5 1 ± 0.035	Bar (gauge) psi MPa	1000 KPa

**Figure 2 – PT2590D Push Back Tractor dimensions**

DESCRIPTION



- | | | | |
|---|--------------------|---|---------------------|
| 1 | Cab | 3 | Battery Compartment |
| 2 | Engine Cover Panel | 4 | Front hitch |

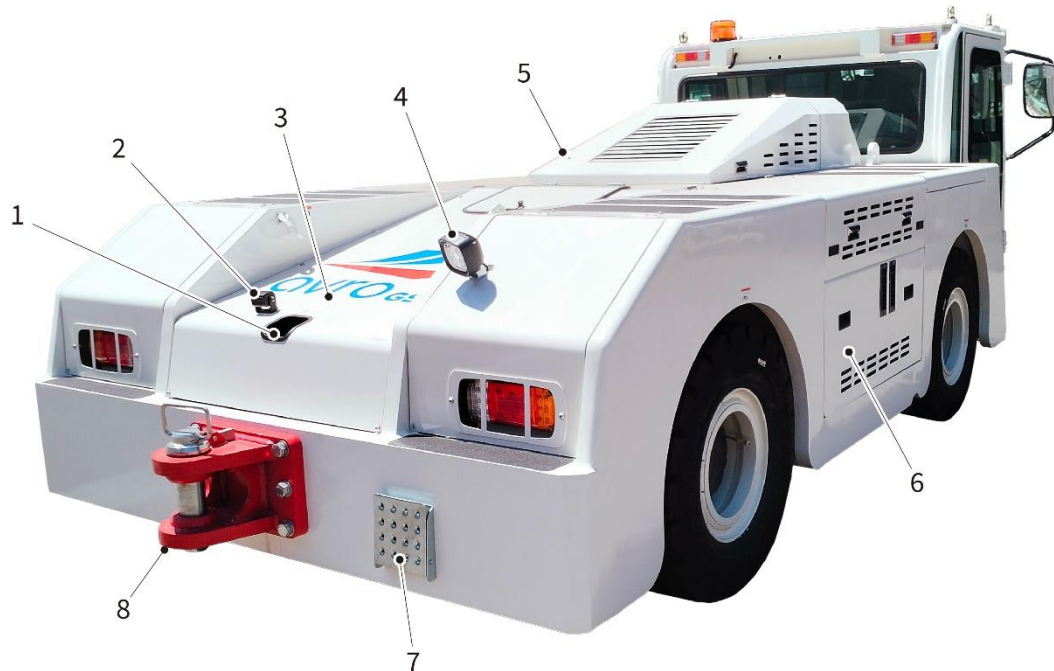
Figure 3 – PT2690D Push Back Tractor (left front view)

To decrease the Nitrogen Oxides emissions from the tailpipe, the PT2690D is fitted with a Selective Catalytic Reduction (SCR) system that incorporates a Diesel Exhaust Fluid (DEF) system.

WARNING – DIESEL EXHAUST FLUID SYSTEM

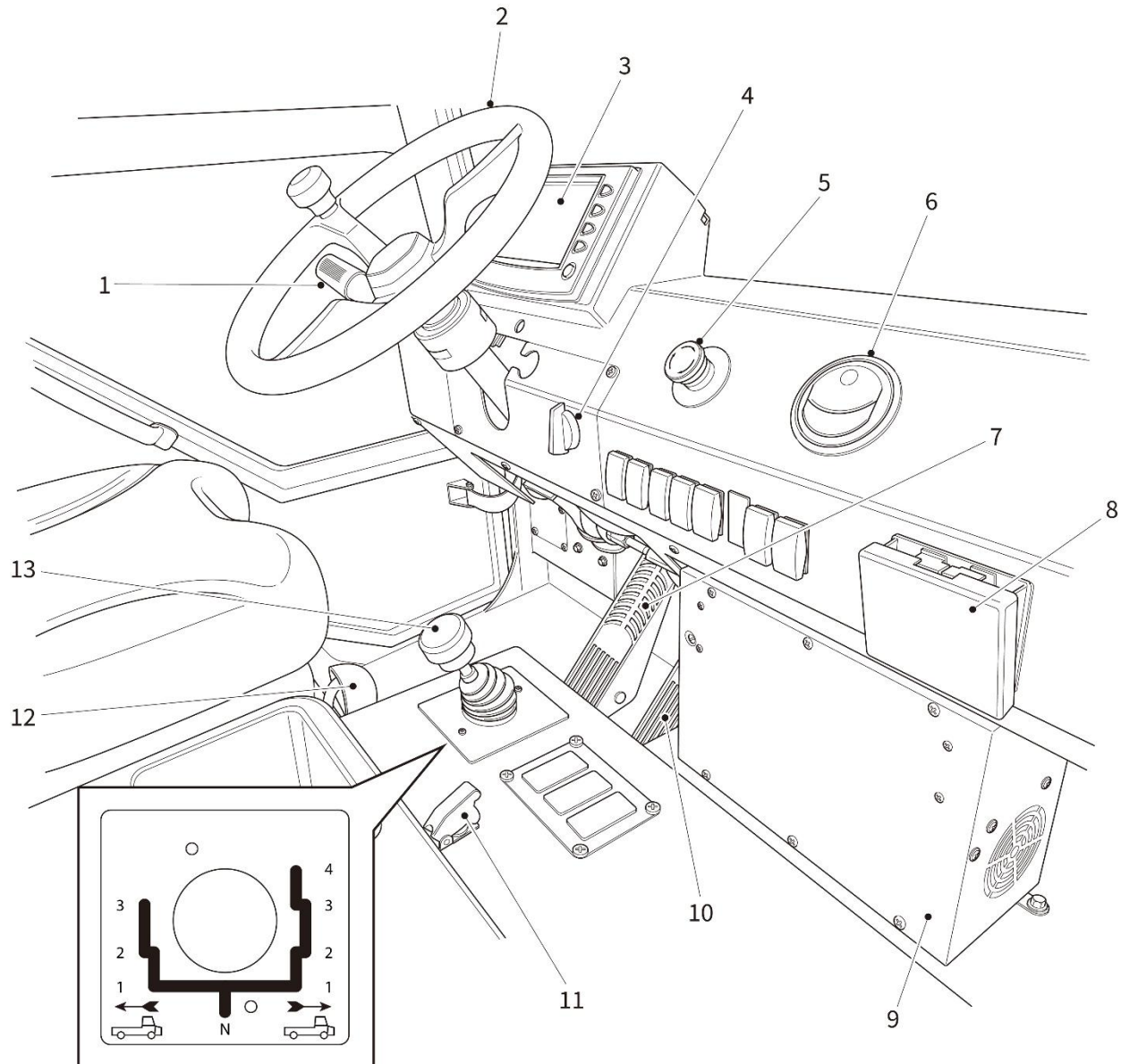


It is unlawful to tamper with or remove any component of the engine aftertreatment system. It is also unlawful to use a Diesel Exhaust Fluid (DEF) that does not meet the required specifications, or to operate this vehicle with no Diesel Exhaust Fluid (DEF).



- | | | | |
|---|--|---|---|
| 1 | Fuel filler point | 5 | Engine compartment |
| 2 | Rear camera | 6 | Exhaust and engine air filter compartment |
| 3 | Fuel Tank and Hydraulic Oil Tank compartment | 7 | Rear fold-down step |
| 4 | Rear work light | 8 | Rear hitch |

Figure 4 – PT2690D Push Back Tractor (right rear view)



- 1 Turn Signal/Combination Switch
- 2 Steering wheel
- 3 Dash Display Screen
- 4 Ignition switch
- 5 EMERGENCY STOP switch
- 6 Air vent
- 7 Brake Pedal

- 8 Cup holder
- 9 Heater
- 10 Accelerator Pedal
- 11 Emergency pump switch
- 12 Seat position adjustment lever
- 13 Transmission Shift

Figure 5 – Driver's Cab controls

The function of the Driver's Compartment controls and indicators is described in the following Table:

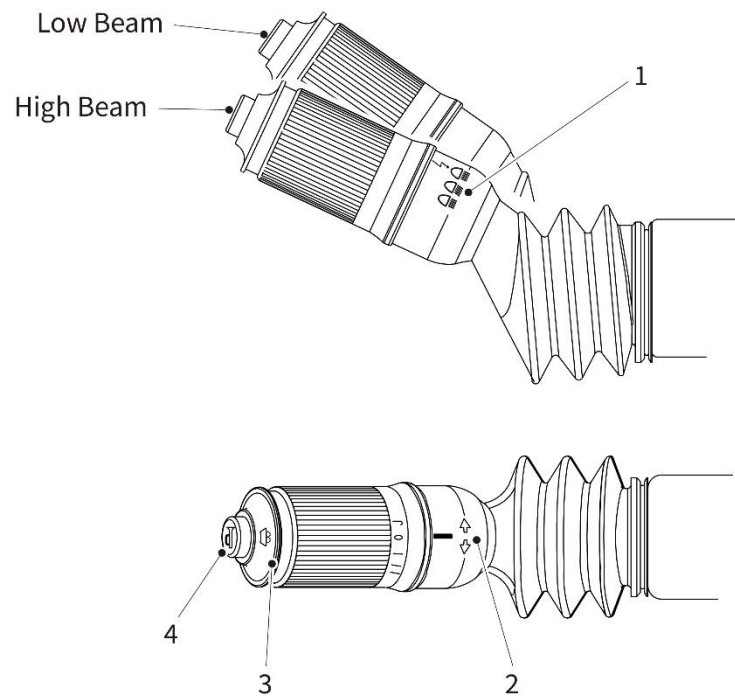
Number	Description	Function
1	Turn Signal/Combination Switch	Described below.
2	Steering wheel	Controls vehicle steering.
3	Dash Display Screen	Displays speed, fault information, operating time, and important warning information.
4	Ignition switch	2-position ON-OFF rotary switch used to Start-Up and Switch Off the Tractor.
5	EMERGENCY STOP switch	Pressing this switch shuts down the vehicle.
6	Air vent	
7	Brake pedal	Applies Service Brake.
8	Cup holder	Very important feature!
9	Heater	Controlled by the Heater switch – see Fig 8.
10	Accelerator pedal	Controls drive speed.
11	Emergency Pump Switch	<p>The Emergency Pump Switch is a toggle switch that is used in conjunction with the Ignition Switch to turn the emergency pump ON and OFF.</p> <p>To prevent accidental operation of the emergency pump, the Emergency Pump Switch is protected by a spring-loaded cover. To operate the Emergency Pump Switch, its protective cover must first be raised to the vertical position.</p> <p>When the protective cover is in the down position it mechanically engages with the Emergency Pump Switch, forcing the switch into the OFF position.</p> <p>The Ignition Switch must be in the Accessory (first notch) position to enable the Emergency Pump Switch to operate.</p>
12	Seat position adjustment lever	Adjusts position of seat.
13	Transmission shift	Selects forward and reverse gears.

STEERING COLUMN COMBINATION SWITCH

The Combination Switch Turn (Figure 6) has multiple functions and is used to control the turn signals, the headlight beam, the horn, the windscreen wipers, and the windscreen wash fluid.

Turn signals are selected by moving the Combination Switch:

- Set the Combination Switch to the Up position for a right turn signal.
- Set the Combination Switch to the Down position for a left turn signal.
- The turn indicator lights are Off when the Combination Switch is in the centre position.



- | | | | |
|---|---------------------------------|---|-------------------------------|
| 1 | Headlight High/Low Beam control | 3 | Windscreen wash fluid control |
| 2 | Windscreen wiper control | 4 | Horn |

Figure 6 – Steering Column Combination Switch controls

The windscreen wash fluid control (3) is the disk next to the horn button.

The windscreen wiper control (2) is a rotary control that has three positions.

- Wiper stop (0).
- Wiper slow (I).
- Wiper fast (II).

Headlight control is by moving the Combination Switch to give either a low beam or a high beam.

TRANSMISSION SHIFT (GEAR SHIFT)

Refer to Figure 7. The Transmission Shift (13) is an eight-position switch:

- The centre position is the Neutral gear position. The Gear Shift **MUST** be in the N position when the vehicle is started.
- Four forward gears.
- Three reverse gears.

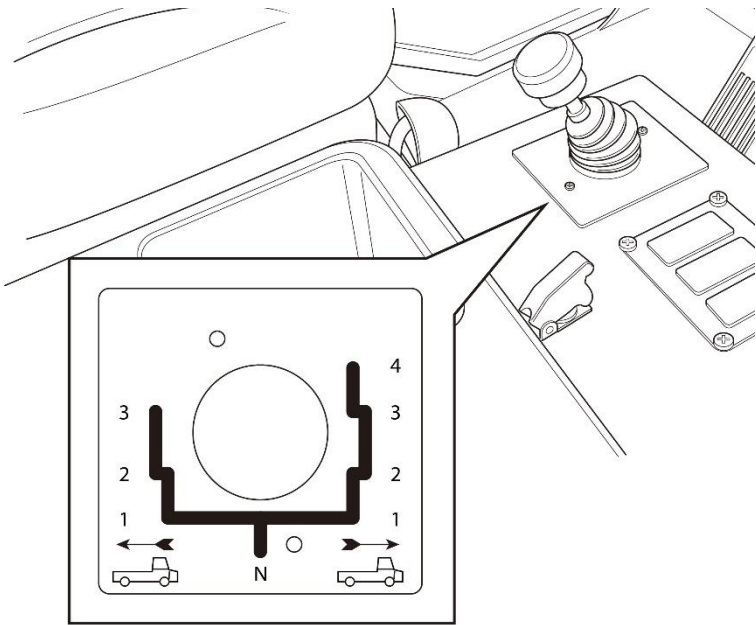
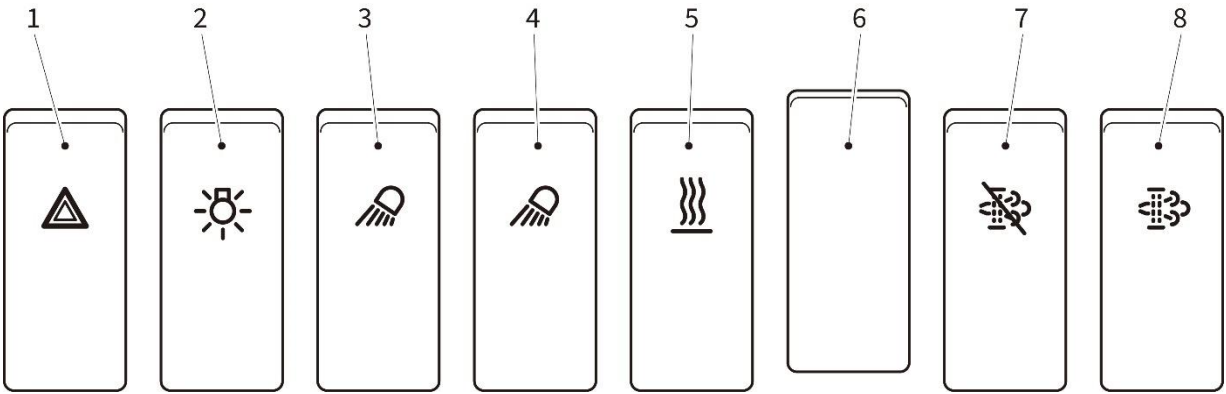


Figure 7 - Transmission Shift gear positions

DRIVER'S CAB SWITCH PANEL

A row of rocker switches is located on the Dash, to the right off the Ignition switch. Refer to Figure 8 below.



- | | | | |
|---|--------------------------|---|------------------------------|
| 1 | Emergency Flasher switch | 5 | Heater switch |
| 2 | Light switch | 6 | Blank cover |
| 3 | Front Headlight switch | 7 | Stop Regeneration switch |
| 4 | Rear Headlight switch | 8 | Initiate Regeneration switch |

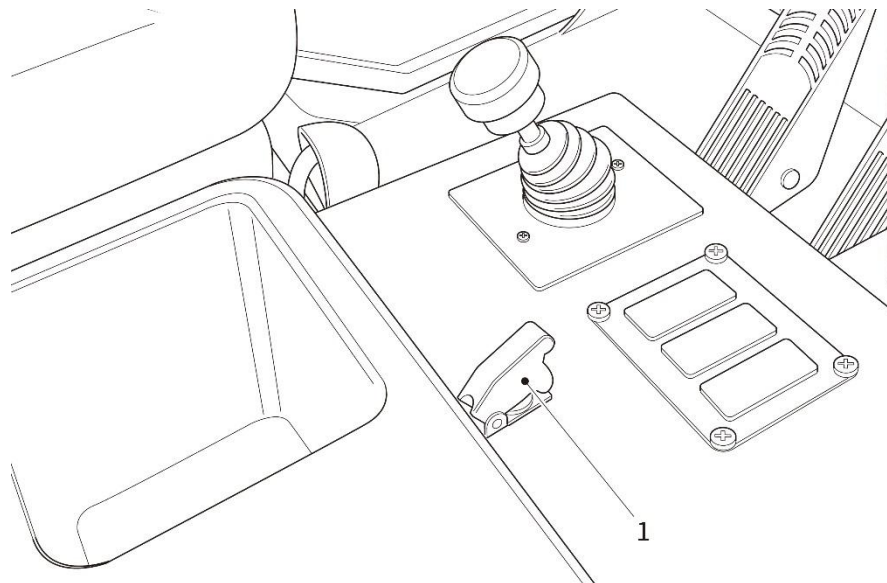
Figure 8 – Drivers' Cab – switch panel

The function of the row of switches in the Cab is described in the following Table:

Number	Description	Function
1	Emergency Flasher switch	Turns On/Off the flashing hazard warning lights.
2	Light switch	Turns On/Off the Cab interior light.
3	Front Headlight switch	Switches the front headlights On/Off.
4	Rear Headlight switch	Switches the rear working lights On/Off.
5	Heater switch	Controls the heater fan. There is no warm air when the engine is not running. NOTE The coolant heater that provides heat when the engine is running should be turned ON when the engine is running.
6	Blank cover	No function.
7	Stop Regeneration switch	Pressing this switch halts the regeneration of the Exhaust Aftertreatment System.
8	Initiate Regeneration switch	Pressing this switch initiates regeneration of the Exhaust Aftertreatment System.

EMERGENCY PUMP SWITCH

The Emergency Pump Switch (Figure 9) is a toggle switch that is used in conjunction with the Ignition Switch to turn the emergency pump ON and OFF.



1 Emergency Pump Switch

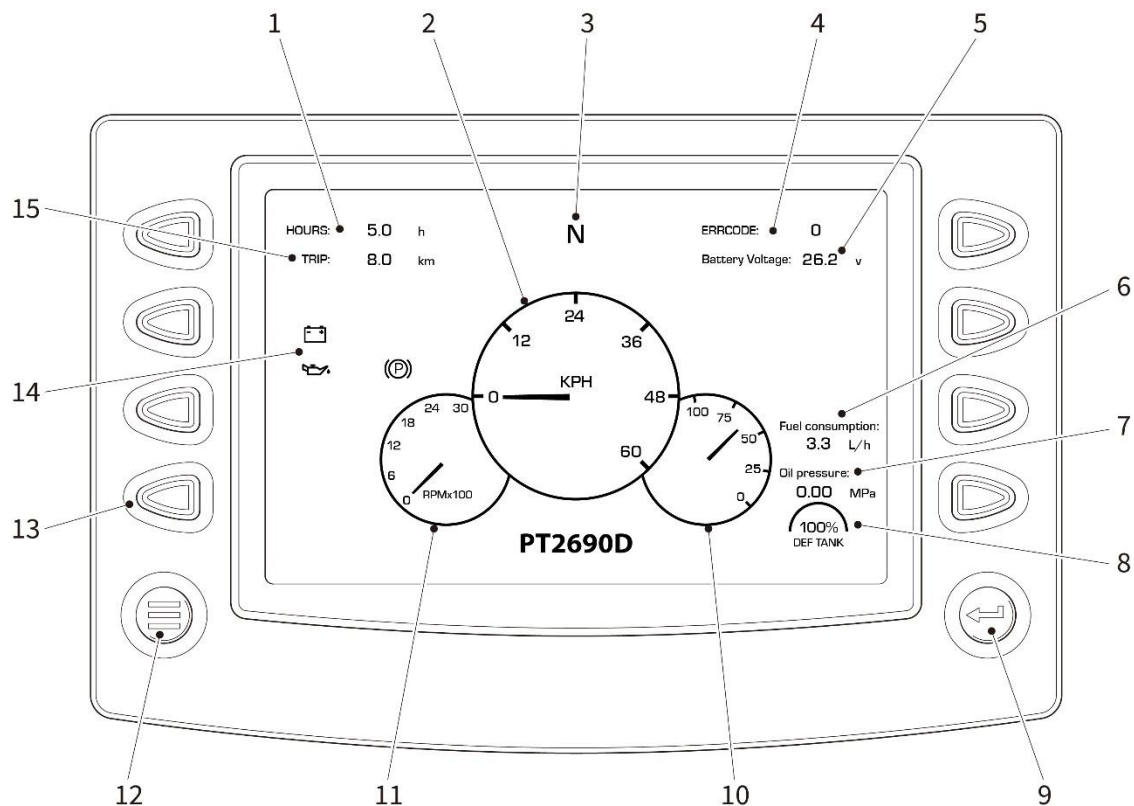
Figure 9 – Emergency Pump Switch

To prevent accidental operation of the emergency pump, the Emergency Pump Switch is protected by a spring-loaded cover. To operate the Emergency Pump Switch, its protective cover must first be raised to the vertical position. When the

protective cover is in the down position it mechanically engages with the Emergency Pump Switch, forcing the switch into the OFF position. The Ignition Switch must be in the Accessory (first notch) position to enable the Emergency Pump Switch to operate.

DASH DISPLAY INSTRUMENT

Figure 10 shows the information provided to the driver by the Dash Display Instrument.




- | | | | |
|---|--|----|---|
| 1 | Operational hours' meter | 9 | Enter/Return button |
| 2 | Speedometer (in kph) | 10 | Fuel gauge |
| 3 | Gear indicator | 11 | Engine tachometer (in rpm) |
| 4 | Fault code (0 indicates no faults) | 12 | Menu button |
| 5 | Battery voltage (in Volts) | 13 | Selector button |
| 6 | Fuel consumption (in L per hr) | 14 | Indicator symbol area (see table below) |
| 7 | Transmission oil pressure | 15 | Mileage meter (in km) |
| 8 | Exhaust Aftertreatment System DEF tank gauge | | |

Figure 10 – Dash Display Instrument

The symbols that may illuminate on the Dash Display Instrument are described in the Table below.

Dash Display Instrument symbols

Icon	Description
	Glow plug lamp
	Driving symbol. Vehicle is ready to move.
	Turn signal.
	Headlights are set to high beam.
	Battery low indication.
	Park brake engaged.
	Service (driving) brake engaged.
	Emergency Stop button has been pressed. Emergency Stop initiated.
	Seat signal.
	Engine problem.
	Engine oil level low.
	Transmission oil temperature high.
	Cooling fluid temperature high.
	Exhaust Aftertreatment System cleaning symbol. This symbol illuminates when the Exhaust Aftertreatment System requires regeneration. During regeneration this symbol will flash.
	This symbol illuminates when the Exhaust System temperature is high. It will illuminate when the Exhaust Aftertreatment System is being regenerated.

The PT2690D control system includes a series of settings that are pre-set at the factory. These factory settings optimise the towing performance and safety of the vehicle. **DO NOT** attempt to alter the factory settings.

The menu button (12) allows access to a series of menus that are used to set-up the Tractor. If the menu button is pressed, or accidentally tripped, further progress is blocked by a password. **DO NOT** attempt to proceed further. These factory settings must not be altered. Press the Enter/Return button (9) to exit the menus.

LETHAL DANGER – DO NOT ALTER FACTORY SETTINGS



DO NOT attempt to alter the factory settings. Lethal injury may result. The factory settings optimise the safety of the Tractor.

Altering the factory settings invalidates the Warranty on the Tractor.

On the Dash Display Screen, the Fault Code area (4) is normally reading 0 (“Running Well”). In the event of a fault or malfunction on the tractor it will sometimes (but not always) display a fault code that can be used to identify the problem.

PARK BRAKE

The Park Brake is a hydraulic brake that acts on the rear axle. The Park Brake is operated using the Park Brake Lever (Figure 11).

- To engage the Park Brake, pull the Park Brake Lever (1) back to the rearward position, until it locks.
- To disengage (release) the Park Brake, lift the locking ring (2), then push Park Brake Lever as far forward as it will go.

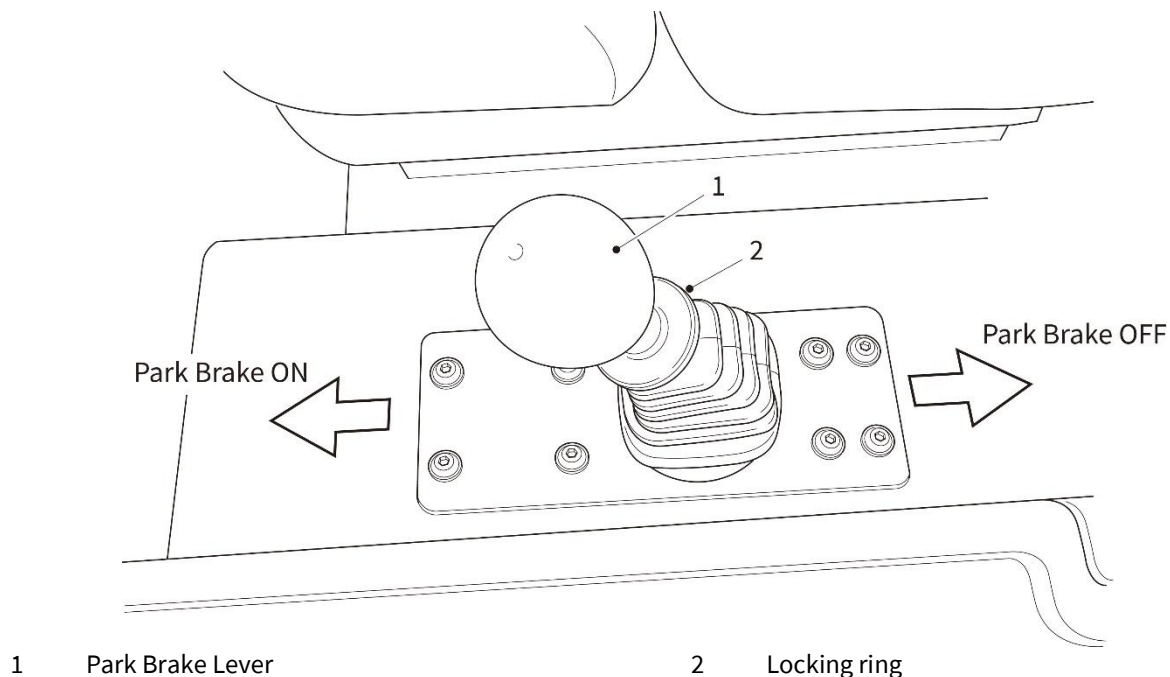
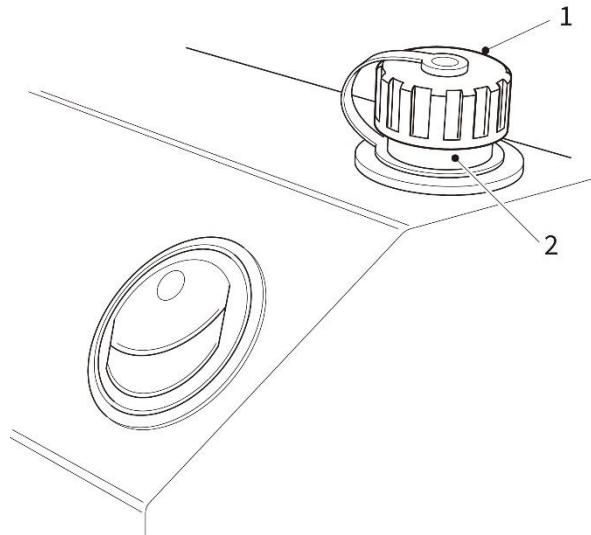


Figure 11 – Park Brake Lever

FILLING THE WIPER FLUID TANK

The filling point for the Wiper Fluid Tank is located on the right-hand side of the Dash (Figure 12).



1 Protective cap

2 Wiper Fluid Tank

Figure 12 – Wiper Fluid tank

SAFETY INTERLOCKS

The PT2690D is equipped with the safety interlocks described in the following Table.

No.	Interlock	Function
1.	Start-Neutral interlock	The engine can only be started-up when the gear shift is in the Neutral position.
2.	Emergency Shutdown.	An EMERGENCY STOP button is provided in the driver's compartment. Pressing the EMERGENCY STOP button will shut the vehicle down completely.
3.	Reverse Gear - Alarm interlock	An audible alarm sounds when the vehicle is in reverse gear.
4.	Park Brake locking ring	A locking ring on the Park Brake Lever must be raised before the Park Brake can be released.
5.	Emergency Pump – Ignition interlock	The Ignition Switch must be the Accessory (first notch) position before the Emergency Pump Switch can operate the Emergency Pump.
6.	Emergency Pump Switch cover	A spring-loaded cover over the Emergency Pump Switch protects the Emergency Pump Switch against accidental activation.

OIL RETURN FILTER GAUGE

The Oil Return Filter, which is located on top of the Hydraulic Oil Tank, includes an oil pressure gauge (Figure 13).

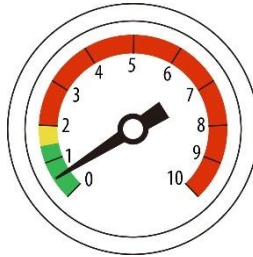


Figure 13 - Pressure gauge on Oil Return Filter

The function of this pressure gauge is to indicate the condition of the filter element located inside the Oil Return Filter. It does this by measuring the difference in oil pressure across the filter element to determine whether the filter element is blocked. This pressure gauge **MUST** be checked at the start of every shift **BEFORE** using the vehicle. Regular checking of this pressure gauge is also included in the Scheduled Maintenance for the PT2690D vehicle.

- If the needle of the pressure gauge is pointing to the green segments, the filter element is serviceable.
- If the needle of the pressure gauge is pointing to the yellow segment, there is a constriction in the filter element. **DO NOT** operate the vehicle until the filter element has been cleaned or replaced, as applicable.
- If the needle of the pressure gauge is pointing to the any of the red segments, the filter element is blocked. **DO NOT** operate the vehicle until the filter element has been cleaned or replaced, as applicable.

START-UP

Before starting the PT2690D Push back Tractor:

- Check that it is safe to move the Tractor.
- Make sure that all the EMERGENCY STOP switch is in the open position.
- Put the Transmission Shift into the centre, Neutral, position.
- Rotate the Start Switch in a clockwise direction to the On position. This turns on the electrical power to the vehicle. The instrument panel will activate, and the PT2690D Tractor will self-test for approximately 3 to 4 seconds.
- If the self-test detects a fault, do not attempt to use the Tractor and **REPORT** the fault.
- When the self-test is completed successfully, the Instrument Panel will display vehicle data normally.
- Rotate the Ignition Switch to the crank position. The engine will start.
- If the engine fails to start, wait at least 10 seconds then repeat the steps above.

NOTE

If the Tractor fails to start after several attempts, **REPORT** the problem. Have a suitably trained and authorised vehicle mechanic check the fuel and ignition system for faults and perform the Troubleshooting Procedure given in this manual.

- Allow the engine to idle for a few minutes before proceeding to the next step.

WARNING – DAMAGE TO HYDRAULIC SYSTEM



Before using the vehicle, at the start of every shift, check the Oil Return Filter pressure gauge. Make sure that the pressure gauge needle is in the green area. If the needle is NOT in the green area DO NOT use the vehicle, SWITCH OFF the vehicle, and report the problem. The filter element located inside the Oil Return Filter, MUST be removed, cleaned, and re-fitted BEFORE using the vehicle.

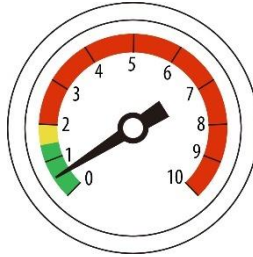


Figure 14 - Pressure gauge on Oil Return Filter

- Check the Oil Return Filter pressure gauge located on top of the Hydraulic Oil Tank (Figure 14). Make sure that the pressure gauge needle is in the green area. If the needle is NOT in the green area DO NOT use the vehicle, SWITCH OFF the vehicle, and REPORT the problem. Have a suitably trained and authorised vehicle mechanic remove and clean the filter element located inside the Oil Return Filter, BEFORE using the vehicle.
- Rotating the end of the Turn Signal/Headlamp control to select and switch On the required vehicle lights.
- Put the Transmission Shift into Forward 1st gear.
- Step on the Brake Pedal and release the Parking Brake. The Parking Brake indicator on the Instrument Panel will extinguish.
- Slowly release the Brake Pedal. Note that with the engine idling, Forward gear selected, and the Brake Pedal released the vehicle will move slowly forward at a speed that should not exceed 2.5 mph (4 km/hr).
- Press the Accelerator Pedal. The vehicle will move forward at the normal travel speed as selected by pressing the Accelerator Pedal.
- If the vehicle does not move forward, check that the Parking Brake has been released. If it has, rotate the Start Switch in a counterclockwise direction to the Off position, put the Forward/Reverse Gear Switch into the Neutral position, and engage the Parking Brake. Check that the Brake Pedal is not depressed or jammed in the depressed position. Remove any debris or objects that may restrict the operation of the Brake Pedal. Then repeat this start-up procedure. If the vehicle still does not move forward, rotate the Start Switch to the Off position, put the Forward/Reverse Gear Switch into the Neutral position, engage the Parking Brake, and REPORT the problem.
- Test the Foot Brake and the Parking Brake before using the Tractor. The brakes MUST have a good and reliable performance. If not, do not use the Tractor and REPORT the problem.
- Park the vehicle on a flat surface.
- Check the hydraulic oil level by viewing the Fluid Level Gauge. The oil level should be at the highest red mark, between the degree line and the lowest red tick mark. If necessary, top-up the oil level in the hydraulic oil tank with clean, new, hydraulic oil through the oil port of the Oil Return Filter Assembly until the Fluid Level Gauge indicates that the hydraulic oil tank is full.
- DO NOT select Neutral gear, or switch OFF the engine, when going downhill.

PARKING

When parking the Tractor:

- Make sure that the Tractor is stable on level ground.
- Set the Forward/Reverse Gear Switch to the Neutral position.
- Engage the Parking Brake.
- Rotate the end of the Turn Signal/Headlamp control to switch OFF the vehicle lights.
- Rotate the Start Switch counterclockwise to the OFF position.

OPERATION

Perform aircraft movement operations as follows:

- Drive to a suitable pushing or towing position close to the aircraft, step on the Brake Pedal to stop the vehicle, engage the Parking Brake, and set the Forward/Reverse Gear Switch to Neutral.
- At night, or during poor visibility, switch ON the front working light.

WARNING – DAMAGE TO AIRCRAFT



DO NOT step on the Accelerator Pedal when approaching the aircraft.

DO NOT select Forward gear when approaching the aircraft.

When approaching the aircraft, make sure that the Forward/Reverse Gear Switch is set to F1 or R1 (as applicable), and the vehicle is only moving forward at idling speed. Keep your foot on the Brake Pedal while manoeuvring close to an aircraft. When close to an aircraft, if in doubt, apply the Foot Brake.



- With the Forward/Reverse Gear Switch set to Neutral and the engine idling, step on the Brake Pedal. Select the desired gear. Release the Parking Brake, and slowly lift your foot to release the Brake Pedal. The Tractor will slowly move forward at a speed of 2.5 mph (4 km/hr). Position the Tractor for connection to the aircraft.
- Step on the Brake Pedal to stop the vehicle, engage the Parking Brake, and set the Forward/Reverse Gear Switch to Neutral. Connect the aircraft to the Tractor using an appropriate towbar.
- Push or tow the aircraft to the desired location.
- With the Forward/Reverse Gear Switch set to Neutral and the engine idling, step on the Brake Pedal. Apply the Park Brake. CHECK THAT THE AREA AROUND THE VEHICLE IS CLEAR. Disconnect the towbar from the Tractor and aircraft. Select the desired forward or reverse gear, release the Parking Brake, and slowly lift your foot to release the Brake Pedal. Gently press on the Accelerator Pedal and slowly drive away from the aircraft.
- Once clear of the aircraft, drive the vehicle normally to its next destination.

EXHAUST AFTERTREATMENT REGENERATION PROCESS

The Engine Exhaust Aftertreatment System periodically requires regeneration. This is a self-clean process that is required to keep the Engine Exhaust Aftertreatment System from becoming clogged.

When the system requires regeneration, the Exhaust Aftertreatment System cleaning symbol on the Dash Display will illuminate in Yellow. This indicates that the system needs to be cleaned at the next available opportunity.

Exhaust System symbols on the Dash Display Instrument

Icon	Description
	Exhaust Aftertreatment System cleaning symbol. This symbol illuminates when the Exhaust Aftertreatment System requires regeneration. During regeneration this symbol will flash.
	This symbol illuminates when the Exhaust System temperature is high. It will illuminate when the Exhaust Aftertreatment System is being regenerated.

NOTES

It is imperative that the Regeneration Process is performed promptly to avoid the Engine entering DERATE mode, which is a self-protection mode limiting the power output in increasing stages until the Engine is in “limp mode”.

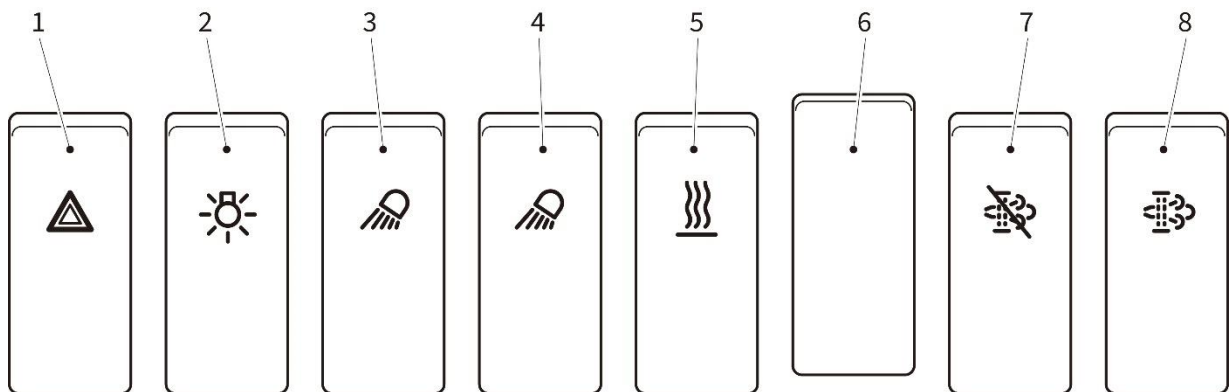
Allowing personnel other than suitably qualified service technicians to perform the regeneration process will void Avro GSE's Warranty.

Perform Exhaust Aftertreatment System regeneration as follows:

- Select an appropriate location to park the vehicle:
 - On a flat level surface that will not burn or melt under high temperatures, in a well ventilated area.
 - At least 3 m (10 feet) away from anything that can burn, melt , or explode.
 - There cannot be anything combustible within 1 m (3 feet) of the exhaust outlet
 - No gas or vapors nearby that could burn, explode or contribute to a fire.
 - Away from people who might come near the exhaust outlet.
- Park the vehicle securely:
 - Set the park brake.
 - Transmission in Neutral.
 - Set wheel chocks, front and rear, of at least one wheel (chocks front and rear of two wheels are recommended).
- Set up a safe exhaust area:
 - If bystanders might enter the area, set up barriers to keep people a minimum of 2 m (6 feet) from the exhaust outlet during regeneration.
 - If indoors, attach an exhaust discharge pipe rated for at least 800 C (1472 F).

- Keep a fire extinguisher nearby.
- Check exhaust system surfaces. Confirm nothing is on or near the exhaust system surfaces (such as rags, tools, grease, debris).
- Expect engine speed changes during regeneration.
- Stay clear of the engine compartment.

Once the above conditions are met, press the Initiate Regeneration switch on the dashboard (Figure 15, item 8). The vehicle will enter and proceed automatically through the regeneration process. It should take approximately 60 minutes to complete the regeneration process.



- | | | | |
|---|--------------------------|---|------------------------------|
| 1 | Emergency Flasher switch | 5 | Heater switch |
| 2 | Light switch | 6 | Blank cover |
| 3 | Front Headlight switch | 7 | Stop Regeneration switch |
| 4 | Rear Headlight switch | 8 | Initiate Regeneration switch |

Figure 15 – Drivers' Cab – switch panel

During regeneration the Exhaust Aftertreatment System cleaning symbol will flash yellow, and the Exhaust System temperature high symbol will illuminate red.

WARNING – HOT SURFACES AND DANGEROUS GASES



During regeneration monitor the vehicle and surrounding areas. If any unsafe condition or situation occurs, stop the regeneration immediately by pressing the Stop Regeneration switch.

Once regeneration is completed, exhaust gas and exhaust surface temperatures will remain elevated for approximately 15 minutes.

The regeneration process can be interrupted and stopped at any point by pressing the Stop Regeneration switch (Figure 15, item 7). Note that the Stop Regeneration switch can be used as a temporary measure to allow a user to drive the vehicle to a safe location for regeneration, or as a safety measure to stop the process.

When the regeneration process is complete it will stop automatically. On the Dash Display, the Exhaust Aftertreatment System cleaning symbol and the Exhaust System temperature high symbol will extinguish.

The regeneration process is now complete, and the vehicle can be returned to service.

FUNCTIONAL DESCRIPTION OF MAIN ASSEMBLIES

STRUCTURE

The PT2690D Baggage Loader is comprised of the following main assemblies:

- Chassis and vehicle body.
- Engine.
- Transmission.
- Drive Shaft.
- Drive Axle.
- Brake system
- Front Axle.
- Steering system.
- The hydraulic system.
- The electrical system.

ENGINE

The engine is a Cummins diesel engine, Model QSF3.8-C120T4. It is a single overhead camshaft, 4-cylinder engine. For the description and technical details of the engine, refer to the “Cummins Operation and Maintenance Manual QSF3.8 CM2350 F107” appended to this PT2690D manual.

AUTOMATIC TRANSMISSION

The PT2690D is fitted with a DANA manually shifted Model T1200 Powershift Transmission. For the description and technical details of the Transmission, refer to the “Dana Spicer T 12000 Powershift Transmission Maintenance & Service Manual”, which is appended to this PT2690D manual.

DRIVE SHAFTS

There are two Drive Shafts which drive the front and rear axles. Each Drive Shaft is a stiff propeller shaft, with universal joints at the front and rear that attach the Drive Shaft to the Transmission and the front or rear Drive Axle, as applicable.

DRIVE AXLES (FRONT AND REAR)

Drive power is through both the front and rear Axles, giving the Tractor four-wheel drive (4WD). Both Axles are comprised of a differential, axle assembly, wheel hubs, brakes, and wheels.

BRAKE SYSTEM

There are two braking systems on the PT2690D, a Foot Brake System (Service Brake) , and a Park Brake (Hand Brake).

The Foot Brake System is a four-wheel braking system. When the Foot Brake is applied, brake fluid from the hydraulic system is applied to the front and rear axles internal braking systems. The system is reliable and easy to use.

The Park Brake is a hydraulic system that forms part of the Rear Axle Assembly. It is activated by the Park Brake Lever located next to the drivers' seat.

FRONT AXLE AND STEERING SYSTEM

The Front Axle is the steering axle. The PT2690D is fitted with a power steering system that forms part of the vehicle hydraulic system. When the steering wheel is turned, a hydraulic steering unit, located below the driver's dash, applies hydraulic oil from the hydraulic system to the steering cylinder attached to the Front axle. In response the steering cylinder turns the Front Axle, causing the vehicle to turn.

CHASSIS AND VEHICLE BODY

The vehicle body and chassis are constructed from welded steel plate. The Cab is also constructed from welded steel plate and is bolted to the chassis and vehicle body. The vehicle has a low centre of gravity giving the vehicle good stability. The driver's compartment has space for the driver and one passenger and provides the driver with a wide field of view. The position of the driver's seat can be adjusted backwards and forwards.

The main towing hitch is located on the front of the PT2690D. A second towing hitch is located at the rear of the PT2690D.

HYDRAULIC SYSTEM

A hydraulic circuit diagram for the PT2690D is provided in the Hydraulic Schematic section of this manual. The hydraulic system comprises:

- A Hydraulic Oil Tank.
- A Gear Pump.
- A suction filter inside the Oil Tank, on the output port to the Gear Pump.
- A cut-off valve, mounted on the outside of the Hydraulic Oil Tank, in the hydraulic line to the Gear Pump.
- An Oil Return Filter Assembly, located on top of the Hydraulic Oil Tank.
- An emergency pump.
- An overflow valve group.
- A priority valve.
- A Steering Gear unit.
- A Front Steering Cylinder (described previously, above).
- Hydraulically operated brakes on the front and rear axles.
- A service brake valve.
- Multiple pressure switches.

- A filling valve.
- A hydraulic Park Brake Lever.
- A pilot oil source black.
- An accumulator assembly.

ELECTRICAL SYSTEM

The vehicle electrical system is a 24V DC system. Electrical power for the Tractor is provided by two 12v DC batteries wired in series. Electrical schematics for the PT2690D are provided in the Electrical Schematics section of this manual.

REFUELLING

Refer to Figure 16 and refuel the PT2690D Tractor as follows:

WARNING – PETROLEUM – FIRE AND HEALTH HAZARD



Fuel expands when heated. Expanding fuel in an over full tank can cause spills and leaks. Do not overfill the fuel tank.

Do not eat, drink or smoke when refuelling the vehicle. If fuel is ingested, or comes into contact with your eyes, nose or mouth, seek medical assistance immediately.

Fuel spillages are a fire and slip hazard. Always clean up any spillages.

- Make sure that the vehicle is shut down, and that there are no naked flames or combustibles nearby.
- Make sure that the vehicle is standing on level ground, and that the vehicle is level with the ground.
- Remove and retain the fuel cap.
- Fill the tank with diesel.
- Refit the fuel cap.

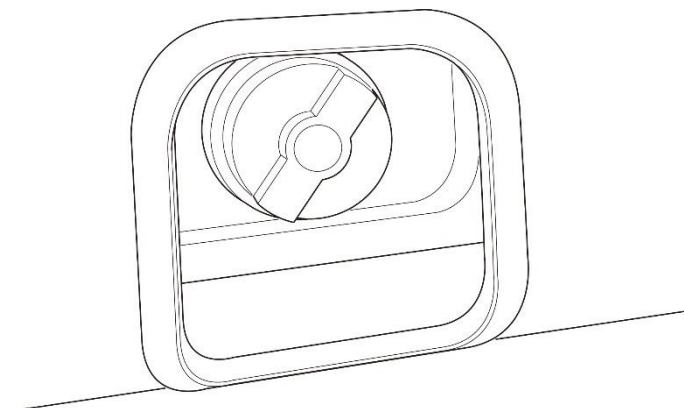


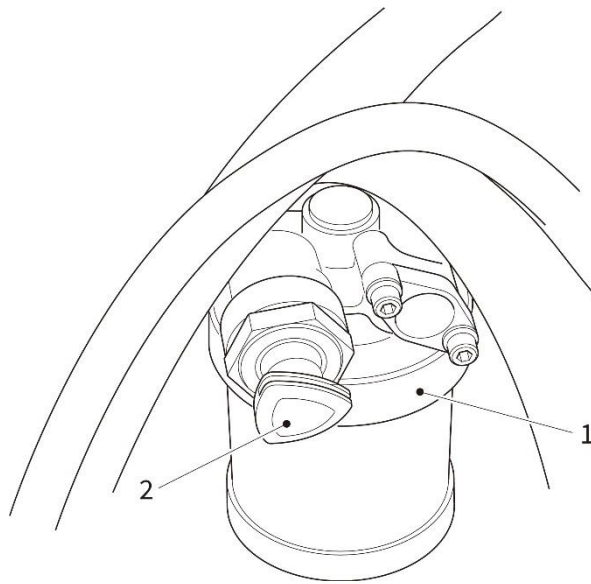
Figure 16 – Fuel cap

PROCEDURE IF TRACTOR RUNS OUT OF FUEL

If the Tractor runs out of fuel, it is not sufficient to simply refill the fuel tank and try to start the engine. To start the diesel engine correctly, two filters attached to the engine must be primed with fuel. The engine will not start if there is no fuel present in those filters, and attempting to start the engine may result in damage to the engine.

NOTE

The Lubrication Diagram provided later in this manual may be used to help locate these filters.

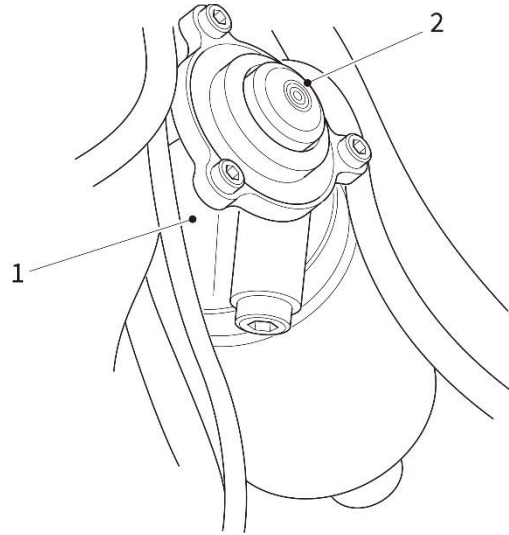


1 Fuel/water separator

2 Priming button

Figure 17 – Fuel/water separator

- On the fuel/water separator (Figure 17, Item 1), unscrew the priming button (2) by turning it in a counterclockwise direction until it will not turn any further.
- On the engine fuel filter (Figure 18, Item 1), press the priming button (2) and hold it down for a few seconds.



1 Fuel filter

2 Priming button

Figure 18 – Fuel Filter

- Start the engine normally, as described in the Start-up Procedure.
- Allow the engine to run for a few minutes. Then, on the fuel/water separator (Figure 17), screw in the priming button (2) by turning it in a clockwise direction until it will not turn any further.
- The procedure for safely starting the engine after the Tractor has run out of fuel is now complete. The tractor can now be operated normally.

STORAGE

If the Tractor is not going to be used for a long time:

- Perform monthly, three-monthly, six-monthly, and 12-monthly lubrication.
- Drain the radiator.
- If necessary, perform the cold weather maintenance (“winterize”) described on page 35.
- Remove and clean the battery. Fully charge the battery and store it separately from the vehicle. During storage check the battery once a month: - if the battery voltage has dropped, charge the battery fully.

NOTE

Long term storage of a battery with a reduced charge in it can result in damage to the battery.

- Protect exposed parts against rust, for example, by applying grease.
- Store the Tractor under cover.
- Check the engine every month.

RECEIPT AND PREPARATION FOR FIRST USE

On receipt of a new PT2690D Tractor, before operating the Tractor for the first time, you **MUST** perform the following:

- Make sure that all loose packaging has been removed from the Tractor.
- Check the Tractor and its components for damage. If there is any visible damage, **DO NOT OPERATE THE TRACTOR**. Contact AvroGSE immediately for assistance. Contact details for AvroGSE are given inside the front cover of this manual.
- Perform an inventory of all parts included with the Tractor and verify that all loose components and fasteners are accounted for. If any are missing, contact AvroGSE immediately for assistance.
- Attach all component parts not already attached to the Tractor.
- Make sure that all necessary fluids (for example fuel, engine oil, coolant) are checked and additional fluid added as needed.
- Verify that the Tractor is fully serviceable by performing the Daily Maintenance checks and Weekly Maintenance checks described in the Scheduled Maintenance section of this manual.
- Move the Tractor to its operating location.
- Complete any receipt documentation and maintenance records as required.

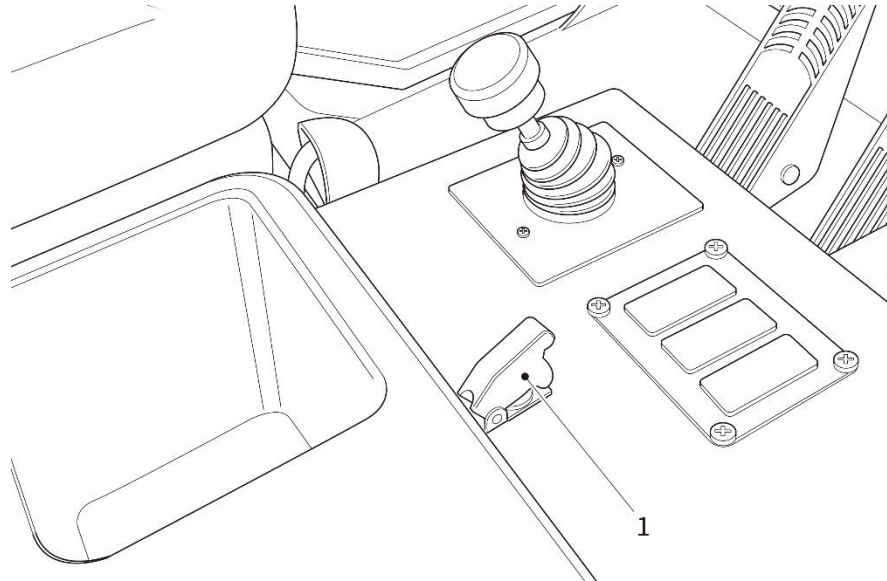
After 100 hours of operational use of the Tractor, replace the oil in the Transmission. This is in addition to the Transmission oil changes specified in the Scheduled Maintenance and Lubrication Diagram.

After 100 hours of operational use of the Tractor the brakes must be adjusted. For information on how to adjust the brakes, refer to the “Dana Spicer Front Axle 212-927 Service Parts List - APL-2167 2011-11-17” and the “Dana Spicer Rear Axle 212-928 Service Parts List - APL-2168 2011-11-17” appended to this manual.

MANUAL EMERGENCY OPERATION INSTRUCTIONS

If the hydraulic system fails, the Tractor should be removed from the ramp as soon as possible to avoid flight delays. Use the following Emergency Operation Procedures to activate the emergency hydraulic pump:

- Set the Ignition Switch to the accessory position (first notch). The Ignition Switch **MUST** be in the accessory position to provide power to the emergency hydraulic pump.
- Refer to Figure 19. Raise the spring-loaded cover that protects the Emergency Pump Switch to the vertical position.



1 Emergency Pump Switch

Figure 19 – Emergency Pump Switch

- Set the Emergency Pump Switch to the ON position (the switch toggle points to the rear).
- The emergency hydraulic pump will start operating.
- When the Tractor has been recovered to a safe location where it will not cause an obstruction, switch Off the emergency hydraulic pump by setting the Emergency Pump Switch to the OFF position (the switch toggle points to the front).
- When the protective cover is in the down position it mechanically engages with the Emergency Pump Switch, forcing the switch into the OFF position.

TOWING INSTRUCTIONS

When towing the PT2690D Tractor:

- Activate the emergency hydraulic pump.
- Put the transmission into Neutral and release the parking brake.
- The towing speed must not exceed 6 mph (10km/hr) and the towing distance must not exceed 12 miles (20 km).

-
- If the towing distance is going to be greater than 12 miles (20 km), or the towing speed is going to be greater than 6 mph (10km/hr), then the rear wheels should be raised off the ground before the PT2690D is towed. Failure to raise the rear wheels off the ground in these circumstances may result in damage to the PT2690D.
 - There must be a person steering the PT2690D during towing, unless the rear wheels have been raised off the ground.

SCHEDULED MAINTENANCE

Scheduled maintenance is limited to the activities specified in the Scheduled Maintenance Table below. The maintenance intervals given are approximate, assume heavy use of the PT2690D Tractor and may be varied by $\pm 10\%$ without adverse effects. Every Tractor should be inspected and serviced based on its own requirements, for example variation in the hours of use and the environment in which it is used.


An **X** in the Scheduled Maintenance Table indicates that the activity described should be performed at that maintenance period.

When fitting fasteners, DO NOT apply thread-locking adhesive. A specific torque setting must be applied to the wheel nuts as detailed on page 75. For other bolts and fasteners, refer to the guidance on torque settings given on pages 76.




NOTE

If further details are required on how to perform the Scheduled Maintenance actions on the engine, refer to the “Cummins Operation and Maintenance Manual QSF3.8 CM2350 F107” for the engine, which is appended to the rear of this manual.

It is not necessary to perform Daily Maintenance if a higher level of maintenance has been performed in the preceding 24 hours.

	Task	Daily	Weekly	Monthly	3 Monthly (250 hrs)	6 Monthly (500 hrs)	12 Monthly (1000 hrs)
1	Cleaning						
a.	Clean the vehicle using water and degreaser, or a domestic detergent and water solution. Do not use industrial cleaning agents, or caustic agents, or aircraft de-icing and cleaning agents. Use of a spray washer is permitted.	X	X	X	X	X	X
b.	Remove dirt and dust from the top surface of the battery and clean each battery terminal.				X	X	X
WARNING – COMPRESSED AIR  Compressed air used for cleaning can create airborne particles that may enter the eyes. Wear Personal Protective Equipment (PPE) including eye shields or protective goggles, and suitable protective gloves. The pressure of the compressed air must not exceed 0.7 Bar (10 lbf sq in.).							
c.	Using a clean, dry, low pressure compressed air jet, clean the radiator surfaces. If the surfaces of the radiator are clogged with dirt or debris, clean the radiator surfaces with a brush soaked in a domestic detergent and water solution.				X	X	X

	Task	Daily	Weekly	Monthly	3 Monthly (250 hrs)	6 Monthly (500 hrs)	12 Monthly (1000 hrs)
d.	Wipe oil, dirt and dust from wires and electrical harnesses in engine compartment.					X	X
e.	If significant corrosion is present, grind off the corrosion, coat the affected area with corrosion protection fluid (if available), apply primer paint, and retouch paintwork.						X
2	Visual Inspection						
a.	Walk around the Tractor and examine the Tractor for the following. During the inspection tighten any fasteners that are loose.	X	X	X	X	X	X
b.	As you walk around the Tractor, check that all Warning labels are present and readable. Replace lost or unreadable Warning labels.		X	X	X	X	X
c.	Check body and Cab are undamaged. Damage that may impair or affect the safe operation of the Tractor must be repaired before operating the Tractor.	X	X	X	X	X	X
d.	Check wing mirrors are present and undamaged. Replace missing or damaged mirrors.	X	X	X	X	X	X
e.	Check that the headlamps, front indicator lights, and rear indicator lights, are present and undamaged. Check that the Front and Rear Work Lights are present and undamaged. Switch ON the ignition and check that all the lights work. Repair or replace any that are not serviceable. DO NOT use a Tractor with an unserviceable light.	X	X	X	X	X	X
f.	Check rear-view mirror in Cab is present and undamaged. Replace missing or damaged mirror.	X	X	X	X	X	X
g.	Check that the Beacon is present, secure, and undamaged. Check that the Beacon functions correctly. Replace or repair if unserviceable. DO NOT use a Tractor with an unserviceable Beacon.	X	X	X	X	X	X
h.	Check that the front and rear hitches are undamaged. Repair if required.	X	X	X	X	X	X
i.	Check that the four lifting lugs on the vehicle body are undamaged. Repair if required.	X	X	X	X	X	X
J	Check that the labels that identify each of the lifting lugs are present and undamaged.			X	X	X	X
k.	Check tires for leaks and damage. Check surface condition of tires. Check tires meet legal requirements for minimum tread depth. Replace if damaged or worn-out.	X	X	X	X	X	X

	Task	Daily	Weekly	Monthly	3 Monthly (250 hrs)	6 Monthly (500 hrs)	12 Monthly (1000 hrs)
l.	Check tightness of wheel nuts. Front wheels :274 to 323 Nm (202 to 239 ft/lbs). Rear wheels: 274 to 323 Nm (202 to 239 ft/lbs). Re-tighten if required.		X	X			X
m.	Check pressure of front tires is 145 ± 5 psi (10.0 ± 0.34 Bar (gauge)) (1000 KPa \pm 34 KPa). Adjust tire pressure if required.	X	X	X	X	X	X
n.	Check pressure of rear tires is 145 ± 5 psi (10.0 ± 0.34 Bar (gauge)) (1000 KPa \pm 34 KPa). Adjust tire pressure if required.	X	X	X	X	X	X
o.	Check that a label specifying the tire pressure is in position above each wheel.	X	X	X	X	X	X
WARNING – BURN HAZARD  Hot coolant in the radiator will scald. Make sure that the engine has cooled down before removing the radiator cap. Wear Personal Protective Equipment (PPE) including eye shields or protective goggles, and suitable protective gloves.							
p.	Check coolant level. Add coolant if required.	X	X	X	X	X	
q.	Replace coolant.						X
WARNING – DIESEL EXHAUST FLUID SYSTEM  It is unlawful to tamper with or remove any component of the engine aftertreatment system. It is also unlawful to use a Diesel Exhaust Fluid (DEF) that does not meet the required specifications, or to operate this vehicle with no Diesel Exhaust Fluid (DEF).							
WARNING – DIESEL EXHAUST FLUID  Diesel Exhaust Fluid (DEF) contains Urea. Do not eat, drink or smoke when filling the DEF Tank. Do not allow the DEF to come into contact with your eyes, mouth or nose. Wear Personal Protective Equipment (PPE), for example suitable gloves, eye shields, and overalls. If DEF is ingested, or comes into contact with your eyes, seek medical assistance immediately. If DEF gets in your eyes, immediately flush eyes with water for a minimum of 15 minutes.							
r.	Top-up the DEF Tank with approved Diesel Exhaust Fluid (DEF).	X	X	X	X	X	X

	Task	Daily	Weekly	Monthly	3 Monthly (250 hrs)	6 Monthly (500 hrs)	12 Monthly (1000 hrs)
t.	Check engine oil level. Add oil as required. Refer to the Fuel, Lubricants and Consumables section of this manual for details of the engine oil.	X	X	X	X	X	X
r.	Check the fuel level. Refuel Tractor if necessary.	X	X	X	X	X	X
3	Seat Belt Checks The driver must check the condition and function of the seat belt each day, BEFORE using the PT2690D. Only regular inspections can detect seat belt failures before a critical incident.						
a.	Pull the seat belt fully out and inspect its surface fibres for wear or fraying. If wear or fraying is found, report the problem, and DO NOT use the Tractor until the seat belt has been replaced.	X	X	X	X	X	X
b.	Check that the seat belt buckle functions correctly. Check that the retractor properly tightens the seat belt. If not, report the problem, and DO NOT use the Tractor until the seat belt has been replaced.	X	X	X	X	X	X
c.	Check the seat belt cover for damage. If damaged, report the problem, and DO NOT use the Tractor until the seat belt has been replaced.	X	X	X	X	X	X
d.	With the vehicle parked on flat ground, pull the seat belt out quickly. Make sure that the seat belt automatic locking device locks the seat belt. If the locking device does not lock the seat belt, report the problem, and DO NOT use the Tractor until the seat belt has been replaced.	X	X	X	X	X	X
4	Operation						
a.	In the Cab, check that the driver's controls and indicators are undamaged. If any are damaged, report the problem and DO NOT use the Tractor until it has been repaired.	X	X	X	X	X	X
b.	Start the engine. Check the operation of the steering, and both braking systems. If not functioning correctly, report the problem and DO NOT use the Tractor until it has been repaired.	X	X	X	X	X	X
b.	Check the operation of the electrical system. Check that all readings on the Dash Display Instrument are normal. If there is a problem, report the problem and DO NOT use the Tractor until it has been repaired.	X	X	X	X	X	X
c.	Check that the horn works. If not report the problem and DO NOT use the Tractor until it has been repaired.	X	X	X	X	X	X

	Task	Daily	Weekly	Monthly	3 Monthly (250 hrs)	6 Monthly (500 hrs)	12 Monthly (1000 hrs)
c.	Check that the windscreen wipers work. And that the wiper blades are in a satisfactory condition. Replace wiper blades if necessary. If the wipers do not work correctly, report the problem and DO NOT use the Tractor until it has been repaired.	X	X	X	X	X	X
d.	Check that the windscreen wash fluid works. Refill if required.	X	X	X	X	X	X
e.	Refill windscreen wash fluid.			X	X	X	X
f.	Check that the rear-view camera functions correctly. Clean rear-view camera with a clean lint-free cloth if necessary. If the camera is unserviceable, report the problem and DO NOT use the Tractor until it has been repaired.	X	X	X	X	X	X
g.	Listen to the sound of the engine when it is idling, at medium speed and at high speed. If you hear anything unusual in the sound of the engine, report the problem.		X	X	X	X	X
5	Mechanical Checks						
a.	Check radiator and water hoses for leaks. Check radiator cap is present and secure. Replace leaking components.		X	X	X	X	X
b.	Check water hoses Replace water hoses if they show any sign of abrasion, delamination, or damage. Max life of hoses is five years.						X
c.	Clean Air Filter Cartridge. Examine Air Filter Cartridge and replace if damaged. NOTE this action may need to be done more frequently, depending upon the operating conditions.		X	X	X	X	X
d.	Replace Air Filter Cartridge. NOTE this action may need to be done more frequently, depending upon the operating conditions.					X	X
e.	Check fuel lines for leaks. Replace leaking components.		X	X	X	X	X
f.	Carefully examine fuel line to engine. Replace fuel line if shows any sign of abrasion, delamination, or damage.					X	X
g.	Remove engine Fuel Filter/Water Separator cartridge, drain any water present, and refit cartridge.		X	X	X	X	X
h.	Replace engine Fuel Filter/Water Separator cartridge.						X
i.	Replace engine Fuel Filter cartridge						X
j.	Replace engine oil filter cartridge.			X	X	X	X
k.	Check condition and tightness of fan belt. If necessary, replace fan belt, and/or check and replace tensioner.			X	X	X	X

	Task	Daily	Weekly	Monthly	3 Monthly (250 hrs)	6 Monthly (500 hrs)	12 Monthly (1000 hrs)
l.	Check service brake system for leaks and brake pipes in poor condition.				X	X	X
m.	Check condition and adjust clearance of brake shoes.						X
n.	Check, and if required, adjust the free stroke of the brake pedal.					X	X
o.	Check power steering system for leaks.					X	X
p.	Check steering wheel and steering column for damage or other problems. Repair if required. Check play clearance of steering wheel and adjust if required. If necessary, tighten the steering system.						X
q.	Check Power Steering System steering cylinder. Replace if damaged or leaking hydraulic fluid.			X	X	X	X
r.	Lubricate ball joints on axles.				X	X	X
s.	Check engine, Transmission, and Axles for oil leaks. Repair any leaks found.		X	X	X	X	X
t.	Check Transmission fluid (oil) level. Top-up fluid as required. Refer to the Fuel, Lubricants and Consumables section of this manual for details of the Transmission oil.			X	X	X	X
u.	Replace Transmission oil filter.						X
v.	Replace Transmission oil. Refer to the Fuel, Lubricants and Consumables section of this manual for details of the Transmission oil.						X
w.	Replace engine oil. Refer to the Fuel, Lubricants and Consumables section of this manual for details of the engine oil.					X	X
x.	Check drive shaft bolts are present and secure. Check drive shafts are not loose. Replace bolts, or tighten bolts as required.			X	X	X	X
y.	Check drive shafts for damage or wear. Replace if required.			X	X	X	X
z.	Replace Axle Differential Gear oil. Refer to the Fuel, Lubricants and Consumables section of this manual for details of the oil.						X
aa.	Lubricate suspension springs.		X	X	X	X	X
ab.	Drain dirt and debris from fuel tank.						X
6	Hydraulic Checks						

	Task	Daily	Weekly	Monthly	3 Monthly (250 hrs)	6 Monthly (500 hrs)	12 Monthly (1000 hrs)
a.	Check Hydraulic System oil level. Top-up oil as required. Refer to the Fuel, Lubricants and Consumables section of this manual for details of the hydraulic oil.	X	X	X	X	X	X
b.	With the engine running, read gauge on Oil Return Filter: If the gauge needle reading is green, the filter element inside the Oil Return Filter is serviceable. If yellow or red, DO NOT operate the vehicle until the filter element has been cleaned or replaced.	X	X	X	X	X	X
c.	Check hydraulic oil tank associated hydraulic system hoses for leaks. Repair any leaks found – leaking hydraulic hoses must be replaced.	X	X	X	X	X	X
d.	Check hydraulic oil pump and associated hydraulic system hoses for leaks. Repair any leaks found – leaking hydraulic hoses must be replaced.		X	X	X	X	X
e.	Check Emergency Hydraulic Oil Pump and associated hydraulic system hoses for leaks. Repair any leaks found – leaking hydraulic hoses must be replaced.			X	X	X	X
f.	Check hydraulic brakes and associated hydraulic system hoses for leaks. Repair any leaks found – leaking hydraulic hoses must be replaced.		X	X	X	X	X
g.	Check Oil Return Filter element as described in the Fuel, Lubricants and Consumables section of this manual.					X	X
h.	Replace hydraulic oil. Refer to the Fuel, Lubricants and Consumables section of this manual for details of the oil, and the procedure for replacing the hydraulic oil.						X
i.	Replace air breather on Hydraulic Oil Tank						X
j.	Replace suction filter in Hydraulic Oil Tank.						X
7	Electrical Checks						
a.	Examine wires and electrical harnesses for damage or abrasion to the insulation, and loose connections.					X	X
b.	Check that alternator and starter are secure and in a satisfactory working condition. Associated electrical wiring must be secure and undamaged. Replace if necessary.					X	X
8	Lubrication						
a.	Lubricate Tractor in accordance with the Lubrication Chart (if not already done in this maintenance sequence).		X	X	X	X	X
9	Maintenance Records						

	Task	Daily	Weekly	Monthly	3 Monthly (250 hrs)	6 Monthly (500 hrs)	12 Monthly (1000 hrs)
a.	Complete all required maintenance records.	X	X	X	X	X	X

HYDRAULIC HOSES

High-pressure hydraulic hoses have a maximum service life of six years. Replace all high-pressure hoses on the PT2690D every six years.

If a hydraulic component is replaced, all high-pressure hydraulic hoses associated with that hydraulic component should be replaced at the same time.

PRECAUTION – LIFE OF HIGH-PRESSURE HYDRAULIC HOSES



Replace all high-pressure hoses on the PT2690D every six years.

When replacing a hydraulic component, replaced associated high-pressure hydraulic hoses at the same time.

COLD/HOT WEATHER MAINTENANCE

When the seasons change, perform the following cold weather/hot weather maintenance:

- Perform “Monthly Maintenance”.
- Clean fuel filter.
- Drain engine oil and replace with oil that is suitable for the coming cold or hot weather. Refer to the Fuel, Lubricants and Consumables section of this manual for details of an appropriate oil.
- Before cold weather arrives, drain the radiator and cooling system. Flush the cooling system with clean water. Then refill with an appropriately rated anti-freeze solution that includes industrial ethylene glycol.
- Before hot weather arrives, drain the radiator and cooling system. Flush the cooling system with clean water. Then refill with an appropriately rated coolant.
- Record that this maintenance has been completed.

WHEEL NUT TIGHTENING

When replacing a tire or checking the tightness of the Wheel Nuts during Scheduled Maintenance, tighten the Wheel Nuts in the order shown in the illustration below.

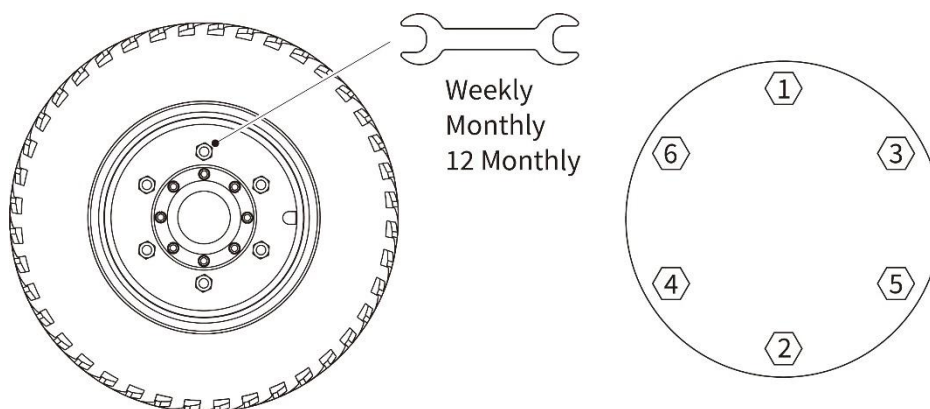


Fig 20 - Wheel Nut tightening

On both the front and rear wheels, torque the Wheel Nuts to 300 Nm (221 ft/lbs). Tolerance range is 274 to 323 Nm (202 to 239 ft/lbs).

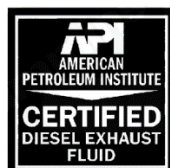
FUEL, LUBRICANTS AND CONSUMABLES

Fuel/Lubricant	Specification	Use
Fuel	Diesel	Fuel
Engine oil	SAE 5W-40 or CES2081/API CJ-4/ACEA E9	Engine lubrication
Coolant	Mix of 50 percent distilled water and 50 percent ethylene glycol or propylene glycol based antifreeze (suitable for use down to -32 deg C/ - 25 deg F)	Engine cooling system
Hydraulic oil	L-HM46 or L-HV32 hydraulic oil (-40 deg C/ -40 deg F and above)	Vehicle hydraulic system
Gear oil	Caterpillar TO-4, Mil Spec MIL-PRF-2104G, Alison C-4, John Deere J20 C or D, Dextron II, Mobil AF220	Transmission
	SAE85W90 or API GL-4 (MIL Spec L-2105) or or API GL-5 (MIL Spec 2105-B)	Drive Axle Differential (both drive axles)
Grease	3# (Grade 3) Lithium based grease	Wheel hubs, bearings, bushings, Drive Shaft joints, Universal Joints, other moving mechanical parts
Diesel Exhaust Fluid (DEF)	Fleetguard® Diesel Exhaust Fluid Diesel Exhaust Fluid meeting ISO 22241-1 or DIN 70070	Diesel Exhaust Fluid (DEF) system

NOTES

To achieve optimum engine performance and durability, it is important that you only use engine lubricating oils displaying the American Petroleum Institute (API) Certification Mark on the container.

For PY2690D Tractors operating in the USA and Canada it is strongly recommended that you only use DEF Fluid displaying the API Diesel Exhaust Fluid Certification Mark on the container. This will achieve optimum engine performance and durability; and ensure compliance with diesel exhaust emission regulations.



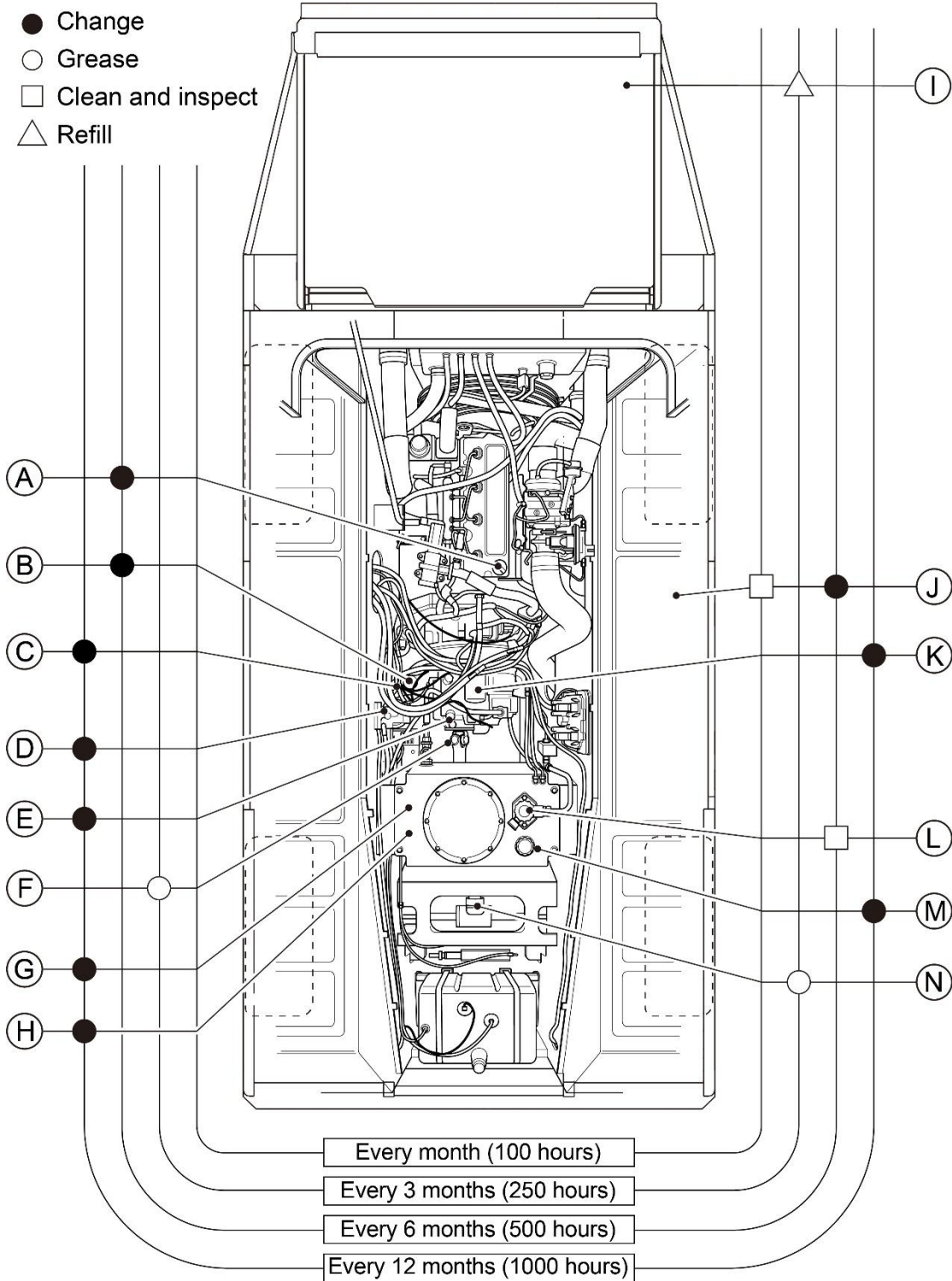
FILL CAPACITIES

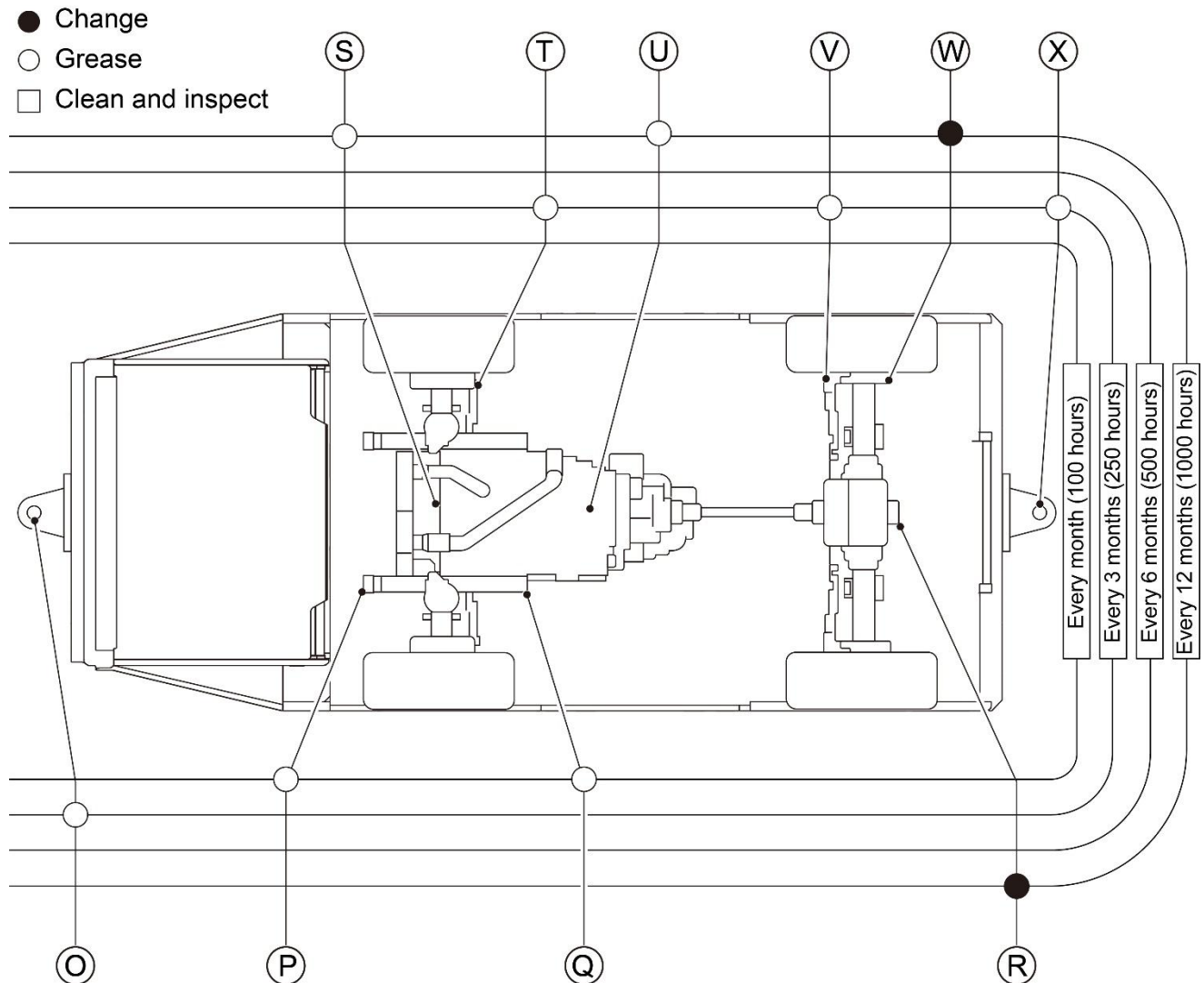
Item	Fill capacities (L)
Fuel tank (Diesel)	90.0
Engine oil (with oil filter)	10.6 or 14.6 (depending on size of oil pan) Start engine and allow to warm up before topping-up engine oil
Transmission oil	25.0 fill Start engine, allow to warm-up, and top up oil to level on dipstick
Hydraulic System oil (inc. Power Steering)	65.0 fill (80.0 maximum)
Drive Axle Differential oil	10.0 (per axle)
Drive Axle planetary gear oil	0.8 (per gear)
Grease	As required
Coolant	7.3
DEF tank	As required – check daily

CONSUMABLES

Consumable	Type
Engine Air Filter Element Kit	Part No. PRPW00580
Engine Oil Filter Cartridge	Part No. PRPW02233
Fuel Water Separator	Part No. PRPW00092
Fuel Filter	Part No. PRPW02231
Air Breather Filter (on Hydraulic Oil Tank)	HF04-450 x 10-1
Oil Suction Filter (in Hydraulic Oil Tank)	HF01-150 x 250-1
Filter Element, Hydraulic (in Oil Return Filter attached to Hydraulic Oil Tank)	PRPW02712
Transmission Filter (Spin On)	PRPW02229
Wash oil	Same type of oil as will be used to refill the hydraulic system
Thread sealant	Any type suitable for hydraulic connections (purchase locally)

LUBRICATION AND MAINTENANCE DIAGRAM





A	Engine oil fill point	M	Air Breather - Hydraulic System
B	Oil Filter cartridge for Engine lubricating oil	N	Rear Drive Shaft – rear joint
C	Fuel filter	O	Front Hitch
D	Fuel/water separator	P	Suspension springs (front)
E	Transmission Oil fill point and Dipstick	Q	Suspension springs (rear)
F	Rear Drive Shaft – front joint	R	Axle differential gear oil (both axles)
G	Oil Suction Filter – Hydraulic System	S	Front Drive Shaft – front joint
H	Hydraulic System oil	T	Steering Ball Joints (Front Axle)
I	Windscreen washer fluid	U	Front Drive Shaft – rear joint
J	Air Filter cartridge	V	Steering Ball Joints (Rear Axle)
K	Transmission Oil Filter	W	Braking system (both sides, both axles)
L	Oil Return Filter – Hydraulic System	X	Rear Hitch

Key to Lubrication diagram

NOTES

Air Filter element. The Air Filter element has an expected life of 300 to 500 hours depending upon environmental conditions. However, arduous operating conditions may affect service intervals and the life of the Air Filter element may be considerably less. Clean and inspect the Air Filter element monthly and replace if necessary. Do not exceed 500 hours use.

Engine oil and filter. The engine oil and filter must be changed every 500 hours or 6 months, whichever occurs first. The engine oil and filter should be changed more frequently if the Tractor is operating in dusty or extremely dirty areas, or during cold weather.

Hydraulic system oil suction filter. The oil suction filter located inside the hydraulic oil tank must be changed whenever the hydraulic oil is changed.

CLEANING/REPLACING THE OIL RETURN FILTER ELEMENT

Clean, inspect, and if necessary, replace, the filter element in the Oil Return Filter as follows:

- Refer to Figure 21 below. On the Oil Return Filter, unlock the plastic cover by rotating the plastic cover counter-clockwise. Then pull the plastic cover off the Oil Return Filter.

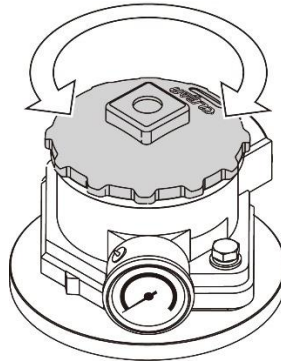


Figure 21 - Oil Return Filter cover

- Refer to Figure 22. A semi-circular steel lifting ring is provided on top of the filter element. Using the lifting ring, pull the filter element out of the Oil Return Filter.

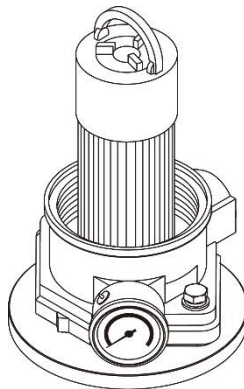


Figure 22 - Removing the oil return filter element

- Clean and inspect the filter element. Replace the filter element if it is damaged.
- Fit the cleaned/replacement filter element into the Oil Return Filter Assembly.
- Refer to Figure 21. Fit the plastic cover onto the Oil Return Filter and forcefully press the plastic cover down. Then lock the plastic cover in place by rotating it clockwise.
- The procedure for cleaning and/or replacing the oil return filter element is now complete.

REPLACEMENT OF HYDRAULIC OIL

The oil in the hydraulic system should be changed every 12 months. It is permitted to change the 12 month interval by $\pm 10\%$.

The normal service life of static hydraulic oil is approximately one year. In the spring and fall (autumn) the temperature difference between day and night is large. In those seasons, when a vehicle that has been working during the day halts for the night, the oil in the hydraulic tank is at a high temperature and the ambient air temperature is low. The hot air in the top of the oil tank meets the cold ambient temperature. Which causes the air in the oil tank to condense on the inside of the roof of the oil tank, forming water droplets that fall into the hydraulic oil. Over time the hydraulic oil will become mixed with water. Then it evolves into an acidic substance that corrodes metal surfaces. Under the dual action of mechanical operation and pipeline pressure shock, corroded metal particles will fall off metal surfaces and become mixed in the hydraulic oil. Metal particles greater in size than $10\mu\text{m}$ will be filtered out by an oil filter element, while particles smaller than $10\mu\text{m}$ will not be filtered out. The particles mixed in the hydraulic oil will increase the wear on metal surfaces. Therefore, do not leave the vehicle outside when it is not in use, especially in cold northern regions. Also, clean or replace the filter element in accordance with the maintenance schedule.

Before replacing the hydraulic oil, make sure that you have the following items available:

NOTE

When changing the type of hydraulic oil used on the PT2690D Tractor, DO NOT mix the two types of hydraulic oil. All the previous type of hydraulic oil must be removed, and the hydraulic system thoroughly cleaned before filling with the new oil.

- Hydraulic oil. At least 100 L (22 gal), this being 1.5 times the capacity of the hydraulic system. Use the type of hydraulic oil specified in the Fuels, Lubricants and Consumables section of this manual.
- A replacement filter element for each filter in the hydraulic system. Only use the filter elements specified in the Fuels, Lubricants and Consumables section of this manual.
- Plugs to close the hydraulic pipes, etc.
- Thread sealant, suitable for high pressure hydraulic systems.
- An empty oil drum, or other container, with a capacity of at least 75 L (16.5 gal). A second container with a capacity of at least 10 L (2 gal).
- A new Access Cover Gasket, 300 x 5.3 mm, Part No. 8KB00-30053.
- Wash oil. Use the same type of oil as will be used to refill the hydraulic system. This is in addition to the oil to be used to refill the hydraulic system.
- A drain hose, with a M6-6H hydraulic connector on one end that will mate with the oil drain point on the piston (rod) end of each Hydraulic Cylinder.

Before replacing the hydraulic oil, make sure that the vehicle is switched Off.

Replace the hydraulic oil as follows:

WARNING – PETROLEUM, OILS AND LUBRICANTS



Do not eat, drink or smoke when applying oil or lubricant. Do not allow oil or lubricant to come into contact with your eyes, mouth or nose. Wear Personal Protective Equipment (PPE), for example suitable gloves, safety glasses, and overalls. If lubricant is ingested, or comes into contact with your eyes, seek medical assistance immediately.

Oil and lubricants are a slip hazard. Always clean up any spillages, or excess oil or lubricant.

- The vehicle must be parked on a flat surface. Make sure that at least two, and preferably all four, wheels and secured with chocks. Make sure that the area around the vehicle is completely clean.
- Place a container with a capacity of at least 75 L (16.5 gal) under the hydraulic oil tank.
- Refer to Figure 23 below. Make sure that the Shut-Off Valve (14) is fully open. On the Hydraulic Oil Tank (11), remove the Oil Drain Plug (13) and allow the hydraulic oil to drain from the Hydraulic Oil Tank. Examine the Oil Drain Plug for cuts or delamination in the seal that forms part of the Oil Drain Plug and replace the Oil Drain Plug if its seal is damaged. Do not refit the Oil Drain Plug at this stage.

NOTE

Approximately three-quarters of the oil in the hydraulic system is stored in the hydraulic oil tank, with the remainder in the rest of the hydraulic system.

PRECAUTION – CONTAMINATION OF HYDRAULIC SYSTEM

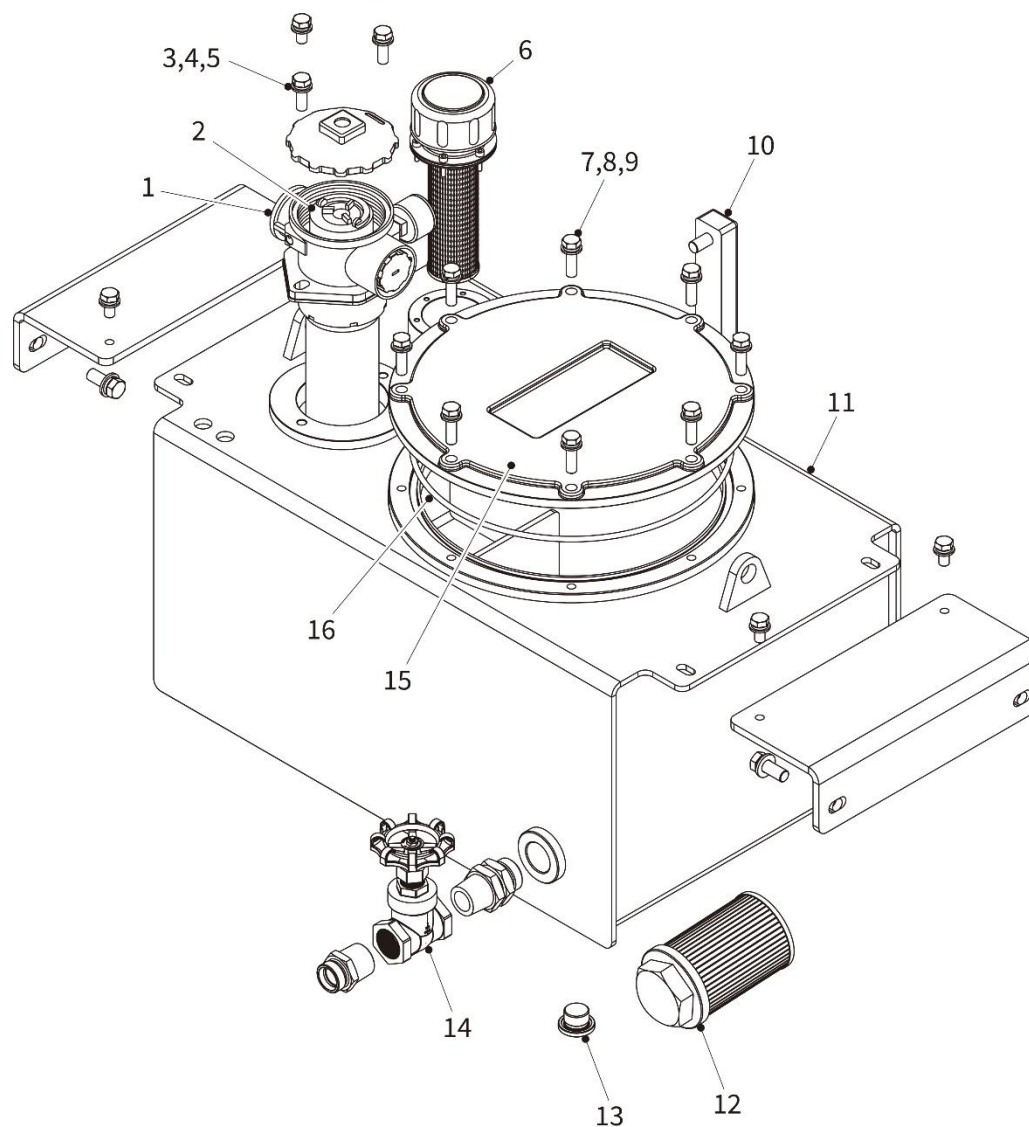


To prevent any damage to the hydraulic components by contaminants, cover the oil tank access holes when not working in the oil tank.

Plug or cap all hydraulic connections immediately after disconnection and make sure that the connectors remain scrupulously clean until sealed.

- When the oil stops draining from the Oil Tank, it is necessary to drain the oil from the Gear Pump, as described later.
- Dispose of the waste oil in accordance with all National and local Laws, Regulations, and Codes; and the airports Environmental Policy.
- Remove and clean the air breather (6).
- Remove and retain the Qty. eight M10 x 35 mm bolts (7) and associated lock washers (8) and flat washers (9). Then remove the access cover (15) and associated access cover gasket (16). Retain the access cover. Discard the access cover gasket.
- Inside the Oil Tank, remove and discard the oil suction filter (12).
- Clean or replace the oil return filter element (2) as applicable, as described in the procedure above.
- Place a container with a capacity of at least 10 L (2 gal) under the Gear Pump.
- Disconnect the hydraulic pipe/hose connecting the Gear Pump to the Oil Tank, at the pump end. Allow the hydraulic oil to drain from the Gear Pump and the hydraulic pipe/hose.
- Dispose of the waste oil in accordance with all National and local Laws, Regulations, and Codes, and the airports Environmental Policy.
- Refer to Figure 23. Fit the Oil Drain Plug (13).

Hydraulic Oil Tank



- | | | | |
|---|----------------------------|----|-----------------------------------|
| 1 | Oil Return Filter Assembly | 9 | M10 flat washer |
| 2 | Oil Return Filter Element | 10 | Fluid Level Gauge |
| 3 | M8 x 35 mm bolt | 11 | Oil Tank |
| 4 | M8 lock washer | 12 | Oil Suction/Filter Strainer |
| 5 | M8 flat washer | 13 | Oil Drain Plug |
| 6 | Air Breather | 14 | Shut-Off Valve |
| 7 | M10 x 35 mm bolt | 15 | Access Cover, Oil Tank Cleaning |
| 8 | M10 lock washer | 16 | Access Cover Gasket, 300 x 5.3 mm |

Fig 23 - Hydraulic Oil Tank

Hydraulic Oil Tank

- Close the Shut-Off Valve (14).
- Flush the Oil Tank and hydraulic piping with wash oil. When flushing the hydraulic piping:
 - Make sure that the wash oil always flows in the same direction.
 - Gently tap all the hydraulic pipes to release oxidation products and debris from the inside walls of the pipes.
 - Initially apply the minimum operating pressure to the wash oil, then gradually increase to normal operating pressure. Flush the system at normal operating pressure for 60 to 90 minutes.
 - Check the condition of the filter element in the Oil Return Filter. If there is no debris in the filter element, the flushing operation is complete. If any debris is found, clean the filter element and flush the system for another 60 to 90 minutes.
- Place a container with a capacity of at least 75 L (16.5 gal) under the hydraulic oil tank. Remove the Oil Drain Plug (13) and allow the wash oil to drain out.
- Dispose of the waste oil in accordance with all National and local Laws, Regulations, and Codes, and the airports Environmental Policy.
- Fully open the Shut-Off Valve (14).
- The interior of the Hydraulic Oil Tank must be thoroughly cleaned before refilling the hydraulic system.
 - Wipe the inside of the Oil Tank with a clean gauze cloth, or a clean, new, lint-free cloth. DO NOT use a cloth that may shed lint, or an old rag, as these will leave behind debris that can cause a blockage in the hydraulic system.
 - Clean the inside of the Oil Tank, twice, with a clean gauze cloth (or a clean, new, lint-free cloth) that has been soaked in diesel fuel (or similar).

WARNING – COMPRESSED AIR



Compressed air and the dust and debris that it generates can cause damage to the eyes and skin punctures. When using compressed air for cleaning, DO NOT use compressed air with a pressure above 0.7 Bar (10 p.s.i.). Wear Personal Protective Equipment (PPE): - safety glasses or eye shields, suitable gloves, and overalls. DO NOT use compressed air in a reckless manner.

If debris does enter your eyes, seek medical assistance immediately.

- Blow dry the exterior of the Oil Tank with a clean low pressure compressed air jet.
- Inside the Oil Tank, examine the edges and corners for residual sludge. Make sure that any residual sludge is removed and that the interior of the Oil Tank is completely clean.
- Then flush the Oil Tank with new oil.
- Inside the Oil Tank, install a new oil suction filter (12).
- Examine the O-ring seal on the Gear Pump inlet for damage and delamination. If necessary, replace the O-ring seal.
- When reconnecting hydraulic pipes and hoses, apply thread sealant to the thread surface to prevent leaks.
- Reconnect the hydraulic hose between the Gear Pump and the Oil Tank.
- Fit the air breather (6).

-
- Fit the access cover (15) and a new access cover gasket (16), and secure with Qty. eight M10 x 35 mm bolts (7) and associated lock washers (8) and flat washers (9). Lightly grease the gasket to assist the fitting and removal of the gasket and access cover.
 - Fit the Oil Drain Plug (13).
 - Fill the Oil Tank with clean, new, hydraulic oil through the oil port of the Oil Return Filter Assembly (1) until the Fluid Level Gauge (10) indicates that the Oil Tank is full.
 - If not already done, fit the plastic cover onto the Oil Return Filter and forcefully press the plastic cover down. Then lock the plastic cover in place by rotating it clockwise.
 - Start Up the vehicle. Hydraulic oil will flow into the hydraulic system, causing the oil level in the Oil Tank to drop.
 - Switch Off the vehicle and top-up the oil level in the Oil Tank.
 - Start Up the vehicle again. Operate all the hydraulic functions and verify that they all function correctly.
 - Switch Off the vehicle. Check the oil level in the Oil Tank and top-up as necessary.
 - The procedure for replacing the hydraulic oil is now complete, and the vehicle may be returned to use. After operating the vehicle for three to four hours, switch OFF the vehicle and check the condition of the filter element in the Oil Return Filter. Clean the filter element if any debris is found.

TROUBLESHOOTING AND FAILURE DIAGNOSIS

Troubleshooting and failure diagnosis on the PT2690D Tractor may be performed as follows:

- The Dash Display Instrument in the Cab can display icons related to the operation of the Tractor. Some of these icons indicate problems with the Tractor. All the Dash Display Instrument icons are described on page 28 of this manual.
- The Cummins diesel engine, Model QSF3.8-C120T4 includes a Built-In-Test (BIT) capability. If a problem occurs with the Engine, a fault code will appear on the Dash Display Instrument.
- The “Cummins Engine Trouble and Fault Codes” document appended to this manual describes the Engine fault codes; and provides detailed troubleshooting and failure diagnosis on the Engine including fault isolation and identification. For servicing and repair information for the Engine, refer to the “Cummins Operation and Maintenance Manual QSF3.8 CM2350 F107” appended to this manual.
- Visually examine the Tractor for obvious problems, using the information given in the Scheduled Maintenance Table as a guide. Also check the ATM Mini Fuses in the Central Control Box.
- For suspected mechanical problems, other than with the Engine, axles, and hydraulic system, perform the Troubleshooting Procedure given in the Troubleshooting Table – Automotive Faults, below.
- For problems with the hydraulic system, and electrical system, perform the Troubleshooting Procedure given in the Troubleshooting Table – Hydraulic and Electrical Faults.

Troubleshooting Table – Automotive Faults

Sub-Assembly	Trouble	Probable Cause	Corrective Action
Automatic Transmission	Power is not transmitted	1. No pressure build-up:	
		a. Insufficient oil.	Top-up oil level.
		b. Oil pump and/or drive oil line unserviceable.	Replace faulty parts.
		c. Control valve damaged or faulty.	Replace control valve.
		d. Seal on clutch piston unserviceable.	Visually check seal. Replace if necessary.
		2. Mechanical damage on:	
		a. Input shaft.	Examine, and repair or replace as necessary.
		b. Gear.	
		c. Clutch hub.	
		d. Driving plate or driven plate.	
Automatic Transmission	Output decrease	1. Oil pressure too low:	
		a. Insufficient oil.	Top-up oil level.
		b. Clogged oil filter.	Clean or replace.
		c. Spring of regulating valve has weakened, or piston unserviceable.	Check and replace if necessary.

Sub-Assembly	Trouble	Probable Cause	Corrective Action
		d. Seal on clutch piston unserviceable.	Check and replace if necessary.
		2. Mechanical damage:	
		a. Damaged or deformed impeller.	Replace damaged or faulty parts.
		b. Clutch hub is deformed.	
		c. Driving plate or driven plate is deformed.	
		d. Use of incorrect oil.	Drain oil and replace with specified oil. Replace Oil Filter.
Automatic Transmission	Oil temperature abnormally high	a. Incorrect oil level.	Drain, or top-up, oil until correct oil level is achieved.
		b. Vane makes contact with adjacent parts.	Replace faulty parts.
		c. Drag due to worn driving plate and/or driven plate.	Replace faulty parts.
		d. Bearing is worn or seized.	Check and repair or replace as required.
		e. Oil cooler unserviceable.	
		f. Clutch slippage or low efficiency due to use of incorrect oil.	Drain oil and replace with specified oil. Replace Oil Filter. If necessary, replace clutch disk.
		g. Transmission oil pump is worn or damaged.	Replace faulty parts.
	Abnormal noise emitted by Transmission	a. Insufficient oil, or cavitation due to trapped air on inlet side.	Top-up oil until correct level is reached. Release trapped air.
		b. Transmission oil pump unserviceable.	Disassemble and replace faulty parts.
		c. Vane in contact with adjacent parts due to deformity.	Disassemble Transmission and replace damaged, faulty, or worn parts.
		d. Damaged input disk.	
		e. Damaged gear and splines.	
		f. Bearing is worn or damaged.	
		g. Worn contact surfaces on clutch hub and driven plate.	
		h. Loose bolt.	Check bolts. Tighten or replace loose bolts.
		i. Clutch slippage due to drop in oil pressure.	Check and rectify oil level.
		j. Cavitation due to clogged oil filter.	Replace oil filter and transmission oil.
	Oil leak	a. Oil seal faulty or perished.	Replace seal.

Sub-Assembly	Trouble	Probable Cause	Corrective Action
		b. O-ring seal is damaged or perished.	
		c. Loose bolt.	Tighten bolt.
		d. Surface of a matching part is scratched or damaged.	Repair or replace damaged part.
Automatic Transmission	Clutch engages too slowly.	a. Driving plate and/or driven plate excessively worn.	Examine, clean, and replace as required.
		b. Oil leak from unserviceable O-ring seal.	
		c. Spring and/or piston of regulating valve unserviceable.	
		d. Blocked oil line.	
		e. Selector valve is unserviceable.	
	Excessive vibration.	a. Accumulator spring is fatigued.	Examine and replace as necessary.
		b. Accumulator piston faulty.	
		c. Taper driven plate is damaged.	
Propellor Shaft (Drive Shaft)	Abnormal noise	a. Flange bolt loose.	Tighten all flange bolts.
		b. Insufficient lubrication.	Apply lubricant. For details refer to Lubrication schedule.
		c. Excessive wear of universal joint.	Replace.
Steering system	Steering wheel vibration, shaking, or instability	a. Tire pressure incorrect.	Adjust tire pressure to bring it within specification.
		b. Front wheel or tire is damaged, or deformed, or has uneven wear.	Replace.
		c. Steering system loose, not secure.	Tighten securing hardware.
		d. Steering column unserviceable.	Replace.
		e. Steering cylinder and/or tie rod loose, not secure.	Tighten securing hardware.
		f. Steering cylinder damaged or unserviceable.	Replace.
		g. Steering cylinder requires lubrication.	Lubricate
		h. Hub bearing worn, or its clearance is incorrect.	Adjust or replace.
		i. Steering Unit unserviceable.	Replace
		j. No hydraulic oil flow to Steering Unit.	Hydraulic fault. Refer to next Table.
Steering System	Steering wheel is hard to turn.	a. Tire pressure incorrect.	Adjust tire pressure to bring it within specification.

Sub-Assembly	Trouble	Probable Cause	Corrective Action
		b. Steering components require lubrication.	Lubricate with grease.
		c. Oil level low.	Top-up oil until correct oil level is achieved.
		d. Oil leak from a Steering System seal.	Replace seal.
		e. Hydraulic oil leak, or blockage or constriction in a hydraulic hose.	Repair/replace hoses as required and rectify leaks.
		f. Steering column unserviceable.	Replace.
		g. Steering cylinder damaged or unserviceable.	Replace.
		h. Steering Unit unserviceable.	Replace
		i. Hydraulic oil contaminated with debris or foreign substance.	Replace oil and Oil Filter.
		j. No hydraulic oil flow to Steering Unit.	Hydraulic fault. Refer to next Table.
Steering System	Steering pulls to one side.	a. Left and right front wheels unbalanced.	Replace.
		b. Brake clearance incorrect on left or right front wheels.	Adjust.
		c. Left and right front wheels toe-in is incorrect.	Adjust.
		d. Steering wheel loose.	Tighten bolt that secures the steering wheel.
		e. Steering wheel deformed.	Replace.
		e. Tie rod loose.	Tighten securing hardware.
		h. Steering Unit unserviceable.	Replace
		g. Steering cylinder unserviceable.	Replace.
Steering System	Steering wheel does not return to normal (centre) position.	a. Steering column unserviceable.	Disassemble, clean, and replace worn parts as necessary.
		b. Steering Unit unserviceable.	
		c. Left and/or right wheel toe-in incorrect.	Adjust.
		g. Tire pressure incorrect.	Adjust tire pressure to bring it within specification.
Steering System	Abnormal noise coming from Steering System	a. Air trapped in Steering System hydraulic hoses.	Vent air from Steering System hydraulics.
		b. Steering Unit unserviceable.	Replace.

Sub-Assembly	Trouble	Probable Cause	Corrective Action
Braking System	Insufficient braking force	a. Brake fluid leak.	Locate and repair brake fluid leak. Top-up brake fluid to correct level.
		b. Air in Braking System hydraulic system.	Vent all air from Braking System hydraulics.
		c. Contamination on surface of brake lining.	Replace brake linings and rectify contamination source.
		d. Brake lining is deformed, or brake lining contact is abnormal.	Replace faulty brake.
		e. Brake lining is worn.	Replace brake lining.
		f. Blockage or restriction in the brake hydraulic system.	Clean and flush hydraulic components to remove blockage or restriction.
	Brake only applies on one side	a. Tire pressure incorrect.	Adjust tire pressure to bring it within specification.
		b. Brake clearances are not equal.	Adjust brake clearances.
		c. On the side where the brake does not apply, there is contamination on surface of brake lining.	Replace brake linings and rectify contamination source.
		d. Brake lining is deformed, or brake lining contact is abnormal.	Repair or replace worn components.
		e. Brake shoe lining contact is abnormal.	Adjust.
		f. Brake lining is worn.	Replace.
		g. Clearance of bearing is incorrect.	Adjust or replace bearings.
Braking System	Brake Drags Brake Drags	a. Brake pedal fouling due to insufficient clearance.	Adjust/repair.
		b. Blockage or restriction in the Brake hydraulic system.	Clean and flush hydraulic components to remove blockage or restriction.

Troubleshooting Table – Hydraulic and Electrical Faults

Sub-Assembly	Trouble	Probable Cause	Corrective Action
Hydraulic System	No hydraulic pressure	a. Insufficient hydraulic oil in the Oil Tank.	Top-up oil level.
		b. Shut-Off valve in the oil inlet line between Oil Tank and Gear Pump is closed.	Check that the Shut-Off valve attached to the Oil Tank is fully Open.
		c. Major oil leak.	Visually examine hydraulic system for oil leaks, and repair or replace parts as necessary.
		d. Gear Pump and/or associated oil line unserviceable.	Replace faulty components.
		e. Pressure relief valve in the Integrated Hydraulic Valve Assembly has failed and continuously returns oil to the Oil Tank.	Replace pressure relief valve.
		f. Pressure relief valve in the Oil Return Filter Assembly has failed.	Replace Oil Return Filter Assembly.
		g. Air leakage in the oil inlet line between oil tank and Oil Gear Pump.	Check and tighten pipeline joints.
		h. Suction Filter inside Oil Tank is blocked.	Check, clean, and if necessary, replace, the Suction Filter.
Hydraulic System	A hydraulic joint is leaking.	a. The hydraulic pipe or hose has not been inserted fully home.	Remove the hydraulic pipe or hose. Clean and examine the hydraulic pipe/hose and replace if required.
		b. The nut that secures the hydraulic pipe or hose is not tightened.	
		c. The exterior of the hydraulic hose is damaged or delaminating.	Refit hydraulic pipe/hose. Apply hydraulic thread sealant to the threads. Make sure the pipe/hose is pushed fully home and the securing nut is tight.
		d. The hydraulic hose is no longer circular in cross-section.	
		e. The hydraulic hose is perished or is no longer flexible.	If there should be even a small bump on the hydraulic hose at the end with the securing clip, the hydraulic hose is unserviceable. The sleeve will not be able to slide back and forth, but the sleeve could rotate slightly.
Hydraulic System	Gear Pump not working	a. A driver's control is not set to the correct position.	Check that the vehicle is in Neutral, with the Park Brake engaged.
		b. Shut-Off valve in the oil inlet line between Oil Tank and Gear Pump is closed.	Check that the Shut-Off valve attached to the Oil Tank is fully Open.

Sub-Assembly	Trouble	Probable Cause	Corrective Action
		c. Major oil leak.	Visually examine hydraulic system for oil leaks, and repair or replace parts as necessary.
		d. Gear Pump and/or associated oil lines unserviceable.	Replace faulty Gear Pump or unserviceable oil line.
Dash Display Instrument	Dash Display Instrument not working	a. Wiring fault.	Using a multimeter, check the wiring associated with the Dash Display Instrument.
		b. Dash Display Instrument unserviceable.	Replace.

ENGINE FAULT CODES

The Cummins diesel engine, Model QSF3.8-C120T4 includes a Built-In-Test (BIT) capability. If a problem occurs with the Engine, a fault code will appear on the Dash Display Instrument in the Cab.

If a fault code is displayed on the Dash Display Instrument refer to the “Cummins Engine Trouble and Fault Codes” document appended to this manual. That document describes the Engine fault codes; and provides detailed troubleshooting and failure diagnosis on the Engine including fault isolation and identification.

For servicing and repair information for the Engine, refer to the “Cummins Operation and Maintenance Manual QSF3.8 CM2350 F107” appended to this manual.

REPAIR

Repair of the PT2690D Tractor is by direct replacement of the faulty or damaged component. The Exploded Parts View illustrations show all the components and how the PT2690D is dismantled and re-assembled. All the components are listed in the Parts Breakdown List and the numbers on the Exploded Parts View illustrations are keyed to the Parts Breakdown List.

Replacement parts should be sourced from Avro GSE. The use of major components not obtained from Avro GSE will invalidate the Warranty.

NOTE

It is expected that replacement fasteners may be sourced locally. If sourcing fasteners locally, make sure that the replacement fasteners are the same type and grade of material, and have the same protective coating, as the original. Where applicable the Parts Breakdown List specifies the required material and finish.

The vehicle chassis is not available as a spare. Any significant damage to the vehicle chassis will almost certainly be part of catastrophic damage to the Tractor. Also, the time and effort required to strip down the Tractor, replace the chassis, and then rebuild, is such that significant damage to the Chassis renders the Tractor “Beyond Economic Repair”.

ENGINE REPAIRS

For information on how to repair the Engine, refer to the following manufacturer’s manual appended to this manual:

- “Cummins Operation and Maintenance Manual QSF3.8 CM2350 F107”.

For Spare Parts information for the Engine refer to the Cummins online Parts System.

TRANSMISSION REPAIRS

For information on how to repair the Transmission, and Spare Parts information for the Transmission, refer to the following manufacturer’s manual appended to this manual:

- “Dana Spicer T 12000 Powershift Transmission Maintenance & Service Manual”

AXLE REPAIRS

For information on how to repair the axles, and Spare Parts information for the axles, refer to the following manufacturer’s manuals appended to this manual:

- “Dana Spicer Axle 212 Maint & Repair Manual”
- “Dana Spicer Front Axle 212-927 Service Parts List - APL-2167 2011-11-17”
- “Dana Spicer Rear Axle 212-928 Service Parts List - APL-2168 2011-11-17”

WHEEL NUT TORQUE VALUES

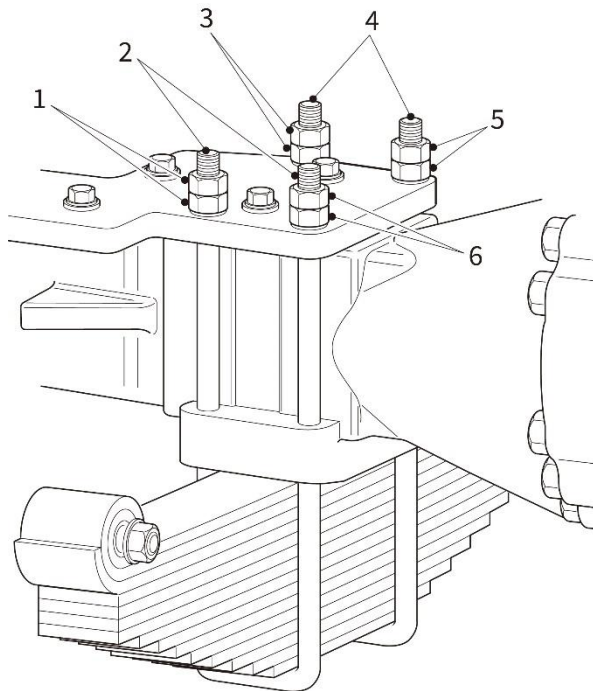
The wheel nuts **MUST** be torque tightened to the correct torque settings given below. Failure to torque tighten the wheel nuts to the correct torque setting may result in a wheel coming loose.

Wheel Nut torque values

Fastener	Torque setting
Front wheel nuts	274 to 323 Nm (202 to 239 ft/lbs).
Rear wheel nuts	274 to 323 Nm (202 to 239 ft/lbs).

FRONT SUSPENSION TORQUE VALUES

Following any repair or maintenance on the Front Axle or front suspension, the hardware that secures the suspension to the Front Axle must be tightened to the correct torque value. Refer to Figure 24 below. The two nuts (items 1, 3, 5, and 6) at each end of all the U-bolts that secure the suspension springs to the Front Axle **MUST** be torque tightened to 400 Nm (295 ft/lbs). Failure to torque tighten these nuts to the correct torque setting may result in the suspension failing.



- | | | | |
|---|--------|---|--------|
| 1 | Nuts | 4 | U-bolt |
| 2 | U-bolt | 5 | Nuts |
| 3 | Nuts | 6 | Nuts |

Figure 24 – Front Suspension U-bolts and securing nuts

GENERAL TORQUE VALUES

For other securing bolts, refer to the general recommended torque values table given on the next page. If in doubt about the strength grade of the bolt, use the lowest figure given for that size of bolt.

General recommended torque values

Bolt Strength Grade	4.6	5.6	8.8	10.9	12.9
Bolt Size	Recommended Torque				
mm	Nm	Nm	Nm	Nm	Nm
M2	0.11	-	0.29	0.41	0.43
M3	0.44	0.56	1.05	1.48	1.77
M4	1.00	1.28	2.44	3.04	3.65
M5	2.10	2.51	4.94	6.15	7.38
M6	3.51	4.30	9.00	13.00	15.00
M8	8.50	10.5	20.00	29.00	34.00
M10	17	21	40	57	68
M12	30	36	70	99	119
M14	47	56	112	116	139
M16	73	88	175	246	295
M18	101	121	241	338	406
M20	143	171	341	480	576
M22	195	230	464	652	783
M24	248	295	590	829	995
M27	362	435	863	1213	1456
M30	491	590	1171	1647	1977
M33	669	800	1594	2242	2690
M36	864	1030	2047	2879	3454
M39	1115	1340	2649	3726	4471
M42	1378	-	3274	4604	5525
M45	-	-	4072	5726	6871
M48	2064	-	4911	6906	8287
M52	-	-	6370	8958	10749

WELDING REPAIRS, GRINDING, AND CUTTING

If any weld repairs, grinding, cutting with power tools or cutting torches, or similar work is to be performed on a PT2690D vehicle, the Safety Warnings and Precautions below **MUST** be complied with.

WARNINGS AND PRECAUTIONS – WELDING, GRINDING, AND CUTTING



WELDING ARC. A welding arc is bright enough to damage eyesight and cause flash burns. Never look directly at a welding arc with unprotected eyes. Always use an approved welding screen or visor. Cover all exposed skin before welding.



PROTECTIVE CLOTHING. Always wear protective clothing and gloves appropriate for welding work.



HOT WELDS. Always allow a weld to cool before removing welding slag.

Make sure that there is no combustible material within 4 Meters (13 feet) of grinding, welding, or slag chipping.



GRINDING, CHIPPING, AND CUTTING. Always wear eye protection (e.g. protective goggles) when using grinding and cutting tools, and when chipping off welding slag. Always wear eye protection when within 4 Meters (13 feet) of grinding, slag chipping, or cutting with power tools.



DAMAGE TO ELECTRICAL EQUIPMENT. To prevent damage to the vehicle electrical system, before performing any welding, remove or disconnect all vehicle batteries, and disconnect all electrical connections to the vehicle electronics.



TRAINING, AUTHORIZATION AND CERTIFICATION OF WELDERS. Welding must only be performed by people who have been **FULLY TRAINED IN WELDING AND ARE AUTHORIZED** to perform welding operations. Welders must be **CERTIFIED** by their respective national association of welders, such as CWB and/or AWS.

Grinding, chipping, and cutting with power tools must only be performed by people who have been **FULLY TRAINED IN USING THE POWER TOOLS AND ARE AUTHORIZED** to perform those operations.

Before performing any welding, grinding or chipping operations, make sure that any necessary Hot Work Permits have been obtained.

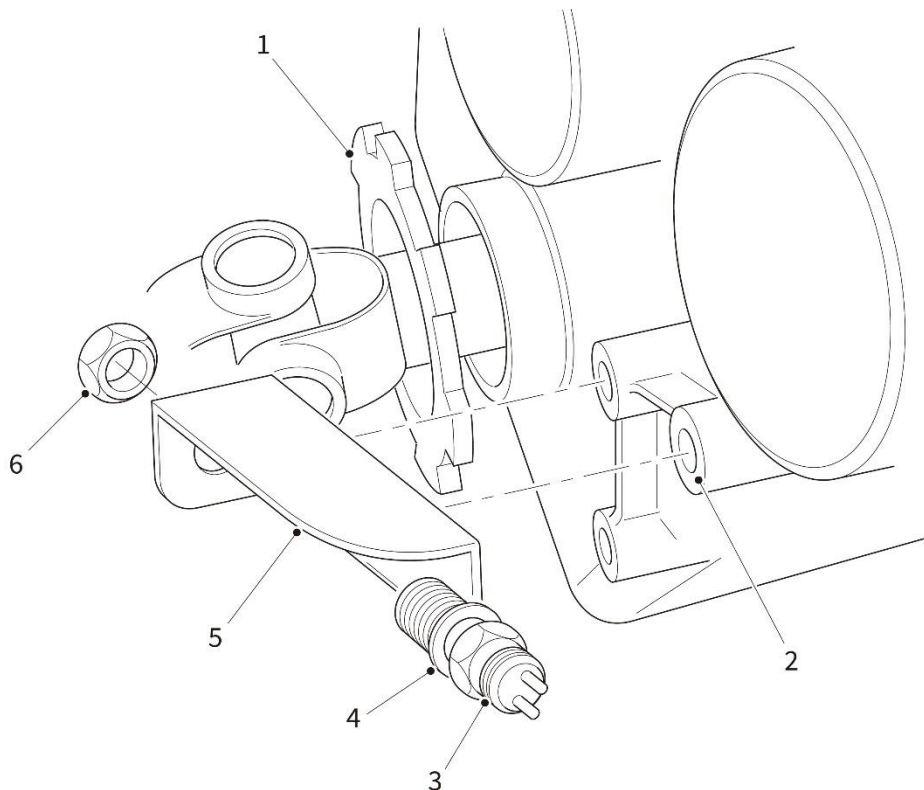
REFITTING THE BATTERY MASTER SWITCH

If the Battery Master Switch, located in the Battery Compartment, has been removed or replaced for any reason. When attaching the interconnecting wiring to the Battery Master Switch, it is recommended that the Negative Battery Cable (from the Battery) is connected to the lower connection of the Battery Master Switch, as shown in the Parts Catalogue breakdown of the Battery Compartment.

SPEED SENSOR

The speed sensor is located on the Transmission, near to the tooth plate (Figure 25, item 1). Replace the speed sensor as follows:

- Disconnect the electrical harness from the speed sensor (3).



- | | | | |
|---|--|---|----------------------------|
| 1 | Tooth plate (part of Transmission) | 4 | Shim |
| 2 | Fixing hole (for speed sensor bracket) | 5 | Speed sensor bracket |
| 3 | Speed sensor | 6 | Nut (part of speed sensor) |

Figure 25 – Speed sensor

SPEED SENSOR

- Remove and retain the fasteners that secure the speed sensor bracket (5) to the fixing holes (2) on the Transmission. Then remove the speed sensor bracket.
- Unscrew the nut (6) and remove the speed sensor (3) from the speed sensor bracket (5). Retain the shims (4).
- Fit the speed sensor and shims to the speed sensor bracket. The number of shims is factory set during manufacture and varies between vehicles.
- Lock the speed sensor in place by fitting the nut (1).
- Secure the speed sensor bracket to the fixing holes (2) on the Transmission.
- Connect the electrical harness to the speed sensor.
- The procedure for replacing the speed sensor is now complete.

If the position of the speed sensor requires adjusting because the speed shown on the Dash Display Instrument is incorrect, adjust the position of the speed sensor as follows:

- Remove the speed sensor as described above.
- If the speed shown on the Dash Display Instrument is less than the actual speed, decrease the number of shims.
- If the speed shown on the Dash Display Instrument is higher than the actual speed, increase the number of shims.
- When the number of shims and the position of the speed sensor is correct, refit the speed sensor as described above.
- The procedure for adjusting the speed sensor is now complete.

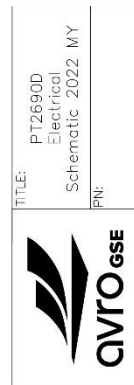
ELECTRICAL SCHEMATICS

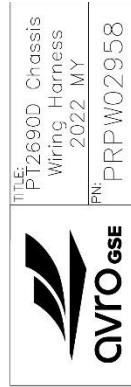
These Electrical Schematics are provided to assist in troubleshooting.

This manual covers the build standard of PT2690D Tractor that were manufactured during 2022.

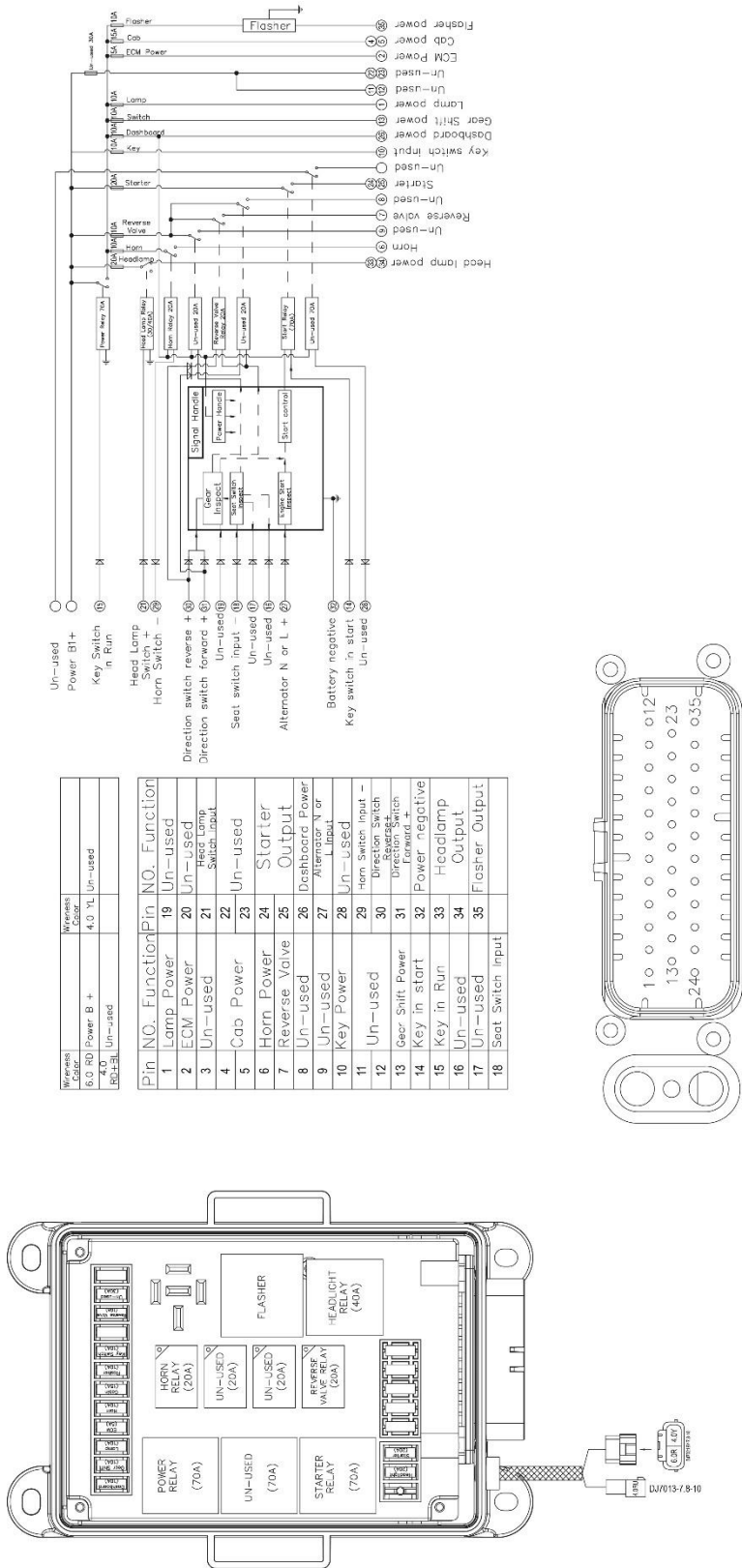
For a PT2690D Tractor with a MY of 2022, the following electrical diagrams are provided (in this sequence):


- PT2690D Electrical Schematic 2022 MY
- PT2690D Chassis Wiring Harness 2022 MY, Part No. PRPW02958
- PT2690D Cabin Harness, Part No. PRPW03097
- PT2690D Center Control Box A, Part No. PRPW02326
- PT2690D Engine After Treatment Harness, Part No. PRPW03098
- PT2690D Combination Switch 2022 MY, Part No. PRPW02957







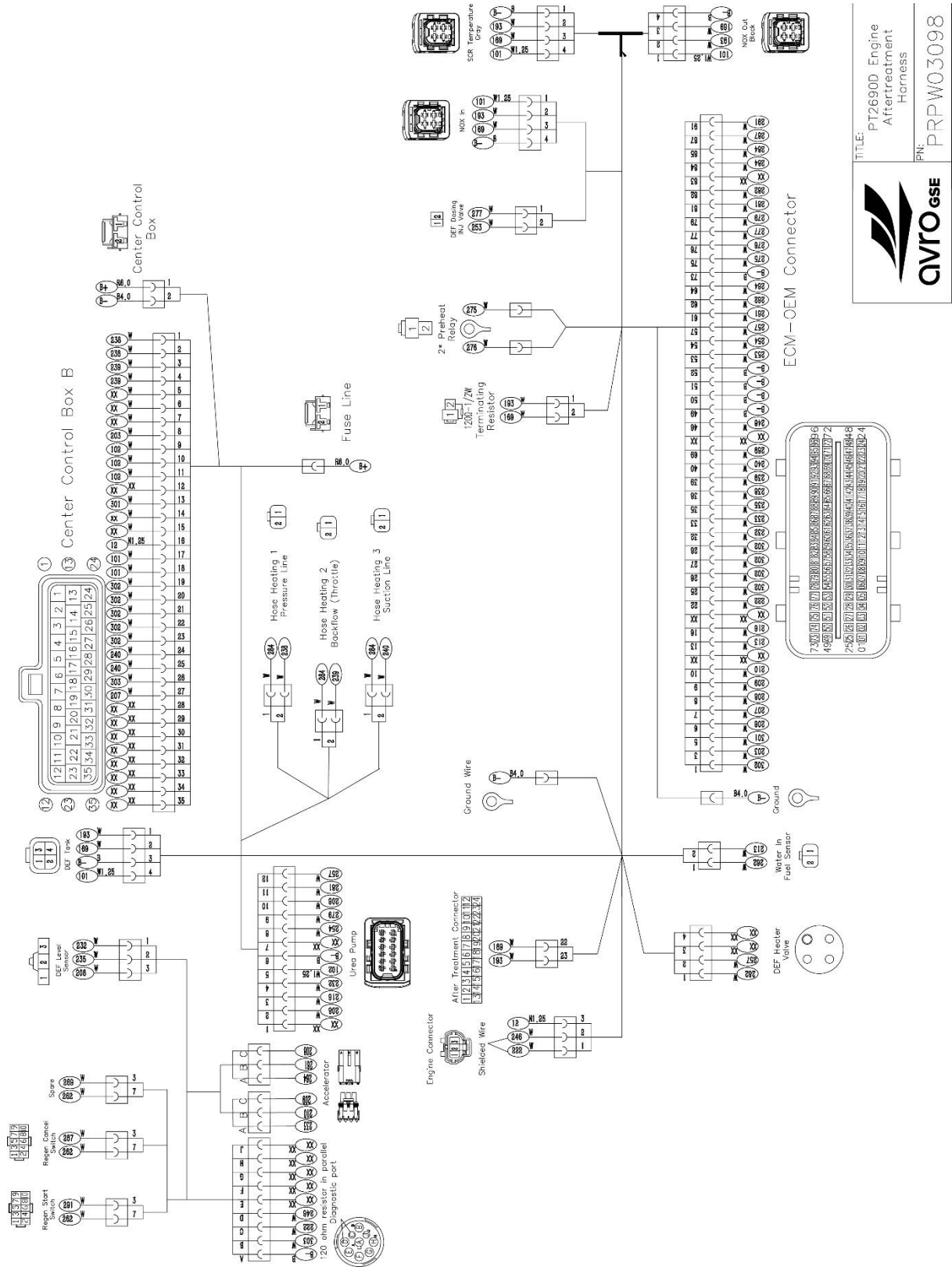




avro GSE

TITLE: Center Control Box A

PN: PRPW02326



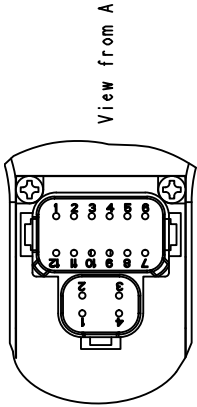
TITLE: PT2690D Engine Aftertreatment Harness

PN: PRPW03098



ECM - OEM Connector

73	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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View from A

Pin assignment	
PIN	Function
1	Windscreen wiper-2 nd speed
2	Windscreen wiper-1 st speed
3	High beam
4	Power to lights
5	Low beam
6	Windscreen wiper-rest
7	Windscreen washer
8	Windscreen wiper
9	Left turn lamps
10	Power to turn lamps
11	Right turn lamps
12	Power to flash

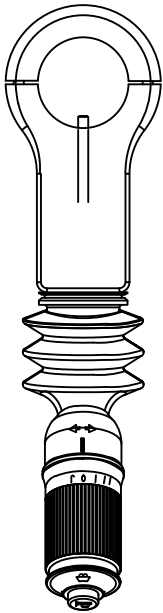
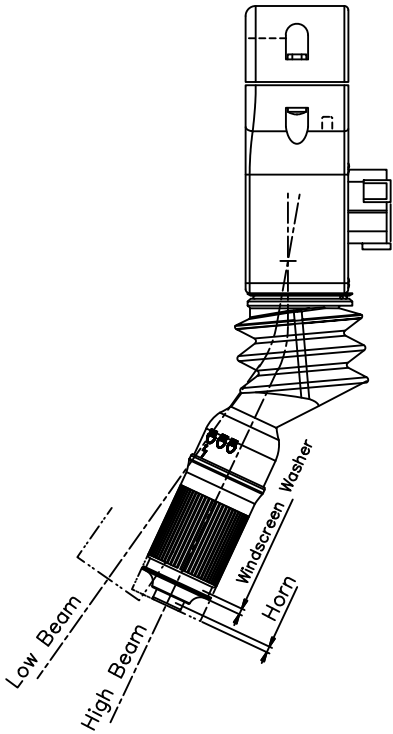
Left side pin assignment	
PIN	Function
1a	Power to horn and washer
2a	Windscreen wiper-intermittent
3a	*
4a	Horn

#: Pin not present or not functional



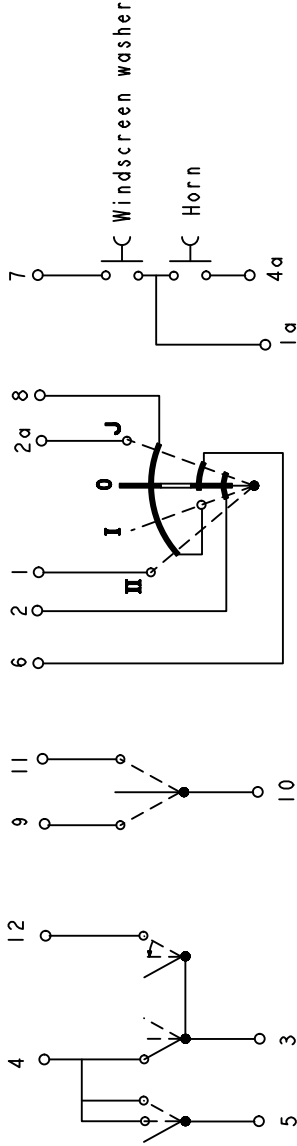
TITLE: PT2690D
Combination
Switch 2022 MY

PN: PRPW02957



Electrical diagram (positions: see drawing)

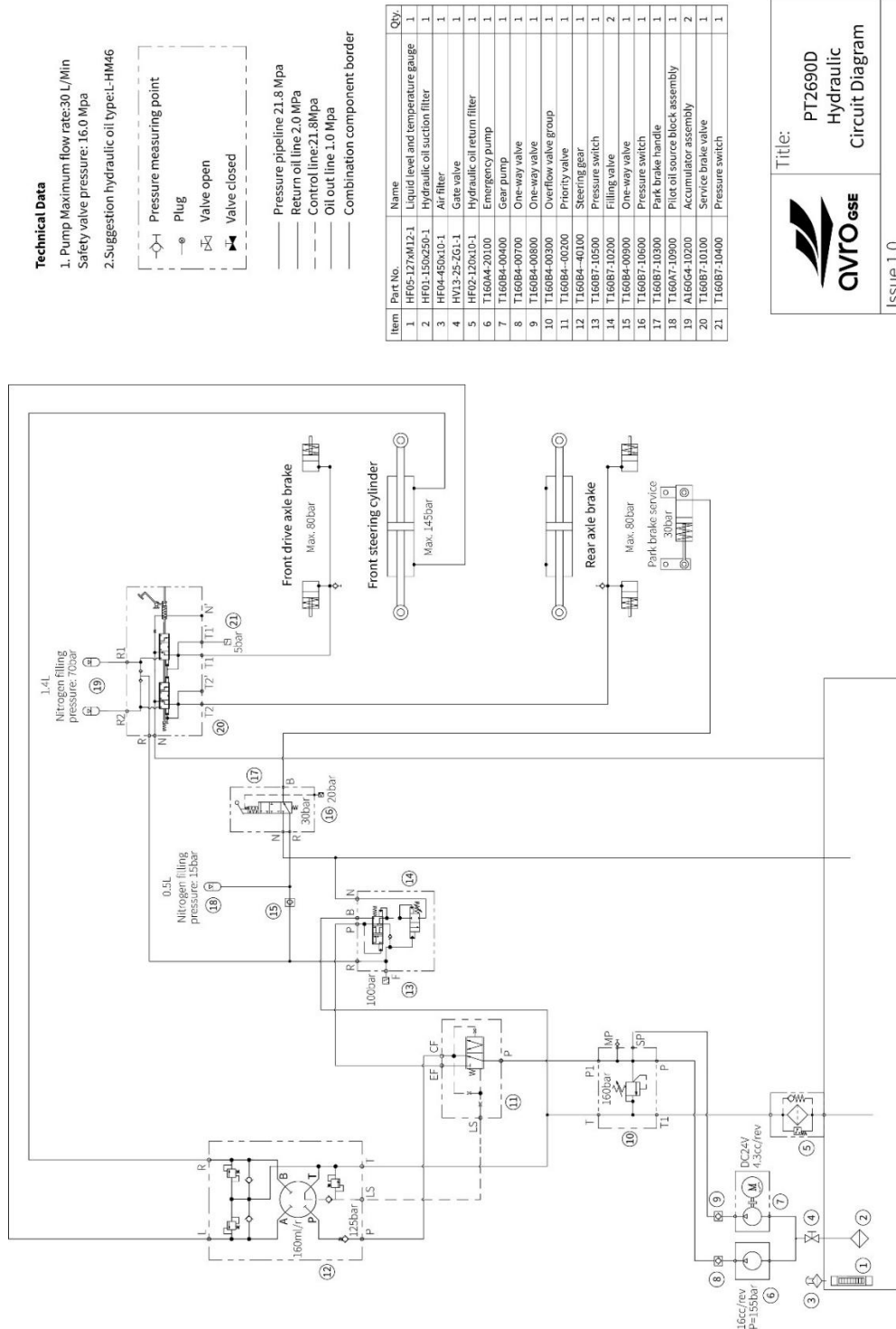
(SX/LH) (DX/RH)




HYDRAULIC SCHEMATIC

This Hydraulic Schematic is provided to assist in troubleshooting.

This Hydraulic Schematic covers the build standard of PT2690D Tractor that were manufactured during 2022+.



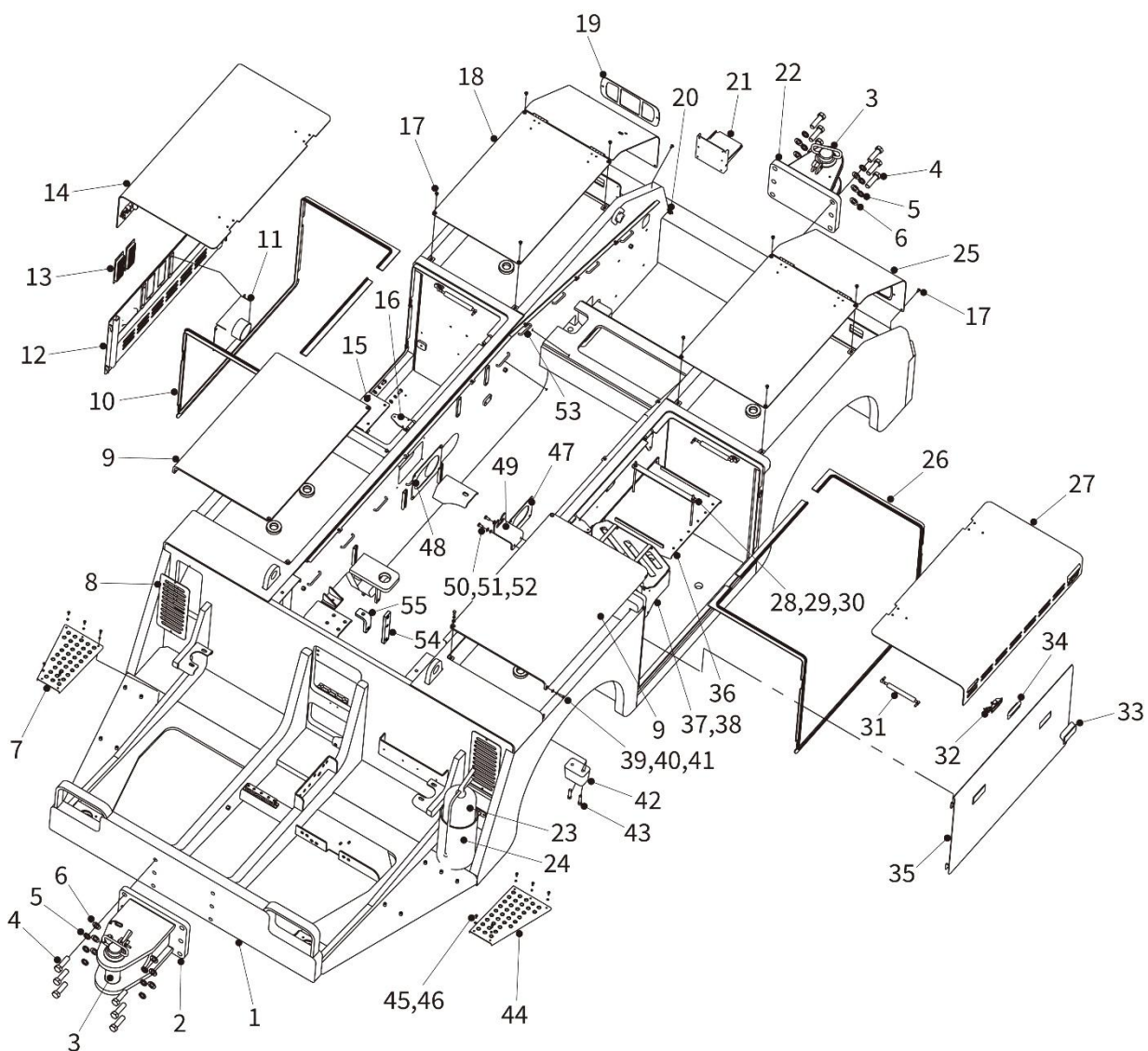
Item	Part No.	Name	Qty.
1	HF02-17X412-1	Liquid level and temperature gauge	1
2	HF01-1506256-1	Hydraulic of suction filter	1
3	HF02-4503-1	Air filter	1
4	HF02-4503-1	Gate valve	1
5	HF02-120X0-1	Hydraulic oil return (filter)	1
6	116004-20100	Emergency pump	1
7	116004-00400	Gear pump	1
8	116004-00700	One-way valve	1
9	116004-00800	One-way valve	1
10	116004-00300	Overflow valve group	1
11	116004-00000	Steering gear	1
12	116004-40100	Pressure valve	1
13	116007-10500	Pressure switch	1
14	116007-10200	Filling valve	2
15	116004-00900	Pressure switch	1
16	116007-10000	Pressure switch	1
17	116007-10300	Pack brake handle	1
18	116007-10900	Pilot oil source block assembly	1
19	AB0604-10200	Accumulator assembly	2
20	116007-10100	Service brake valve	1

	Title: PT2690D Hydraulic Circuit Diagram
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EXPLODED PARTS VIEWS & PARTS LISTS

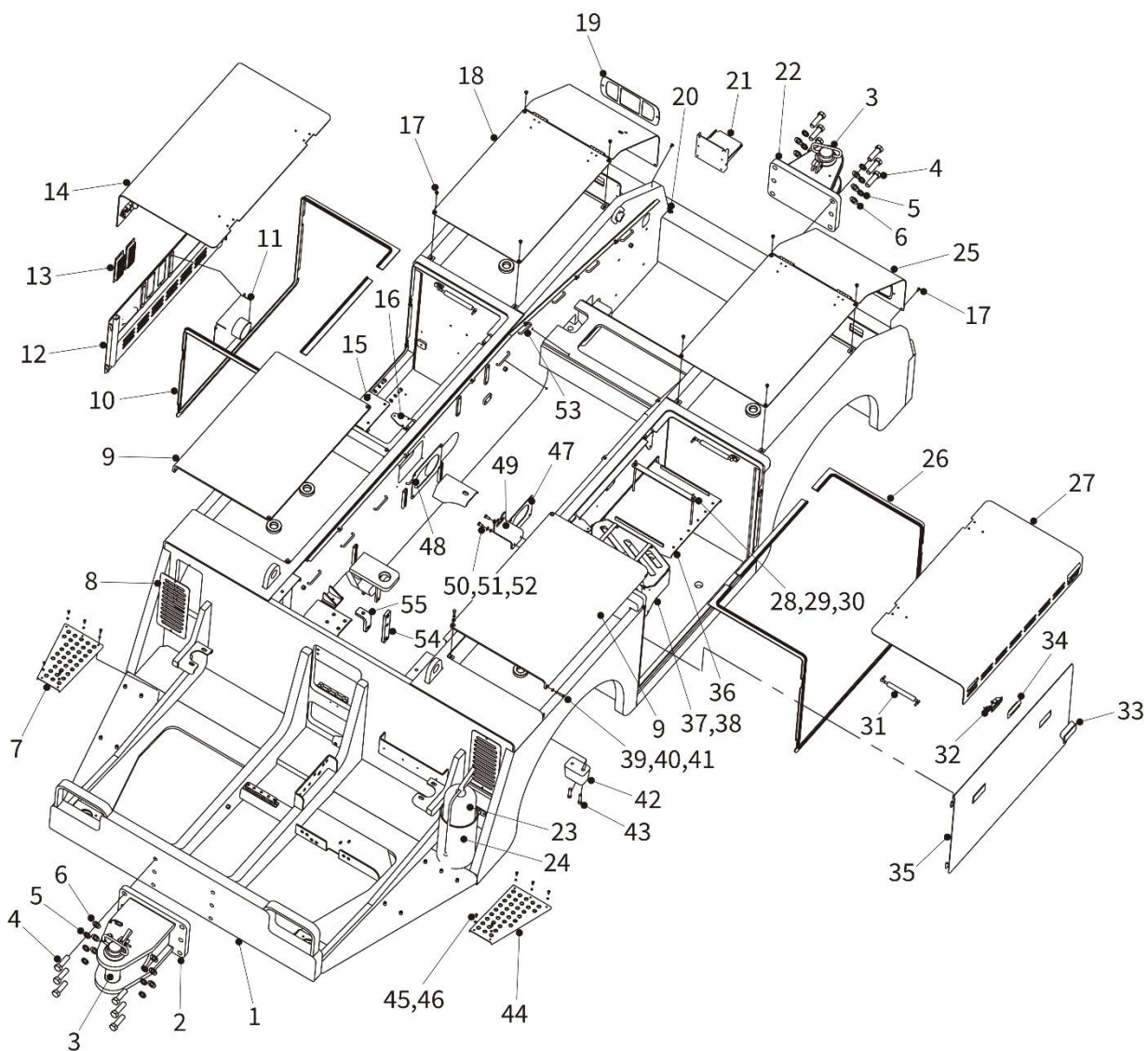
BODY & EXTERIOR



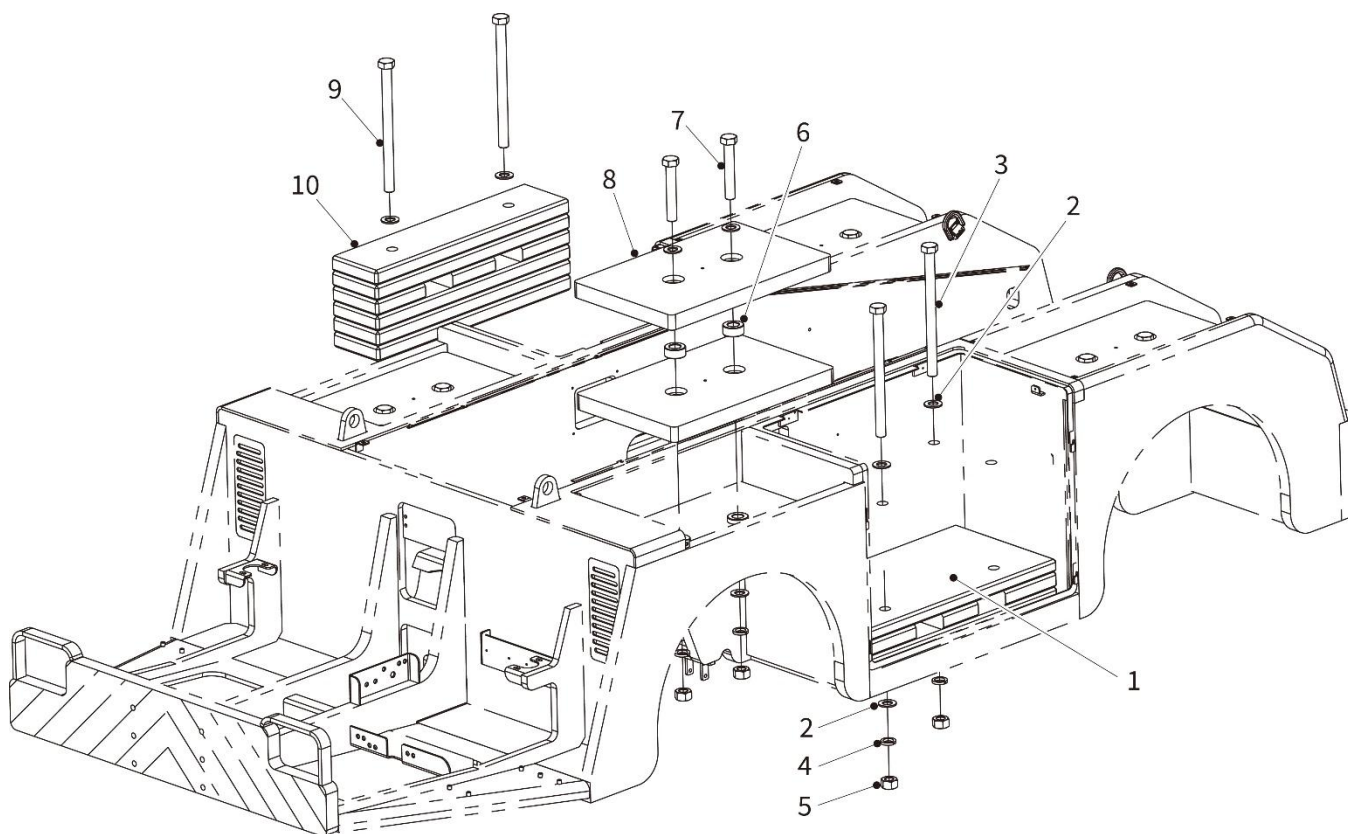
Vehicle Body - Exploded Parts View

Vehicle Body – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	T160B1-10100	Chassis	1	
2	T160A1-11500	Front Hitch (Long Type)	1	
3	PRPW00437	Hitch Pin, w/chain	2	
4	PRPW00546	Bolt, M24 x 80 mm	12	
5	PRFA00177	Washer, Lock, M24	12	
6	PRFA00178	Washer, Flat, M24	12	
7	T160A1-10006R	Plate, Anti-Slip, Right-Hand	1	
8	T160B1-10008	Plate, Air Vent	2	
9	T160B1-10002	Cover, Front Counter-Weight	2	
10	T160B1-10006	Sealing Strip	1	
11	T160B1-10500	Intake Connector	1	
12	T160B1-10400	Side Panel, Air Filter and Exhaust Compartment	1	
13	PRPW00568	Vent, Air Intake	2	
14	T160B1-10300	Cover, Air Filter and Exhaust Compartment	1	
15	T160A1-10004	Air Filter Holder	1	
16	T160A1-20400	Hinge	4	
17	PRFA00024 or PRFA00017	Screw, Hex Socket Countersunk Head, M8 x 16 mm or Screw, Flat Round Hex Socket Head, M8 x 16 mm	12	
18	T160B1-10800R	Cover, Right-Hand, Rear Counter-Weight	1	
19	T160B1-10007	Protective Grill, Rear Lights	2	
20	T160A1-10008	Nut, M8, Special	10	
21	T160A1-10029	Rear Step	1	
22	T160A1-10600	Rear Hitch	1	
23	N/A	Fire Extinguisher	-	Replacement locally sourced
24	T160A1-20800	Fire Extinguisher Storage	1	
25	T160B1-10800L	Cover, Left-Hand, Rear Counter-Weight	1	
26	T160B1-10003	Sealing Strip	1	
27	T160B1-10200	Battery Compartment Cover	1	
28	PRFA00021	Nut, M8	6	
29	T160A1-11304	Threaded Rod, Battery Retaining	2	
30	T160A1-11305	Battery Securing Bar	1	

**Vehicle Body - Exploded Parts View****Vehicle Body – Spare Parts List**

Item	Part No.	Description	Qty	Remarks
31	D15A1-20008	Gas Spring	4	
32	PRPW00059	Access Door Latch	4	
33	PRPW02264	Handle, side access panel	4	
34	PRPW00368	Compartment door handle - PT2690D	4	
35	T160B1-11100	Access Hatch, Battery Compartment	1	
36	T160B1-10610	Tray, Battery	1	
37	D50S1-10001	Plate	2	
38	D50S1-10300	Holder, Cooling System Overflow Tank	1	
39	PRFA00009	Washer, Flat, M8	12	
40	PRFA00010	Washer, Lock, M8	10	
41	PRFA00013	Bolt, M8 x 25 mm	10	
42	PRPW00378	Bumper Block, Black	2	
43	PRFA00017	Screw, Hex Socket Head Cap, M6 x 50 mm (10mm threaded)	4	
44	T160A1-10006L	Plate, Anti-Slip, Left-Hand	1	
45	PRFA00024	Screw, Cross Recessed Pan Head, M6 x 16 mm	10	
46	PRFA00007	Washer, Lock, M6	10	
47	T160B1-10004	Bracket	1	
48	T160B1-10005	Plate	1	
49	T160B1-11000	Support	1	
50	PRFA00011	Washer, Flat, M10	4	
51	PRFA00012	Washer, Lock, M10	4	
52	PRFA00189	Bolt, M10 x 20 mm	4	
53	T160B1-10700	Pipe Trap Diagram	1	
54	T160A1-10122	Spring Plate, Straight	2	
55	T160B1-10121	Spring Plate, Bent, 90 deg	2	



Counter-Weight Mounting - Exploded Parts View

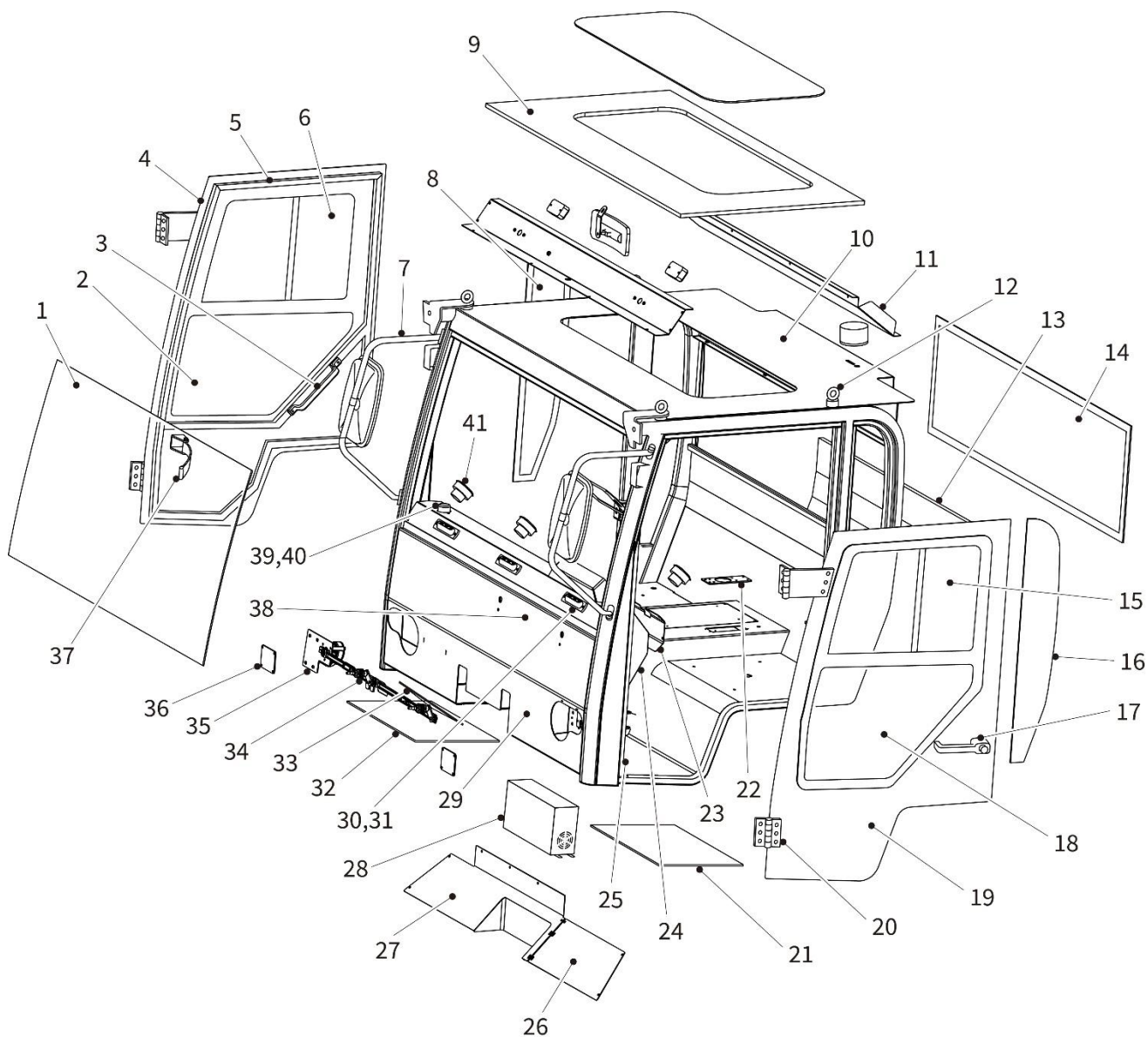
Counter-Weight Mounting – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	T160B1-50100	Counter-Weight Plate 1	1	
2	PRFA00011	Washer, Flat, M10	24	
3	GB/T 5782	Bolt, M36 x 300 mm, threaded length 100 mm	2	
4	PRFA00015	Washer, Lock, M36	12	
5	PRFA00021	Nut, M36	12	
6	T160A1-50006	Bushing	8	
7	GB/T 5782	Bolt, M36 x 220 mm, threaded length 100 mm	8	
8	T160B1-50004	Counter-Weight Plate 2	8	
9	GB/T 5782	Bolt, M36 x 450 mm, threaded length 100 mm	2	
10	T160B1-50200	Counter-Weight Plate 3	1	



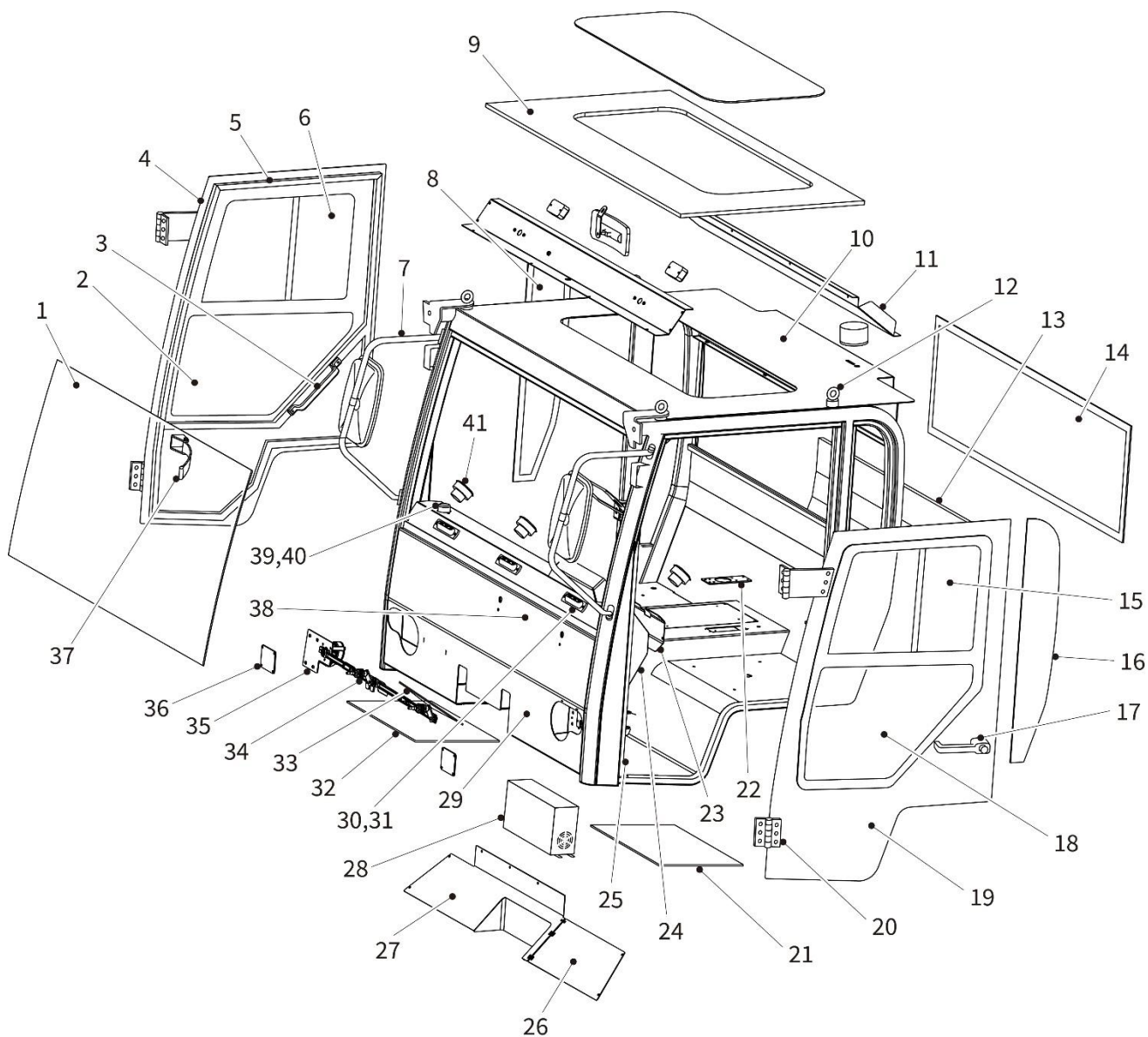
Engine compartment hood – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	PRPW00623	Seal Strip, 1275 mm	1	
2	D30A1-20010 x 380	Seal Strip, 380 mm	1	
3	PRPW03278	Hood Hinge	4	
4	PRFA00010	Washer, Lock, M8	12	
5	PRFA00017	Screw, Flat Round Hex Socket Head, M8 x 16 mm	36	
6	PRFA00186	Nut, Self-locking, M8	1	
7	PRFA00009	Washer, Flat, M8	1	
8	T160A1-20014	Pin	1	
9	T160B1-20400	Hood Strut Assembly	1	
10	T160B1-20002	Clip	1	
11	D25G1-12301	Lock	1	
12	D25G1-12302	Bolt, Steel, Special	1	
13	D30A1-20010 x 385	Sealing Strip, 385 mm	1	
14	T160B1-20800	End Cover, Engine Compartment	1	
15	T160A1-20006	Hatch	1	
16	D30A1-20010 x 2280	Sealing Strip, 2280 mm	1	
17	T160B1-20600	Rear Cover Assembly, Engine Compartment	1	
18	PRFA00186	Nut, Self-locking, M6	12	
19	PRPW00368	Handle Assembly	2	
20	T160B1-20300	Centre Cover Assembly, Engine Compartment	1	
21	PRFA00063	Bolt, M10 x 25mm	4	
22	PRFA00012	Washer, Lock, M10	4	
23	PRFA00011	Washer, Flat, M10	4	
24	T160A1-20700	Bracket	1	
25	D90F1-20002	Bracket	2	
26	T160B1-20200	Front Cover Assembly, Engine Compartment	1	
27	PRPW02349	AVRO Cover Plate, D/S	1	
28	T160B1-20001	Mesh Screen	1	
29	PRFA00010	Washer, Lock, M8	4	
30	GB/T 70.2	Screw, Flat Round Hex Socket Head, M8 x 20 mm	4	
31	PRPW02350	AVRO Cover Plate, P/S	1	

**Cab Assembly - Exploded Parts View**

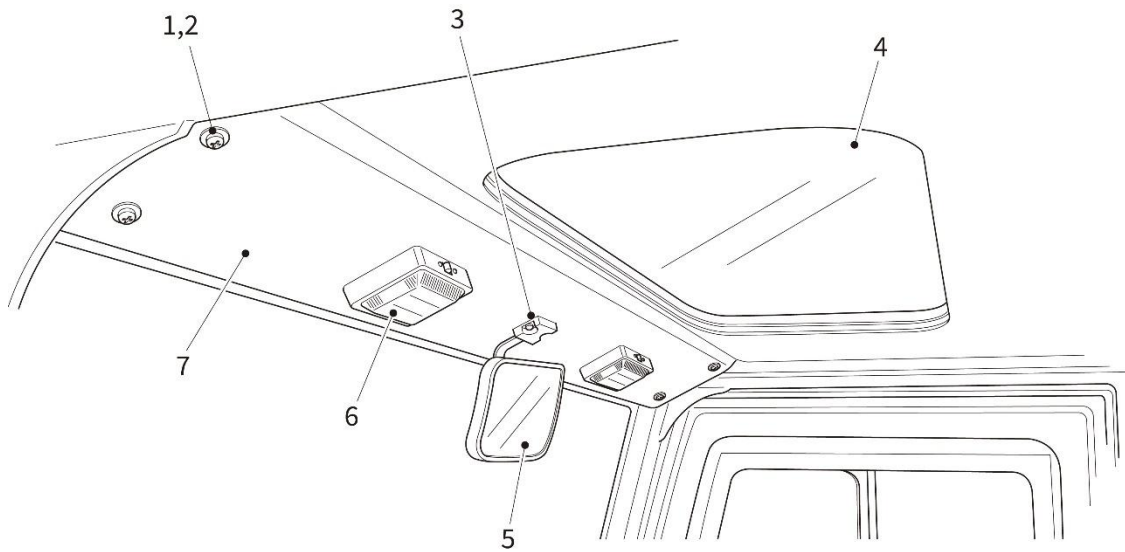
Cab Assembly – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	T160B1-41011-OLD	Front Windscreen	1	
2	TBA	Glass, Lower Door, Passenger Side, complete with seal	1	
3	T160B1-41040-OLD	Door Handle, Interior	2	
4	T160B1-41029-OLD	Passenger Side Door	1	
5	TBA	Sliding Glass Assembly, Passenger Side Door, complete with seal		
6	T160B1-41042-OLD	Door Seal, 10m length	1	Cut to required length
7	T160B1-41026-OLD	Exterior Rearview Mirror	2	
8	T160B1-41030-OLD	Rear Side Glass, Right-Hand Side, complete with seal	1	
9	T160B1-41027-OLD	Cab Interior Top, Sponge	1	
10	T160B1-41001-OLD	Cab Assembly, Welded	1	
11	T160B1-41021-OLD	Rear Roof Mounting Plate	1	
12	T160B1-41012-OLD	X45 Eyebolt, M12	4	
13	T160B1-41028-OLD	Cab Interior Rear, Sponge	1	
14	T160B1-41005-OLD	Rear Window	1	
15	TBA	Sliding Glass Assembly, Driver Side Door, complete with seal	1	
16	T160B1-41002-OLD	Rear Side Glass, Left-Hand Side, complete with seal	1	
17	T160B1-41041-OLD	Door Lock Assembly	2	Complete assembly
18	TBA	Glass, Lower Door, Driver Side, complete with seal	1	
19	T160B1-41024-OLD	Driver Side Door	1	
20	T160B1-41025-OLD	Door Hinge	4	
21	TBA	Cab Floor Mat, Drivers Side	1	
22	T160B1-41003-OLD	Mounting Plate, Parking Brake	1	
23	T160B1-41007-OLD	Cover Plate, Steering Column	1	
24	T160B1-41037-OLD	Sealing Plate, for CPU	1	
25	T160B1-41016-OLD	Pedal Seat Plate	1	
26	T160B1-41008-OLD	Sealing Plate under Dashboard	1	
27	T160B1-41009-OLD	Sealing Plate Assembly, Instrument, Right-Hand-A	1	
28	PRPW00142	Heater	1	

**Cab Assembly - Exploded Parts View**

Cab Assembly – Spare Parts List

Item	Part No.	Description	Qty	Remarks
29	T160B1-41039-OLD	Bracket Assembly, Steering Gear	1	
30	T160B1-41014-OLD	Air Outlet Strip, Outer Chamber	3	
31	T160B1-41015-OLD	Air Outlet Strip, Inner Chamber	3	
32	TBA	Cab Floor Mat, Passenger Side	1	
33	PRPW02262	Wiper Arm and Blade	2	
34	T160B1-41020-OLD	Wiper Motor & Linkage Assembly	2	
35	T160B1-41035-OLD	Wiper Motor Adapter Plate	2	
36	T160B1-41004-OLD	Plate	2	
37	T160B1-41043-OLD	Limit Strap	2	
38	T160B1-41033-OLD	Dash Assembly, Welded	1	
39	T160B1-41032-OLD	Sealing Plate, Wiper Tank Port	1	
40	T160B1-41013-OLD	Wiper Fluid Tank	1	
41	PRPW03359	Heater Vent	3	
Not shown	T60A1-40010	Anti-vibration Mounting	2	Front of Cab
Not shown	T60A1-40011	Anti-vibration Mounting	2	Rear of Cab
Not shown	PRFA00032	Bolt, M16 x 130 mm	4	
Not shown	PRFA00068	Washer, Flat, M16	4	
Not shown	Y30A1-30002	Gasket, Type B	4	
Not shown	GB/T 889.1	Nut, Self-locking, M16	4	

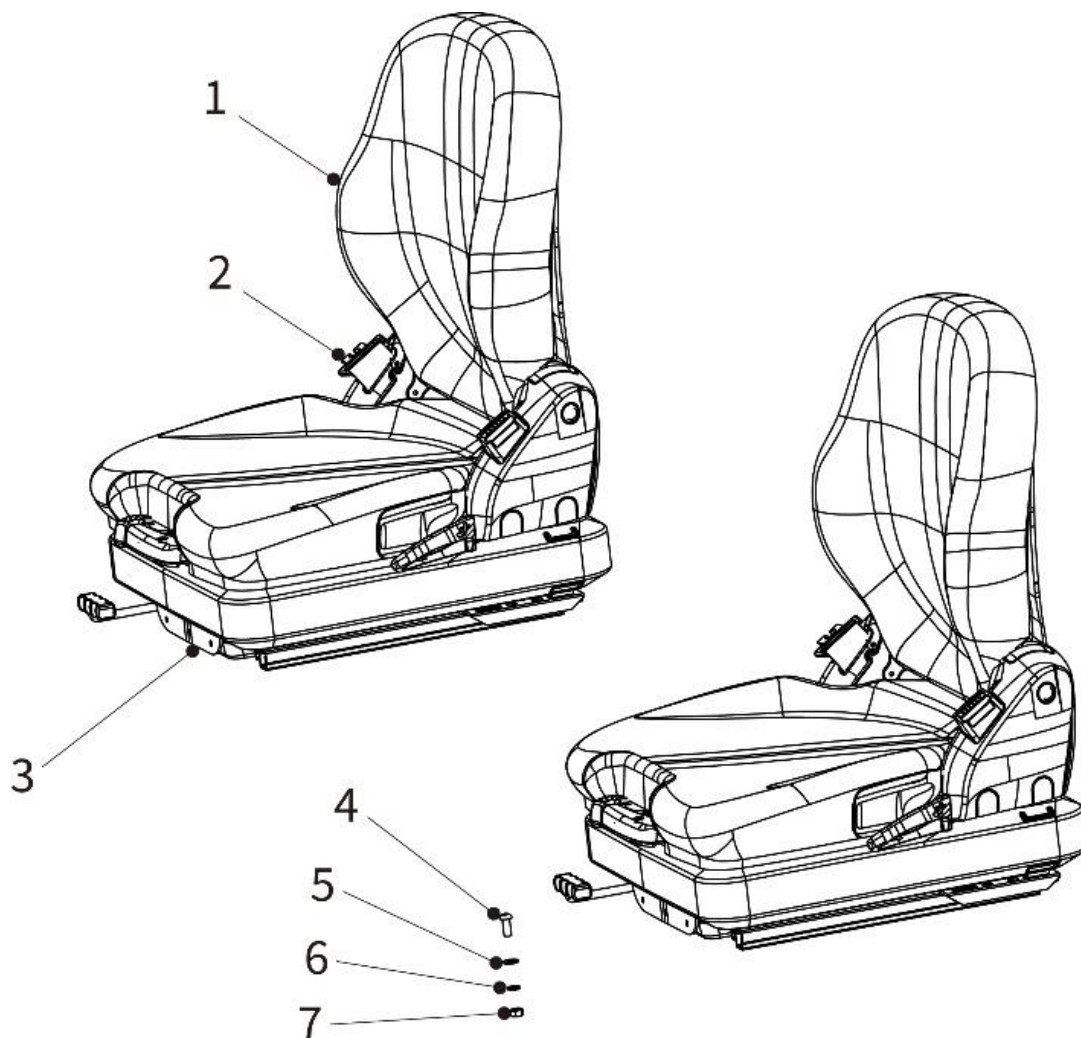


Cab roof interior - Exploded Parts View

Cab roof interior – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	TBA	Screw	4	
2	TBA	Washer	4	
3	T160B1-41031-OLD	Bracket, for Cab Mirror	1	
4	T160B1-41010-OLD	Window, Roof, complete with seal	1	
5	T160B1-41031-OLD	Mirror, Rear View, Complete with screws	1	
6	T160B1-41023-OLD	Roof Light Fitting, complete with bulb (bulb not available as a spare part)	2	
7	T160B1-41022-OLD	Front Roof Mounting Plate	1	

SEATS

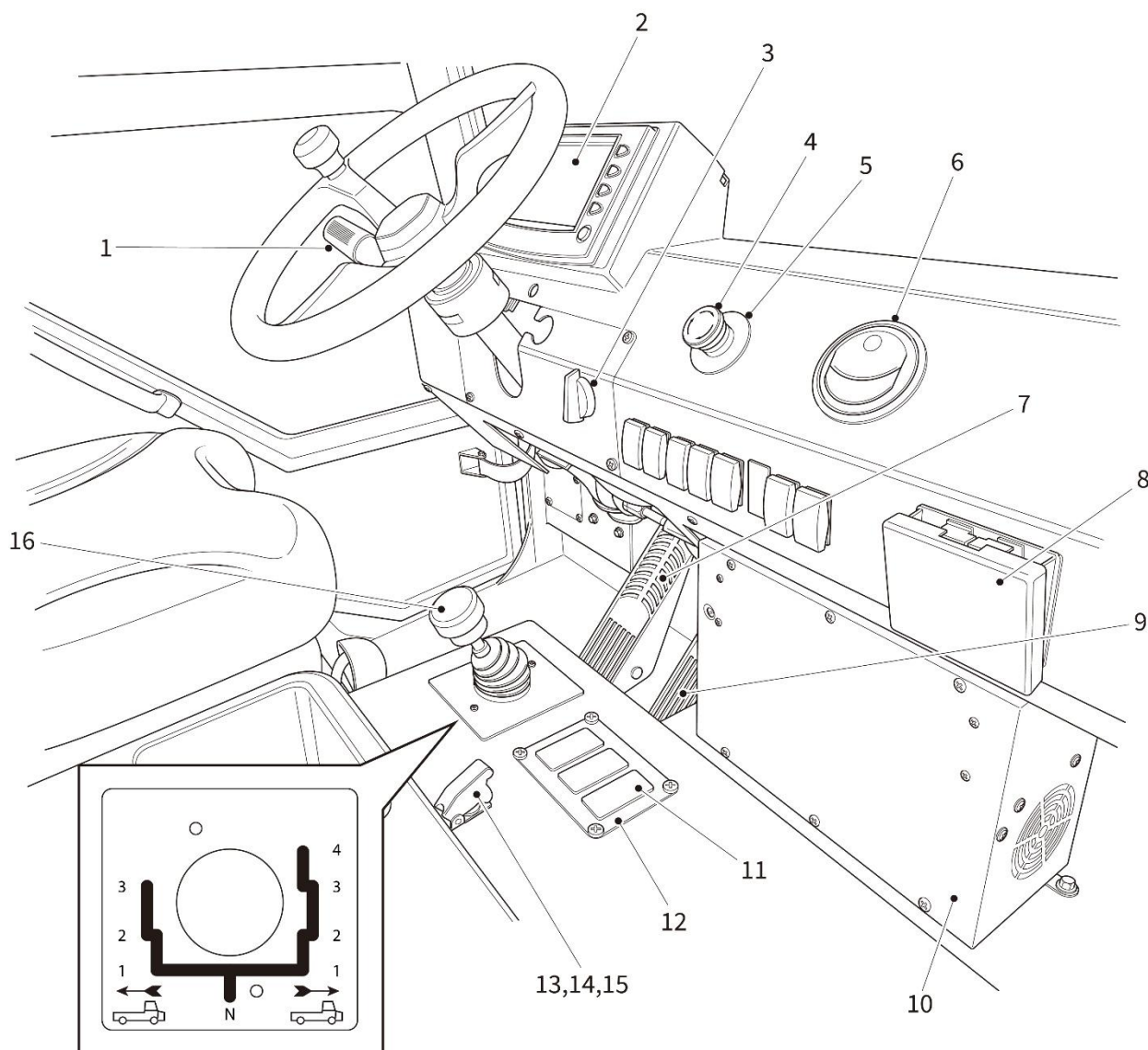


Seat Installation - Exploded Parts View

Seat Installation – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	PRPW00141	Seat c/w switch - PT2690D	2	
2	PRPW03272	Seat Belt c/w switch	2	
3	N/A	Seat Mounting	N/A	Part of Seat
4	PRFA00039	Screw, Flat Round Hex Socket Head, M8 x 20 mm	8	
5	PRFA00010	Washer, Lock, M8	8	
6	PRFA00009	Washer, Flat, M8	8	
7	PRFA00021	Nut, M8	8	

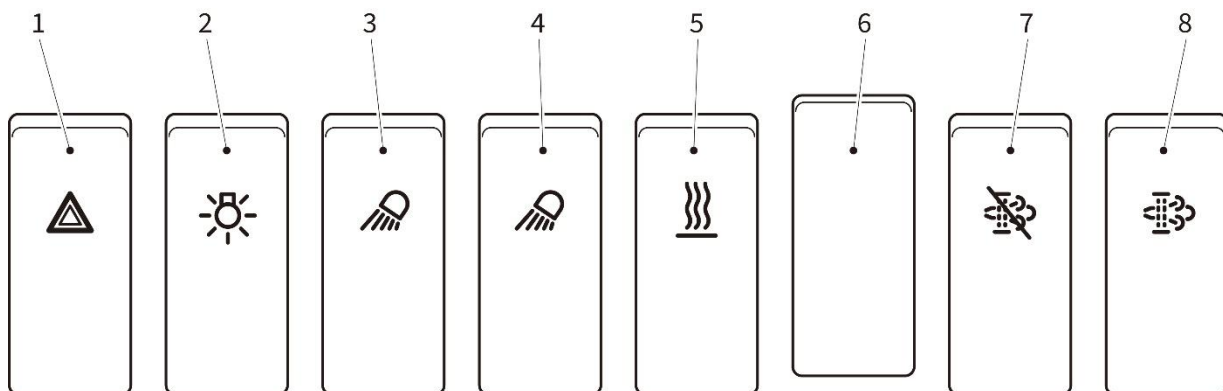
CONTROLS AND INSTRUMENTS



Controls and instruments - Exploded Parts View

Controls and instruments – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	PRPW02957	PT2690D Combination switch 2022 MY	1	
2	PRPW00551	Dash Display Instrument, PT2690D	1	
3	PRPW00051	Ignition Switch	1	
4	PRPW00682	EMERGENCY STOP switch	1	
5	PRPW00681	Label, Emergency Stop Switch	1	
6	PRPW03359	Heater Vent	3	
7	N/A	Brake Pedal (Part of the Foot Brake Support Assembly)	1	
8	T25C1-20012	Cup Holder	1	
9	PRPW00136	Accelerator Pedal	1	
10	PRPW00142	Cab heater w/6 outlets	1	
11	B80C2-60501	Blanking Cover	3	
12	T160B1-41037	Seal Plate for CPU	1	
13	T160A2-60140	Toggle Switch	1	
14	T160A2-60150	Protective Cover	1	
15	T160A2-60160	Protective Sheild	1	
16	PRPW02881	Transmission Shift	1	Complete assembly

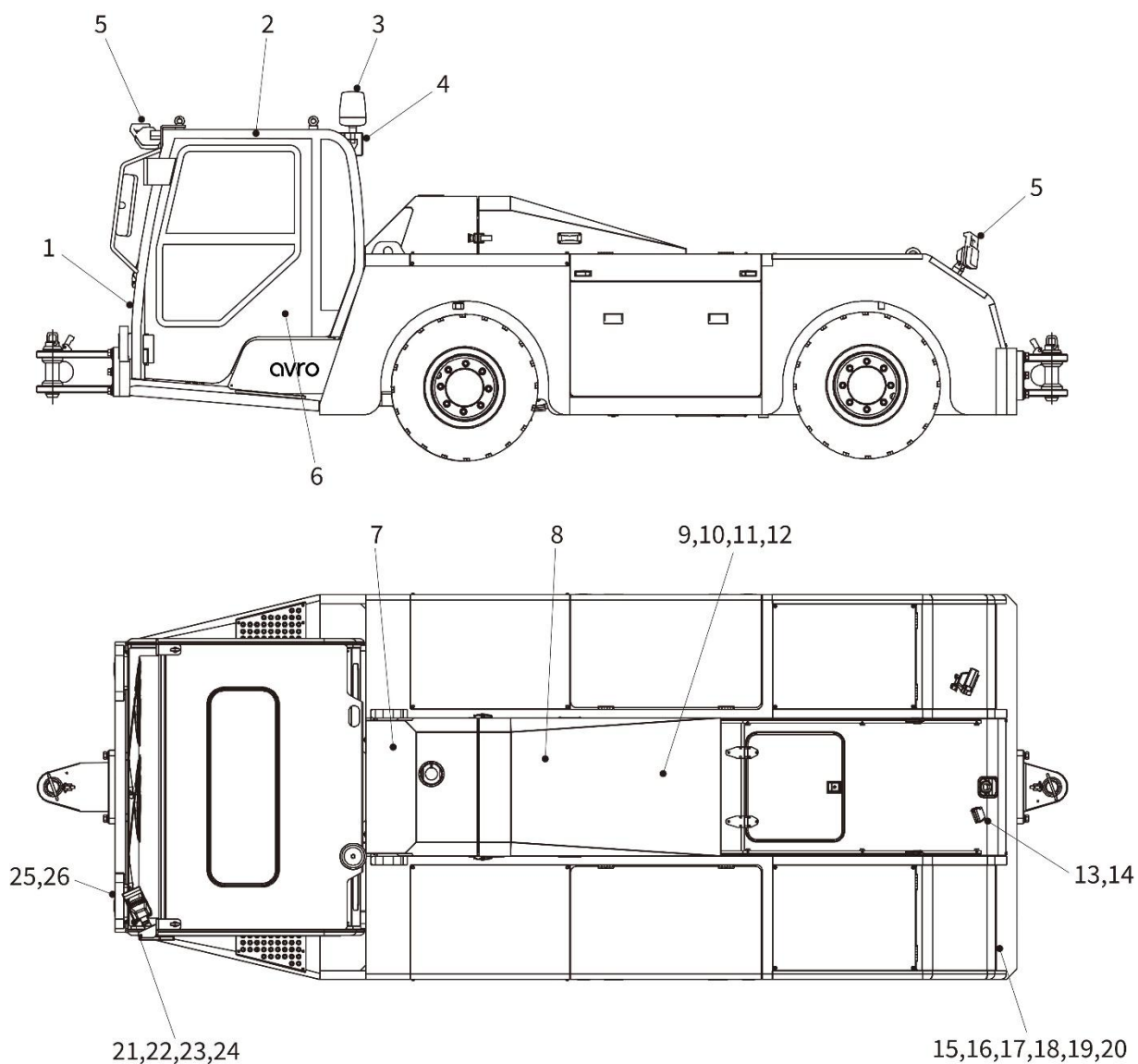


Cab switch panel - Exploded Parts View

Cab switch panel – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	T25C2-60600	Emergency Flasher Switch	1	
2	A250A2-60100	Light Switch	1	
3	T25C2-60400	Front Headlight Switch	1	
4	T25C2-60400	Rear Headlight Switch	1	
5	T25C2-60500	Heater Blower Switch	1	
6	B80C2-60501	Blank Cover	1	
7	A30TI2-60200	Stop Regeneration Switch	1	
8	A30DL2-60100	Initiate Regeneration Switch	1	

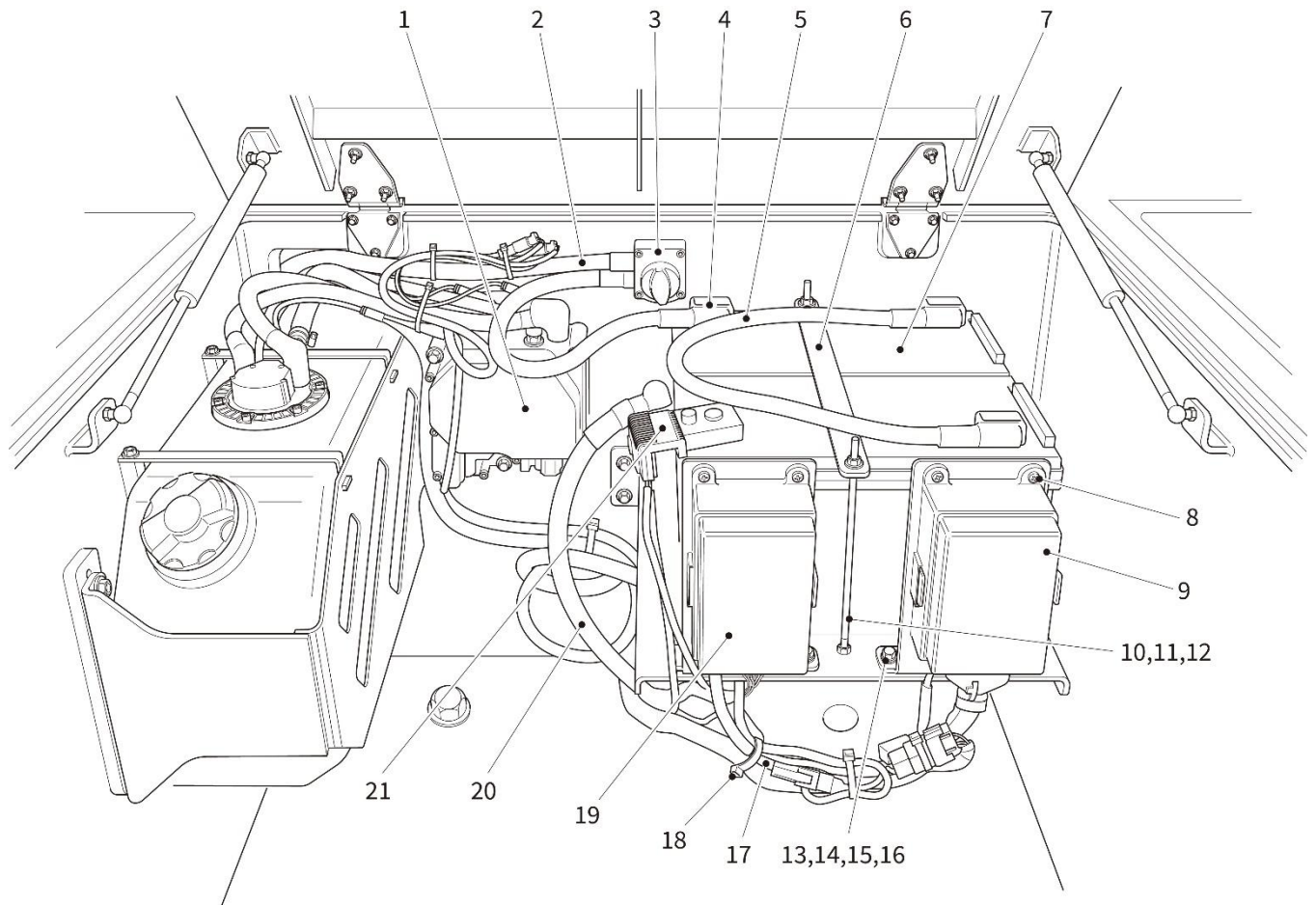
ELECTRICAL SYSTEM



Electrical system - Exploded Parts View

Electrical System – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	PRPW02958	PT2690D Chassis Wiring Harness 2022 MY (runs throughout the chassis)	1	
2	PRPW03097	PT2690D Cabin Harness	1	
3	A280A2-40500	Warning Beacon	1	
4	PRPW00055	Tail Light	2	
5	PRPW00436	Rear Work Light	2	
6	PRPW02959	Controller	1	
7	PRPW00539	Sensor, coolant level	1	Located on the Radiator
8	PRPW03098	PT2690D Engine After Treatment Harness	1	
9	PRPW00133	Starter/preheat relay	2	Located on the Transmission bracket
10	T160A2-80900	Cable (related to the Emergency Pump)	1	
11	T160B2-80400	Positive Line, Emergency Pump (Relay)	1	
12	T160B2-80410	Positive Line, Emergency Pump (Motor)	1	
13	PRPW00135	RVC - Rear camera	1	
14	T160A2-81110	Mounting Bracket, Reversing Camera	1	
15	PRPW03298	Rear Combination Light	2	
16	PRPW01092	Reversing Buzzer	1	
17	PRFA00001	Bolt, M6 x 20 mm	1	
18	PRFA00006	Washer, Flat, M6	2	
19	PRFA00007	Washer, Lock, M6	1	
20	PRFA00025	Nut, M6	1	
21	T160B2-50100	Horn, Electric, 24 VDC	2	
22	PRFA00033	Bolt, M8 x 20 mm	2	
23	PRFA00009	Washer, Flat, M8	2	
24	PRFA00010	Washer, Lock, M8	4	
25	T160B2-40100	Headlamp	2	
26	PRPW00111	Front Indicator Combination Light	2	

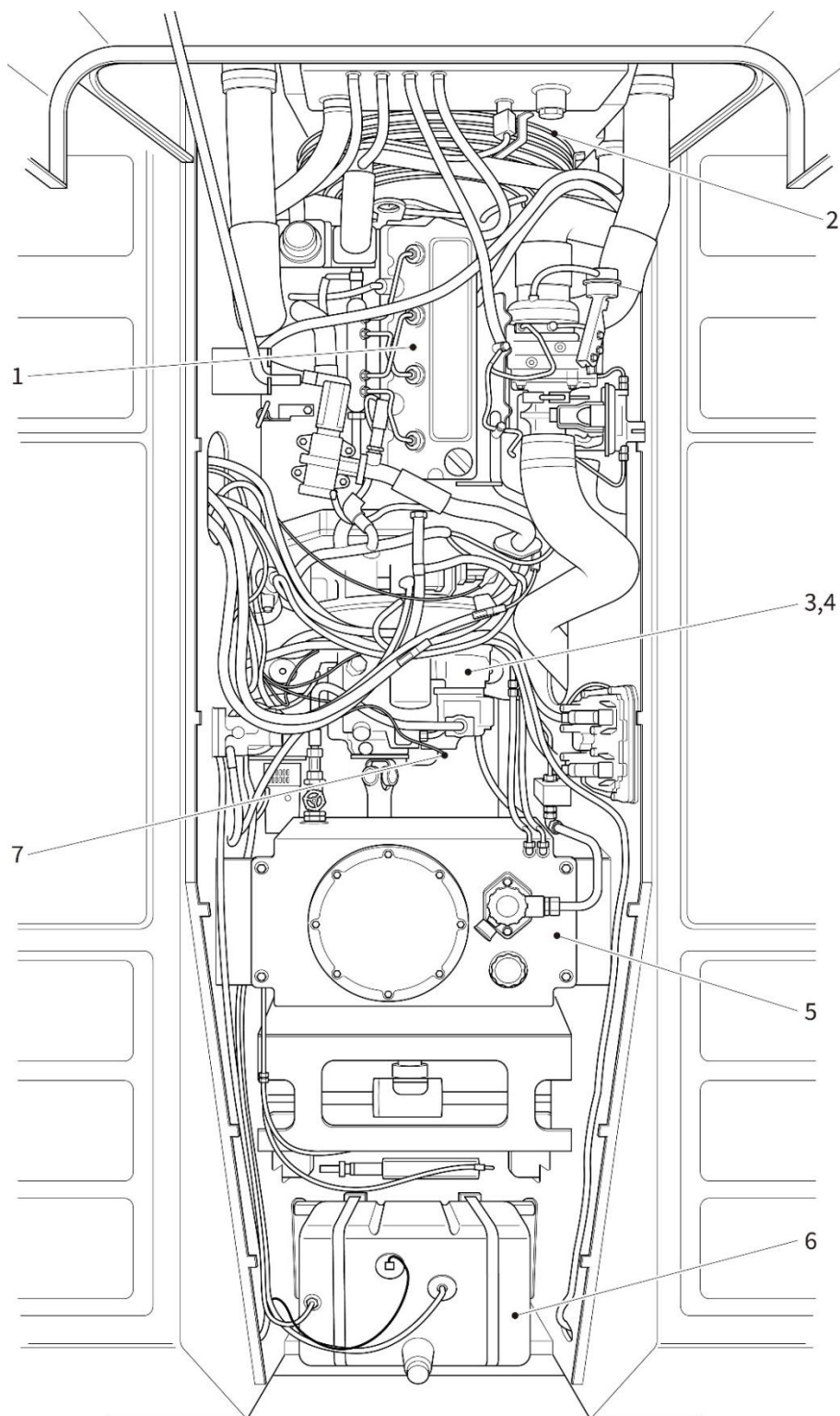


Battery compartment - Exploded Parts View

Battery compartment – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	PRPW03098	Engine Aftertreatment Harness	1	Part of engine. Cummins P/N A052B705
2	T160B2-80530	Cable, Battery Negative to Chassis	1	
3	PRPW00118	Main battery disconnect switch	1	
4	T160B2-80500	Battery Cable, Negative	1	
5	A280A2-80600	Battery Power Connection Cable	1	
6	T160A1-11305	Battery Securing Bar	1	
7	PRPW02858	Battery	2	
8	PRFA00287	Screw, Cross Recessed Pan Head, M6 x 12 mm	8	
9	PRPW00117	Center Control Box B	1	
10	T160A1-11304	Threaded Rod, Battery Retaining	2	
11	PRFA00241	Nut, Special, M8	8	
12	PRFA00009	Washer, Flat, M8	2	
13	PRFA00253	Bolt, M8 x 30 mm	4	
14	PRFA00010	Washer, Lock, M8	4	
15	PRFA00009	Washer, Flat, M8	4	
16	PRFA00021	Nut, M8	4	
17	PRPW02333	Fuse Wire, 60A, PT2690D	1	
18	Not applicable	Cable tie (purchase locally, 30 mm minimum diameter when tightened)	20	
19	PRPW02326	Center Control Box A	1	
20	T160B2-80520	Battery Cable, Positive	1	
21	PRPW00116	Battery Connector with Fusible Links	1	
Not shown	N/A	ATM Mini-Fuse, 5 Amp (located inside Center Control Box A)	1	Purchase locally
Not shown	N/A	ATM Mini-Fuse, 10 Amp (located inside Center Control Box A)	7	Purchase locally
Not shown	N/A	ATM Mini-Fuse, 15 Amp (located inside Center Control Box A)	1	Purchase locally
Not shown	N/A	ATM Mini-Fuse, 30 Amp (located inside Center Control Box A)	1	Purchase locally

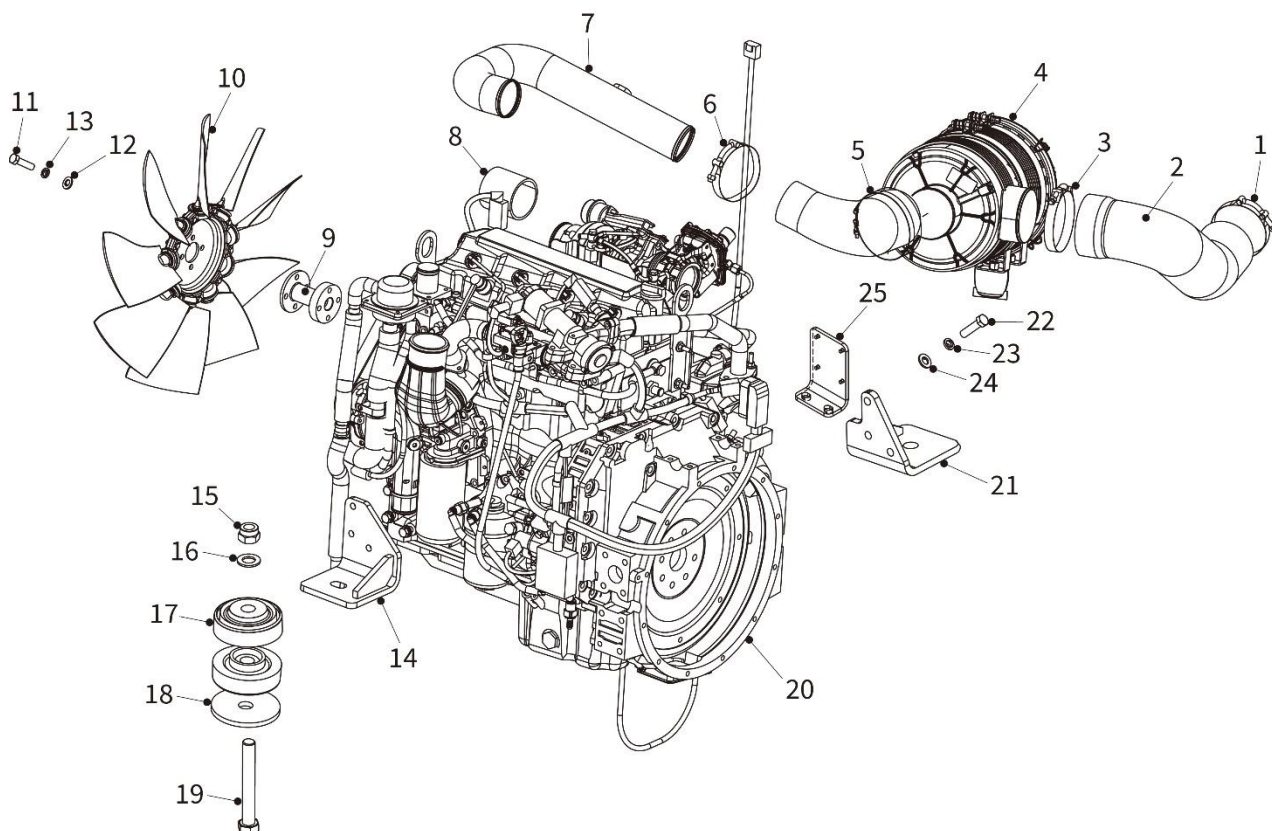
ENGINE MOUNTING



Engine Compartment- Exploded Parts View

Engine compartment – Spare Parts List

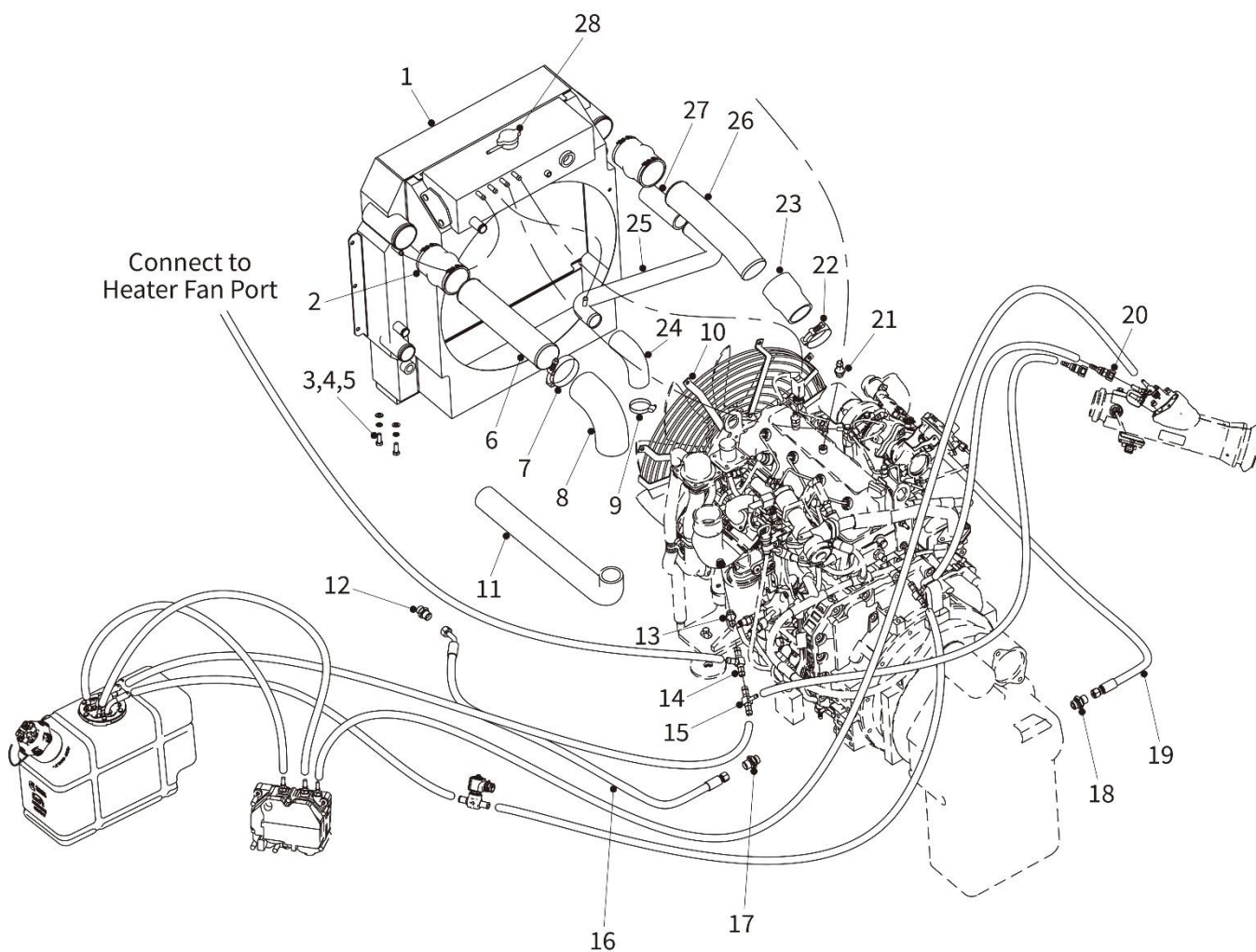
Item	Part No.	Description	Qty	Remarks
1	T160B5-10100	Engine, Type QSF3.8-C120T4 (refer to Cummins Operation and Maintenance Manual QSF3.8 CM2350 F107)	1	
2	N/A	Cooling System	N/A	Refer to page TBD
3	N/A	Transmission (refer to Dana Spicer T12000 Powershift Transmission _3_4_6_ID Maintenance & Service Manual)	1	
4	T160A2-50200	Transmission Oil Temperature Sensor	1	On Transmission
5	N/A	Hydraulic Oil Tank		Refer to page TBD
6	PRPW03313	Fuel Tank	1	Refer to page TBD
7	PRPW00138	Speed Sensor	1	On Transmission

**Engine Mounting - Exploded Parts View**

Engine Mounting – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	PRPW00877	Clamp, Hose, dia. 116 to 106 mm	1	
2	T160B5-10005	Hose, Air Filter Intake	1	
3	JB/T 8870	Clamp, Hose, dia. 122 to 114 mm	2	
4	PRPW00580	Air Filter	1	
5	T160B5-10004	Pipe, Air Filter Outlet	1	
6	JB/T 8870	Clamp, Hose, dia. 87 to 82 mm	3	
7	T160B5-10002	Hose, Air Intake	1	
8	T160B5-10003	Hose, Air Intake	1	
9	T160B5-10001	Fan Mount	1	
10	T160B5-10200	Cooling Fan	1	
11	PRFA00008	Bolt, M10 x 30 mm	8	
12	PRFA00011	Washer, Flat, M10	8	
13	PRFA00012	Washer, Lock, M10	8	
14	A90P5-10200	Engine Mount, Left-Hand	1	
15	GB/T 889.1	Nut, Self-locking, M20	2	
16	PRFA00006	Washer, Flat, M20	2	
17	A50N5-10100	Mounting, Rubber, Shock/Vibration Absorbing	4	
18	A50N5-10101	Plate, Shock Absorber	2	
19	PRFA00008	Bolt, Hex Head, M20 x 150 mm	2	
20	T160B5-10100	Engine, Type QSF3.8-C120T4	1	
21	A90P5-10100	Engine Mount, Right-Hand	1	
22	PRFA00057	Bolt, M12 x 45 mm	6	
23	PRFA00034	Washer, Lock, M12	6	
24	PRFA00030	Washer, Flat, M12	6	
25	A50V5-10003	Bracket, relay	1	

COOLING SYSTEM



Cooling System - Exploded Parts View

Cooling System – Spare Parts List

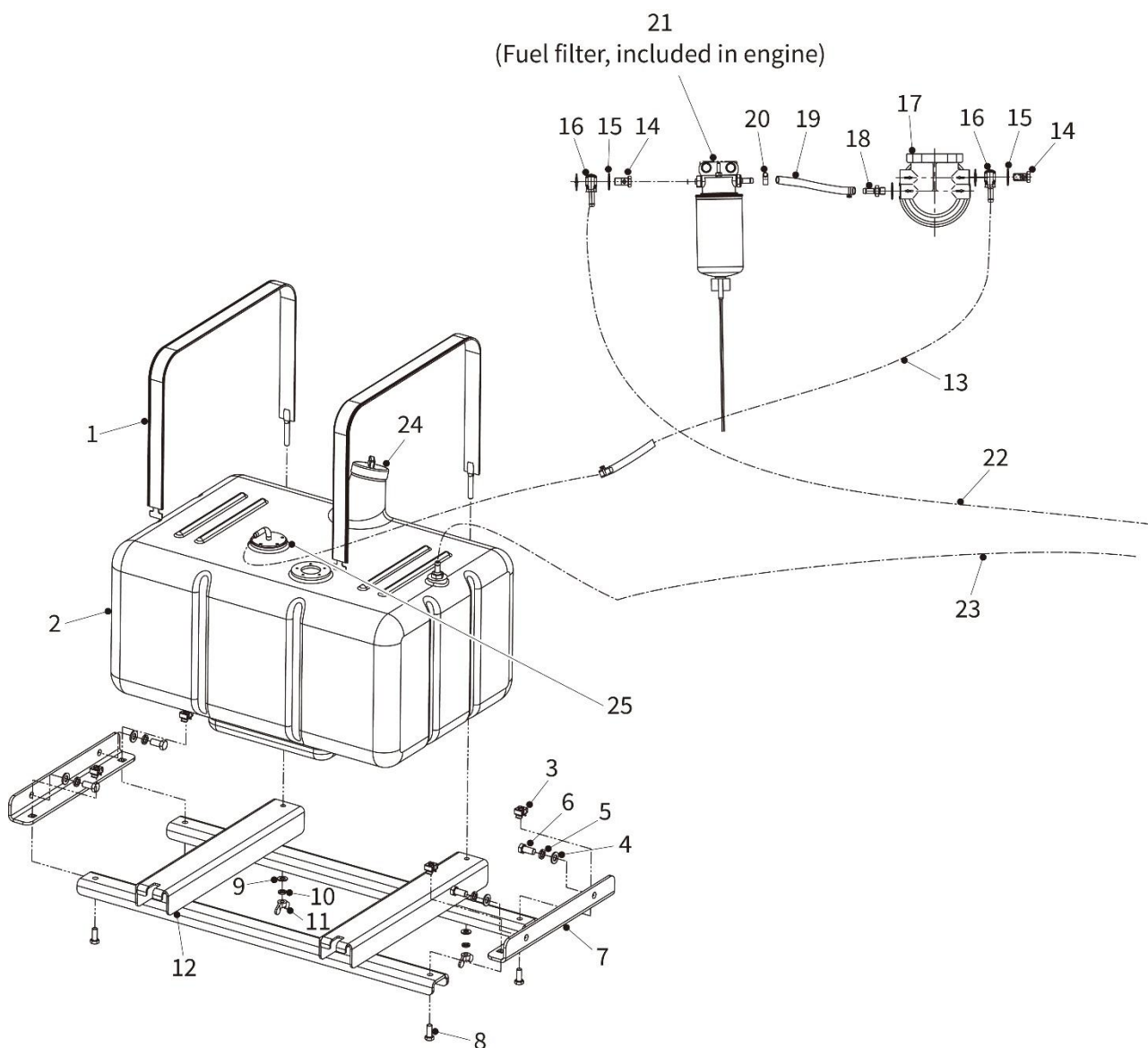
Item	Part No.	Description	Qty	Remarks
1	T160B5-40100	Radiator	1	
2	PRPW00124	Intercooler Pipe	2	
3	PRFA00011	Washer, Flat, M10	8	
4	PRFA00012	Washer, Lock, M10	8	
5	PRFA00063	Bolt, M10 x 25 mm	2	
6	PRPW00125	Intercooler out-take pipe	1	
7	PRPW00128	Radiator hose clamp, 87 x 82 mm	7	
8	T160B5-40006	Intercooler Connector Pipe - Engine Air Intake	1	
9	PRPW00126	Clamp, Hose, 64 x 44 mm	6	
10	A50A5-40210	Retainer	1	
11	PRPW00129	Radiator cress-pipe	1	
12	GJT-679-00	Connector, Hydraulic, Straight	1	
13	PRPW00718	Tee Fitting	1	
14	GJT-678-00	Connector, Hydraulic, Tee-Joint	2	
15	TGFDY-16XXX	Hose, 16mm dia., cut to length	1	
16	GJT-1CM-26-22WD	Hydraulic Stud Adapter, Straight Joint, Metric to Metric with captive seal, metric threads M26 x 1.5 mm to M22 x 1.5mm, hose o.d. 18 mm	2	
17	TGFDY-16XXX	Hose, 16mm dia., cut to length	1	
18	A047Y471	DEF Suction Pipe	1	
19	A051A909	DEF Suction Pipe	1	
20	A051Y806	DEF Tank	1	
21	A052B705	DEF SM		
22	TGFDY-16XXX	Hose, 16mm dia., cut to length	1	
23	A047S305	Coolant Valve, Electrical, 24V	1	
24	TGVFI-06050-H23.5*J	Hose, Cooling System, High Pressure, 16 x 1500 mm	1	
25	GJT-1CO-26-12	Straight Joint, Metric to SAE with captive seal, metric thread M26 x 1.5 mm, SAE thread 1 1/16 in. x 12, tube o.d. 22 mm	1	
26	TGFDY-16XXX	Hose, 16mm dia., cut to length	1	
27	GJT-1CO-26-10	Straight Joint, Metric to SAE with captive seal, metric thread M26 x 1.5 mm, SAE thread 7/8 in. x 14, tube o.d. 18 mm	1	



Cooling System – Spare Parts List

Item	Part No.	Description	Qty	Remarks
28	PRPW00130	Hose, Cooling System, High Pressure, 16 x 1800 mm	1	
29	TGFDY-10XXX	Hose, 10mm dia., cut to length	1	
30	A50V5-30002	Connector, Quick Release	2	
31	A052M495	DEF Pressure Pipe	1	
32	TGFDY-10XXX	Hose, 10mm dia., cut to length	1	
33	GJT-621-00	Connector, Hydraulic, Tee-Joint	1	
34	PRPW00120	Clamp, Hose, with Spring, 75 x 67 mm	1	
35	PRPW00121	Inter-cooling pipe	1	
36	PRPW00127	Suction line pipe	1	
37	T160B5-40001	Pipe, Suction Line	1	
38	PRPW00122	Intercooler intake pipe	1	
39	PRPW00123	Connecting Hose	1	
40	PRPW03228	Radiator Cap	1	Inc. with Radiator
41	TGFDY-16XXX	Hose, 16mm dia., cut to length	1	

FUEL SYSTEM

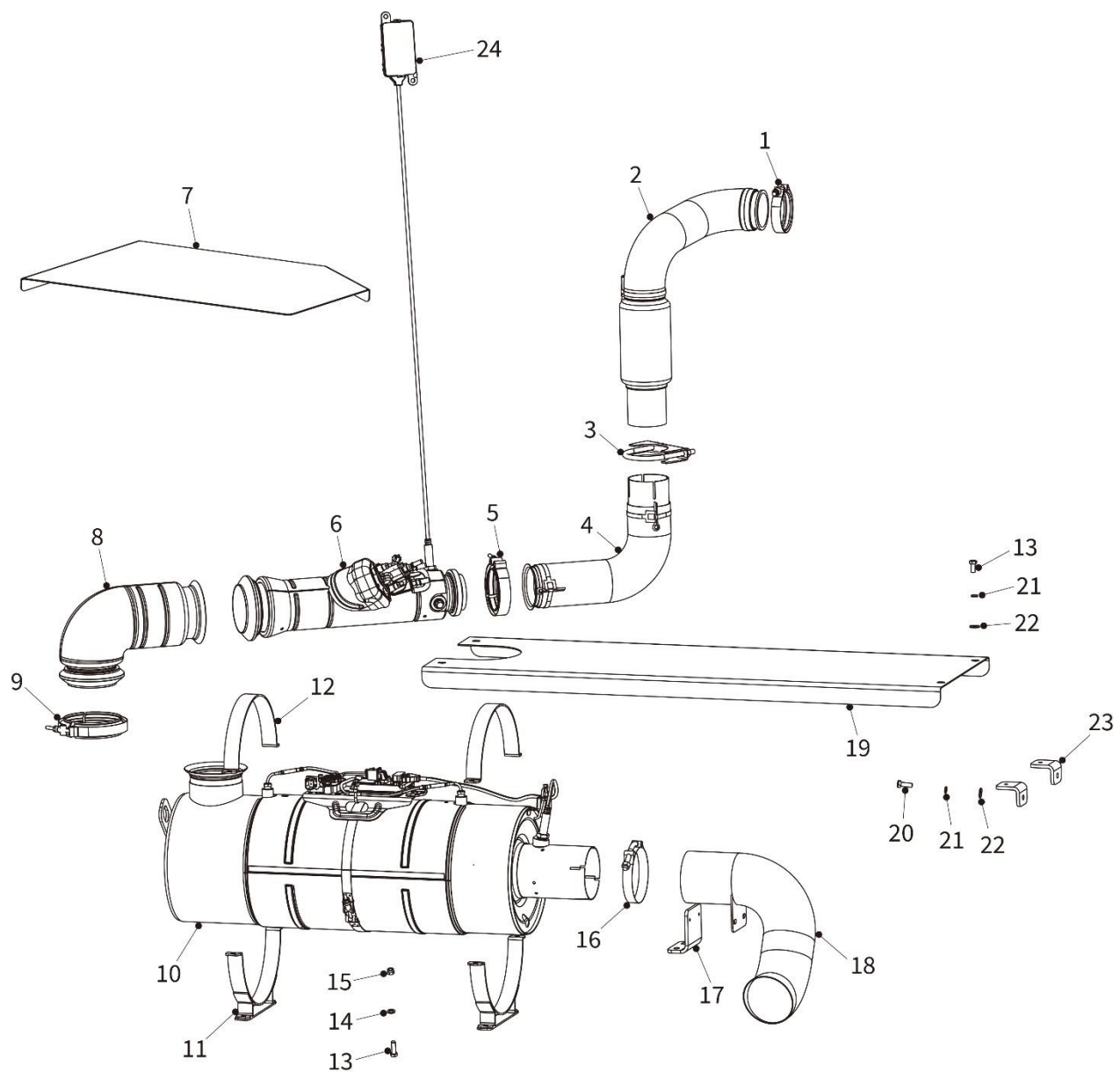


Fuel System - Exploded Parts View

Fuel System – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	T160B5-30300	Strap, Fixing	2	
2	PRPW03313	Fuel Tank	1	
3	PRFA00087	Nut, Special, M10	4	
4	PRFA00030	Washer, Flat, M12	4	
5	PRFA00034	Washer, Lock, M12	4	
6	PRFA00258	Bolt, M12 x 25 mm	4	
7	T160A5-50003	Support Bracket	2	
8	PRFA00063	Bolt, M10 x 25 mm	4	
9	PRFA00011	Washer, Flat, M10	2	
10	PRFA00012	Washer, Lock, M10	2	
11	GB/T 62	Wing Nut, M10 x 1.5 mm thread	2	
12	T160B5-30200	Fuel Tank Bracket	1	
13	TG000-10180	Fuel Hose, Rubber, $\phi 10 \times 1800$ mm	1	
14	A90F5-30004	Bolt, Special, M14	2	
15	PRPW02909	Gasket, M14	5	
16	A45U5-30003	Connector, 90 deg, Fuel Line	2	
17	A90F5-30100	Oil-Water Separator	1	
18	PRPW02908	Connector, Hydraulic, Straight	2	
19	PRPW01992	Vacuum Hose, dia.10 mm, length 400 mm	1	
20	PRPW00878	Clamp, Hose, 20 x 12 mm	8	
21	3398231	Fuel Filter	1	Cummins Part No.
22	TG000-10080	Fuel Hose, Rubber, $\phi 10 \times 800$ mm	1	
23	TG000-10250	Fuel Hose, Rubber, $\phi 10 \times 2500$ mm	1	
24	PRPW00119	Fuel Cap	1	
25	PRPW03275	Fuel Tank Level Sensor	1	

EXHAUST SYSTEM

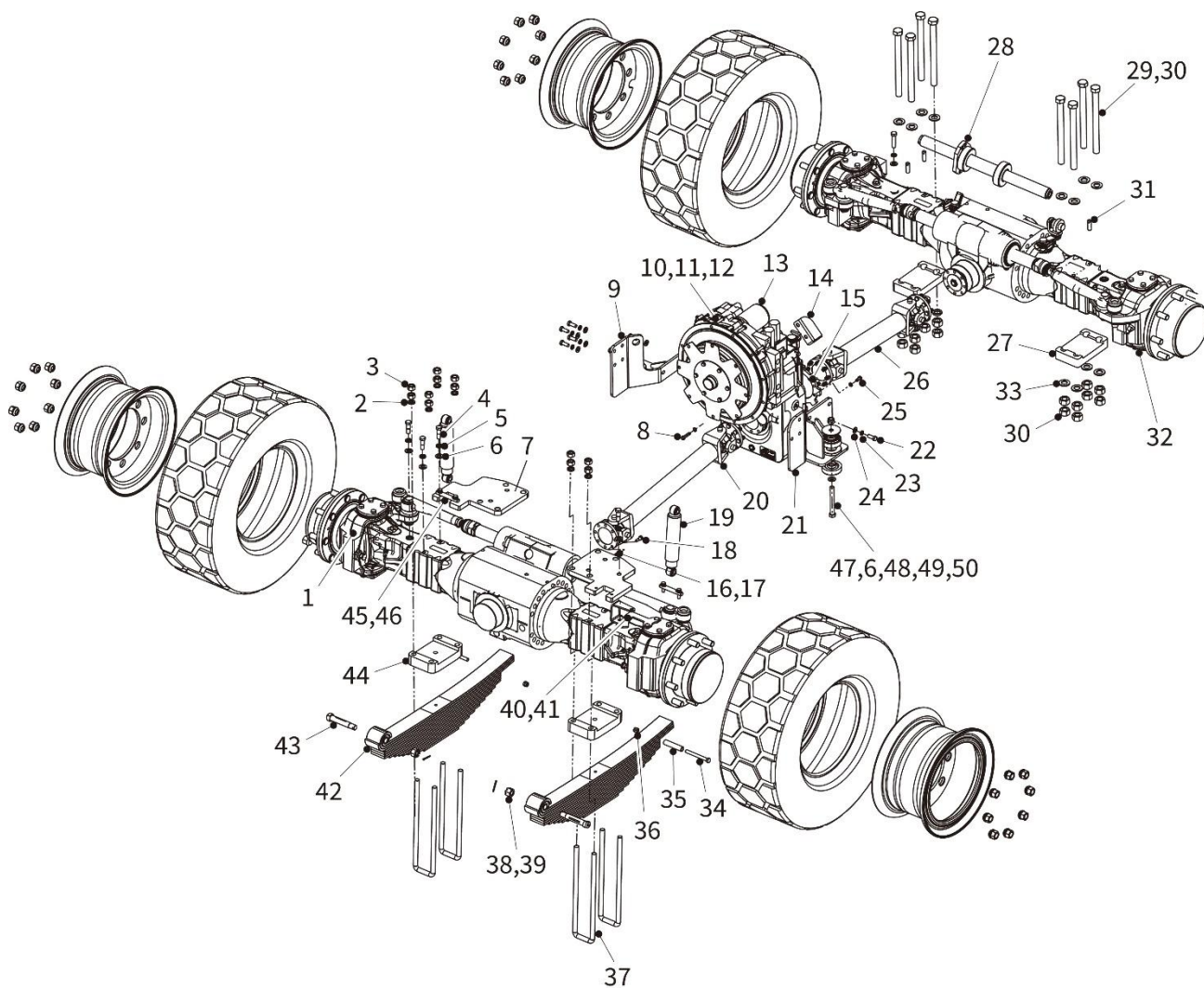


Exhaust System - Exploded Parts View

Exhaust System – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	A120A5-20001	Clamp, Hose	1	
2	PRPW03308	Exhaust Down Pipe	1	
3	A120A5-20500	Clamp, Hose	1	
4	T160B5-20200	Exhaust Pipe	1	
5	A50S5-20001	Clamp, Hose	1	
6	A50S5-20300	Injection Pipe	1	
7	T160B5-20005	Heatshield	1	
8	A50S5-20002	Exhaust Pipe, Elbow	1	
9	A50S5-20008	Clamp, Hose	2	
10	T160B5-20300	Exhaust Aftertreatment Unit	1	
11	A50S5-20004	Support Pedestal, Catalytic Converter	2	
12	T160B5-20006	Securing Strap	2	
13	PRFA00013	Bolt, M8 x 25 mm	8	
14	PRPW00009	Washer, Flat, M8	2	
15	PRFA00186	Nut, Self-locking, M8	2	
16	JB/T 8870	Clamp, Hose, 109 x 102 mm	1	
17	T160B5-20003	Bracket, Exhaust Pipe	1	
18	T160B5-20002	Exhaust Pipe	1	
19	T160B5-20001	Cover, Protective	1	
20	PRFA00253	Bolt, M8 x 30 mm	6	
21	PRPW00010	Washer, Lock, M8	12	
22	PRFA00009	Washer, Flat, M8	12	
23	T160B5-20004	Support Bracket, 90 deg	4	
24	PRPW02709	Sensor, Core - NOX	1	

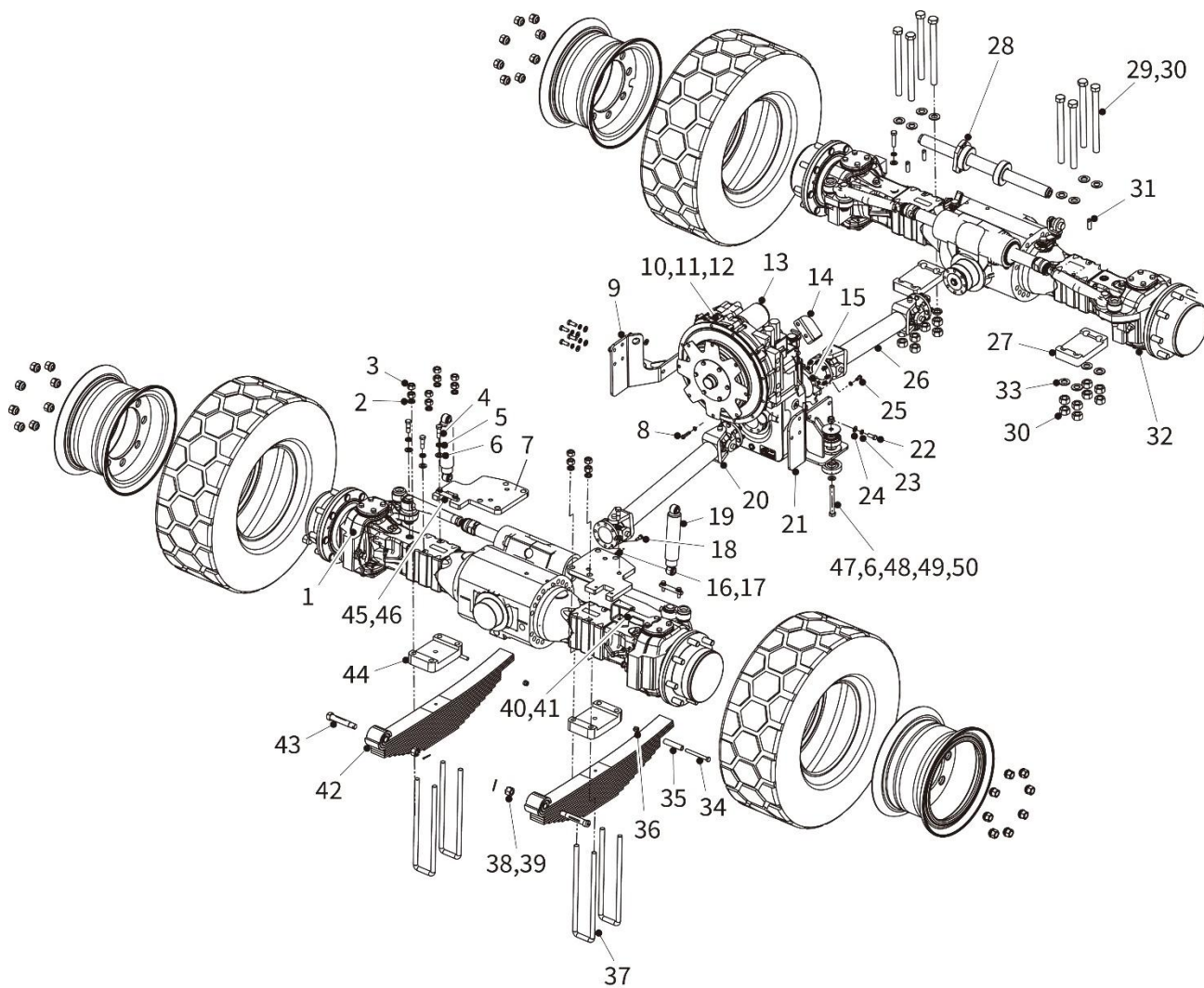
DRIVETRAIN



Drivetrain - Exploded Parts View

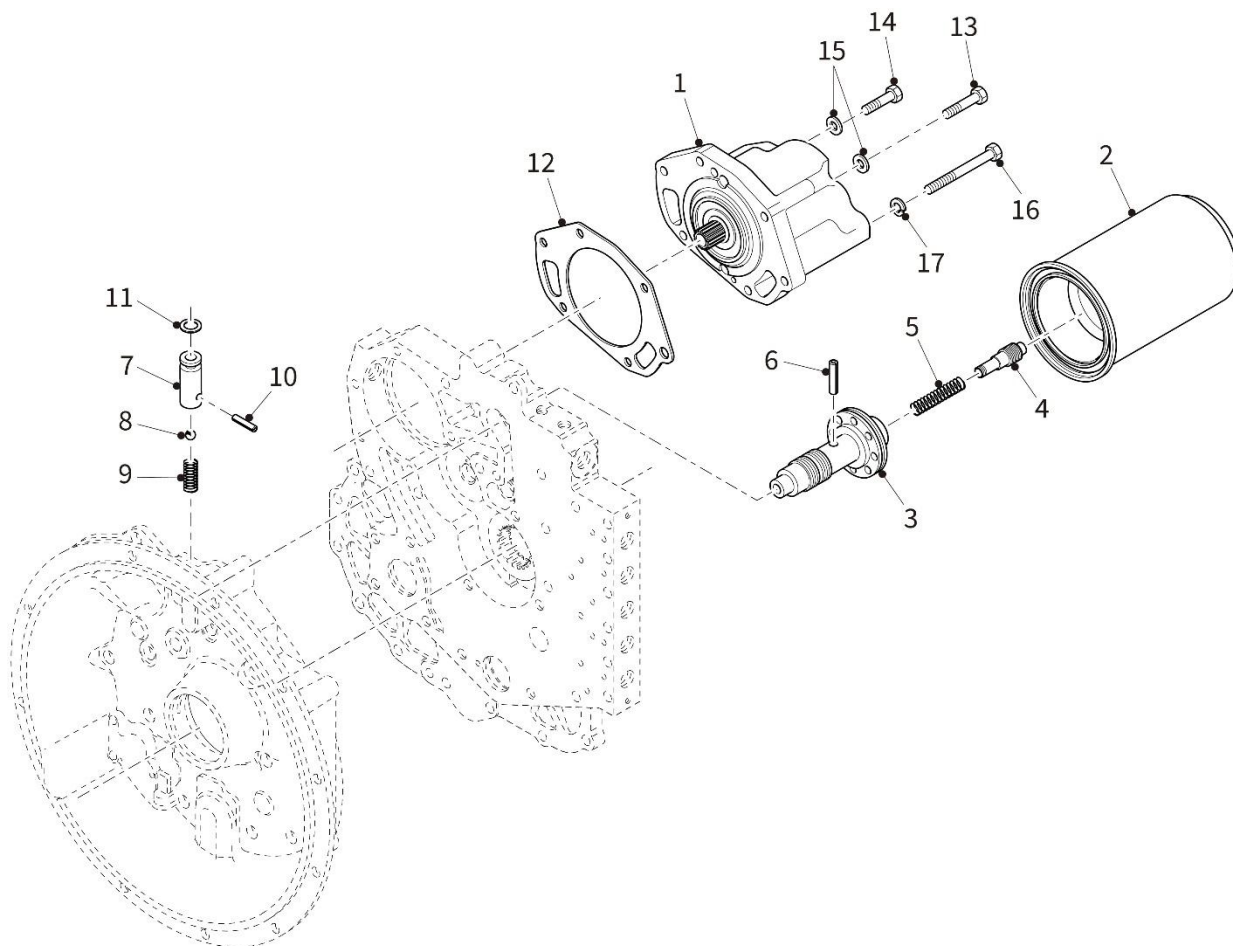
Drivetrain – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	T160A5-00200	Front Drive Axle	1	
2	PRFA00111	Washer, Lock, M18	8	
3	GB/T 6170	Nut, M18	16	
4	T160A5-00007	Bolt, Special, M16	6	
5	PRFA00069	Washer, Lock, M16	6	
6	PRFA00068	Washer, Flat, M16	8	
7	T160B5-00001	Press Plate, Leaf Spring	2	
8	ANSIB 1.1	Bolt, 3/8 – 24 UNF x 1-3/4	8	
9	T160B5-00200	Bracket, Drive	1	
10	PRFA00011	Washer, Flat, M10	15	
11	PRFA00012	Washer, Lock, M10	16	
12	PRFA00049	Bolt, M10 x 40mm	4	
13	T160A5-00400	Transmission, Powershift, Type T12000	1	
14	T160A5-00018	Support	1	
15	T160A5-00017	Gear Plate	1	
16	PRFA00186	Nut, Self-locking, M8	32	
17	PRFA00009	Washer, Flat, M8	32	
18	PRFA00208	Bolt, Special	32	
19	T160A5-00200	Shock Absorber	2	
20	PRPW00339	Drive Shaft - Front	1	
21	T160B5-00100	Bracket, Transmission	1	
22	PRFA00183	Bolt, M12 x 30 mm	12	
23	PRFA00030	Washer, Flat, M12	12	
24	PRFA00034	Washer, Lock, M12	12	
25	ANSIB 1.1	Bolt, 3/8 – 24 UNF x 25mm	4	
26	T160B5-00400	Drive Shaft	1	
27	T160B5-00500	Plate	2	
28	T106A5-00310	Fixing Rod, Rear Steering Axle	1	
29	GB/T 5782	Bolt, M24 x 300 mm, threaded length 120 mm	8	
30	PRFA00178	Washer, Flat, M24	16	

**Drivetrain - Exploded Parts View**

Drivetrain – Spare Parts List

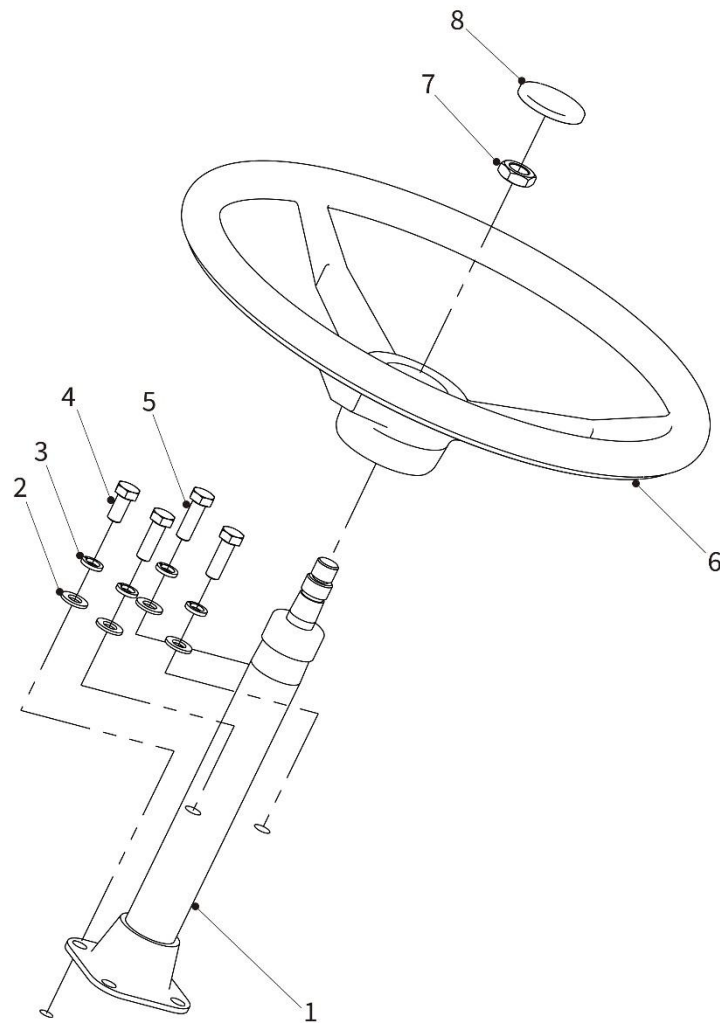
Item	Part No.	Description	Qty	Remarks
31	T160A5-00009	Screw, Special	4	
32	T160A5-00300	Rear Drive Axle	1	
33	GB/T 6170	Nut, M24	16	
34	PRFA00346	Bolt, M12 x 110 mm, threaded length 30 mm	2	
35	PRPW03340	Bushing	2	
36	PRFA00297	Nut, Self-locking, M12	2	
37	PRFA00207	U-bolt	4	
38	PRFA00347	Nut Slotted Castle M20	2	
39	PRFA00105	Pin, Split Cotter, 4.0 x 36 mm	2	
40	T160B5-00002	Gasket	2	
41	T160B5-00003	Support Plate	2	
42	PRFA00231	Leaf Spring	2	
43	PRPW03339	Pin, Leaf Spring	2	
44	T160A5-00004	Plate, Leaf Spring	2	
45	PRFA00026	Bolt, M10 x 35 mm	8	
46	T160A5-00016	Pin	4	
47	GB/T 5783	Bolt, M6 x 130 mm	2	
48	A50N5-00200	Shock/Vibration Absorber, Rubber	4	
49	Y30A1-30002	B Washer, Special, M16	2	
50	GB/T 889.1	Nut, Self-locking, M16	2	

**Pump - Exploded Parts View**

Pump – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	T160A5-00496	Charging Pump Assembly	1	
2	PRPW02229	Hydraulic Oil Filter, Dana Spicer gearbox	1	
3	T160A5-00498	Sleeve, Regulator Valve	1	
4	T160A5-00499	Piston, Regulator Valve	1	
5	T160A5-00400-1	Spring, regulator Valve	1	
6	T160A5-00400-2	Pin	1	
7	T160A5-00400-3	Body, Check valve	1	Includes items 8 thru 11
8	N/A	Ball, Check valve	1	Part of item 7
9	N/A	Spring, Check Valve	1	Part of item 7
10	N/A	Pin, Straight, Check Valve	1	Part of item 7
11	N/A	O-ring, Check Valve	1	Part of item 7
12	T160A5-00400-8	Gasket, Charging Pump	1	
13	T160A5-00400-9	Screw, Pump, Mounting	4	
14	T160A5-00400-10	Screw, Pump, Mounting	1	
15	T160A5-00400-11	Washer, Lock, Pump Mounting Screw	5	
16	T160A5-00400-12	Screw, Pump, Mounting	1	
17	T160A5-00400-13	Washer, Lock, Pump Mounting Screw	1	

STEERING SYSTEM

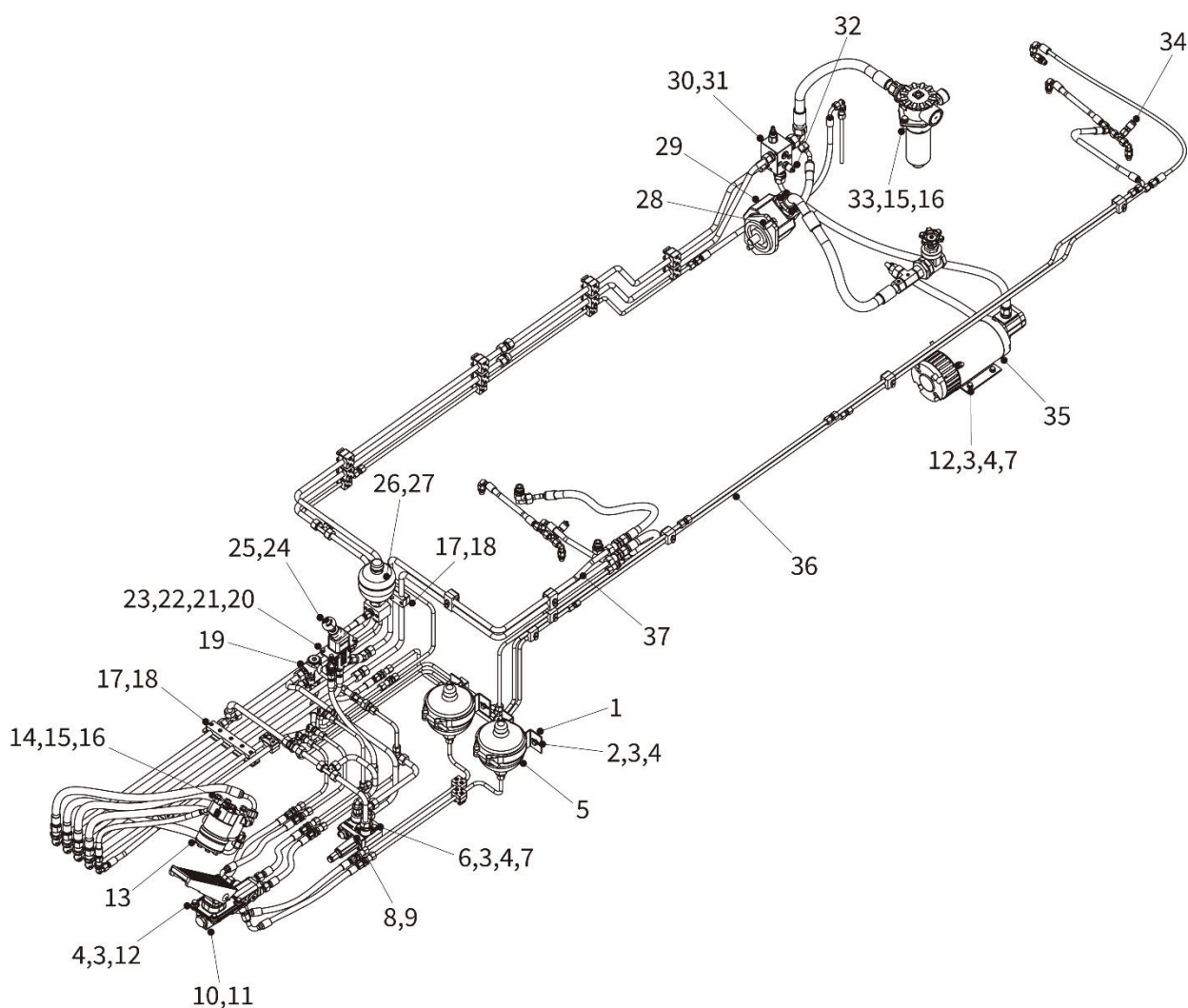


Steering Column - Exploded Parts View

Steering Column – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	T160A6-00100	Steering Column	1	
2	PRFA00011	Washer, Flat, M10	4	
3	PRFA00012	Washer, Lock, M10	4	
4	PRFA00189	Bolt, M10 x 20 mm	1	
5	PRFA00008	Bolt, M10 x 30 mm	3	
6	T160A6-00001	Steering Wheel	1	
7	GB/T 6173	Nut, M16 x 1.5 mm		
8	T160A6-00002	Cover Cap, Steering Wheel	1	Included with Steering Wheel

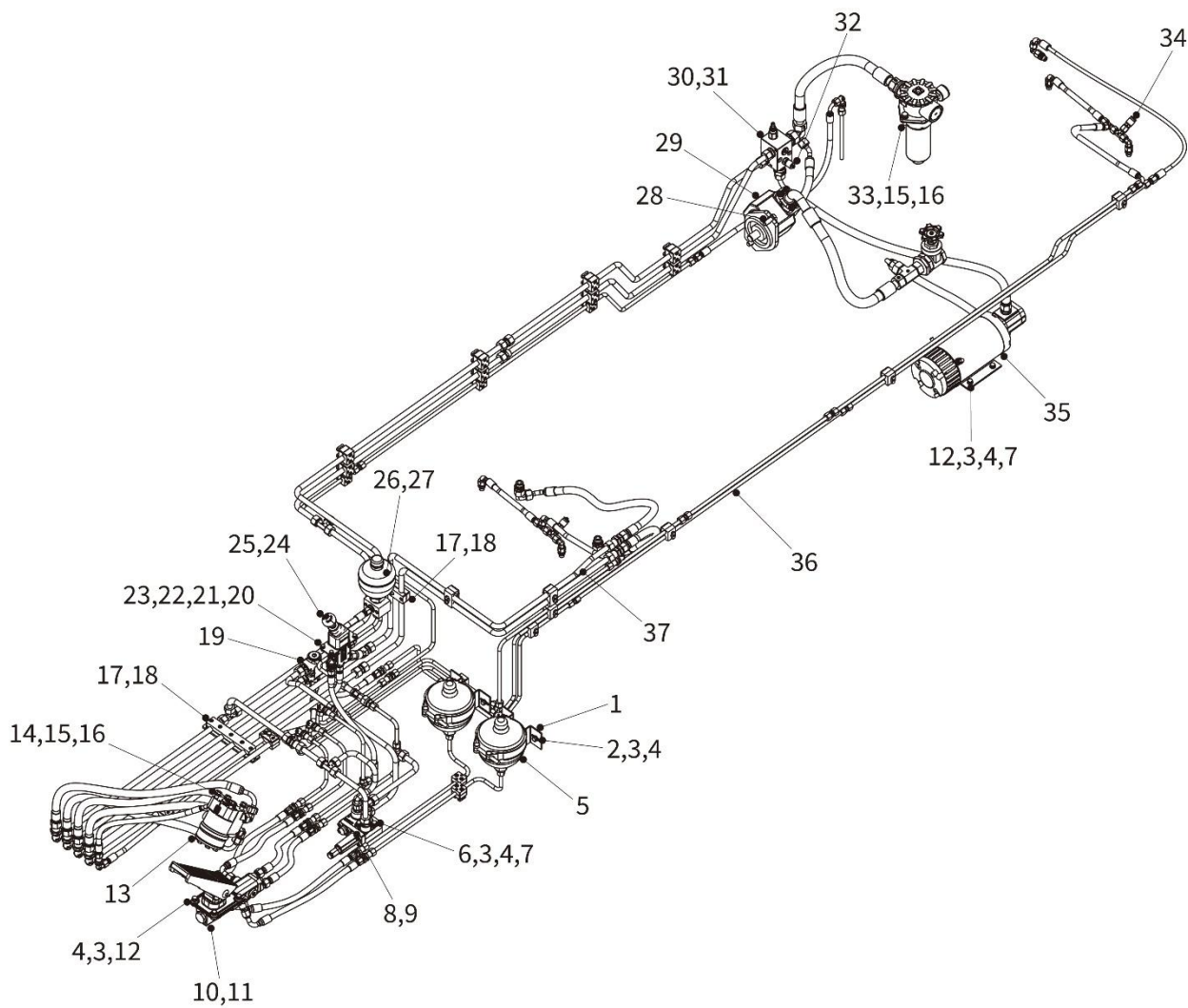
HYDRAULIC SYSTEM



Hydraulic System - Exploded Parts View

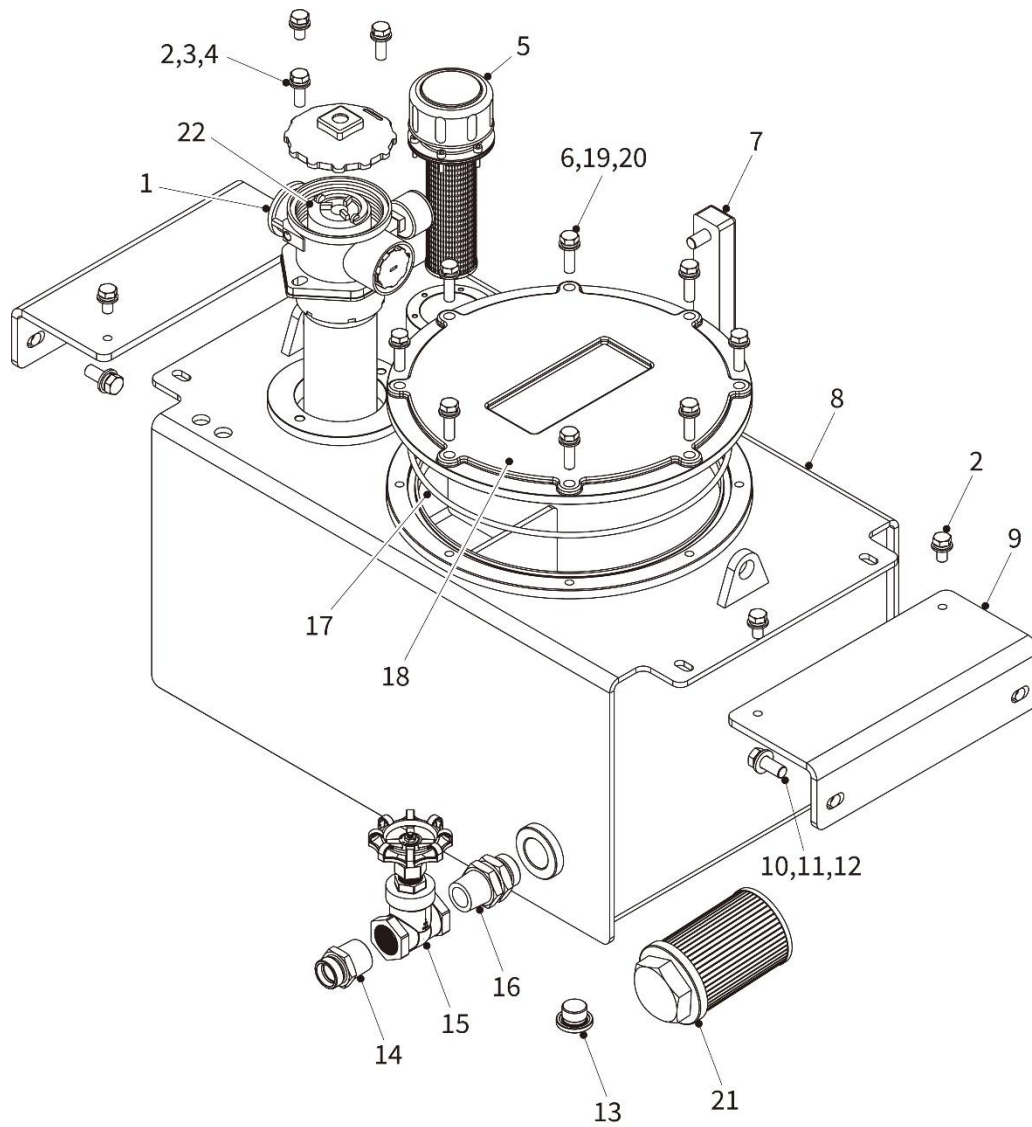
Hydraulic System – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	Y35A4-40201	Clamp	2	
2	PRFA00061	Bolt, M8 x 16mm	4	
3	PRFA00010	Washer, Lock, M8	14	
4	PRFA00009	Washer, Flat, M8	14	
5	T160G4-10200	Hydraulic Accumulator	2	
6	PRFA00286	Bolt, M8 x 60 mm	2	
7	PRFA00021	Nut, M8	2	
8	T160A7-10200	Valve, Filling	1	
9	T160B7-10500	Pressure Switch	1	
10	PRPW02765	Foot Brake Valve Assembly	1	
11	PRPW02766	Foot Brake Pressure Switch	1	
12	PRFA00033	Bolt, M8 x 20 mm	8	
13	T160B4-40100	Steering Unit	1	
14	PRFA00063	Bolt, M10 x 25 mm	4	
15	PRFA00012	Washer, Lock, M10	6	
16	PRFA00011	Washer, Flat, M10	10	
17	T160A4-00700	Combined Pipe Clamp	2	
18	GB/T 70.1	Screw, Hex Socket Head Cap, M6 x 30 mm	4	
19	T160B4-00200	Priority Valve	1	
20	PRFA00248	Bolt, M6 x 16 mm	4	
21	PRFA00007	Washer, Lock, M6	4	
22	PRFA00006	Washer, Flat, M6	4	
23	PRFA00025	Nut, M6	8	
24	PRPW00110	Park brake control handle/valve	1	
25	PRPW00504	Pressure Switch	1	
26	T160A7-10900	Pilot Oil Source Block	1	
27	PRFA00017	Screw, Hex Socket Head Cap, M6 x 50 mm (10mm threaded)	2	
28	ASME B18.2.1	1/2-13 UNC x 1-1/4 Bolt	2	
29	PRPW00139	Hydraulic pump, main	1	
30	T160B4-00100	Relief Valve	1	

**Hydraulic System - Exploded Parts View**

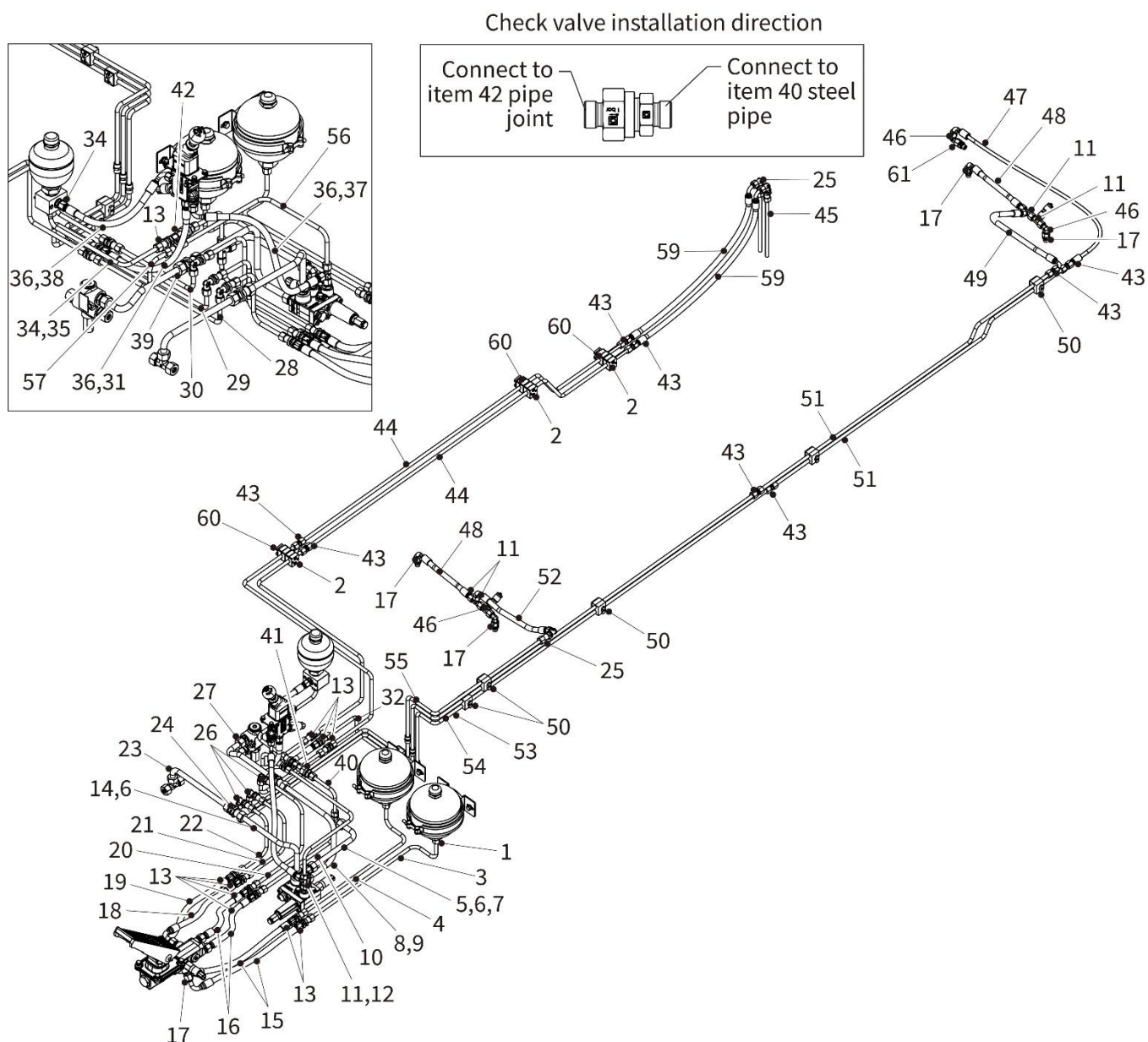
Hydraulic System – Spare Parts List

Item	Part No.	Description	Qty	Remarks
31	PRFA00285	Screw, Hex Socket Head Cap, M8 x 60 mm	2	
32	GJT-788-05	Test Point, Hydraulic	1	
33	PRFA00026	Bolt, M10 x 35 mm	2	
34	PRPW02990	Test Point, Hydraulic	1	
35	T160B4-00400	Emergency Pump	1	
36	T160C4-70000A	Hydraulic Brake Pipe System, complete (NOTE: a complete set of hydraulic brake piping is NOT available as a replacement part)	1	
37	T160C4-10000A	Hydraulic Steering Pipe System, complete (NOTE: a complete set of hydraulic steering piping is NOT available as a replacement part)	1	

**Hydraulic Oil Tank - Exploded Parts View**

Hydraulic Oil Tank – Spare Parts List

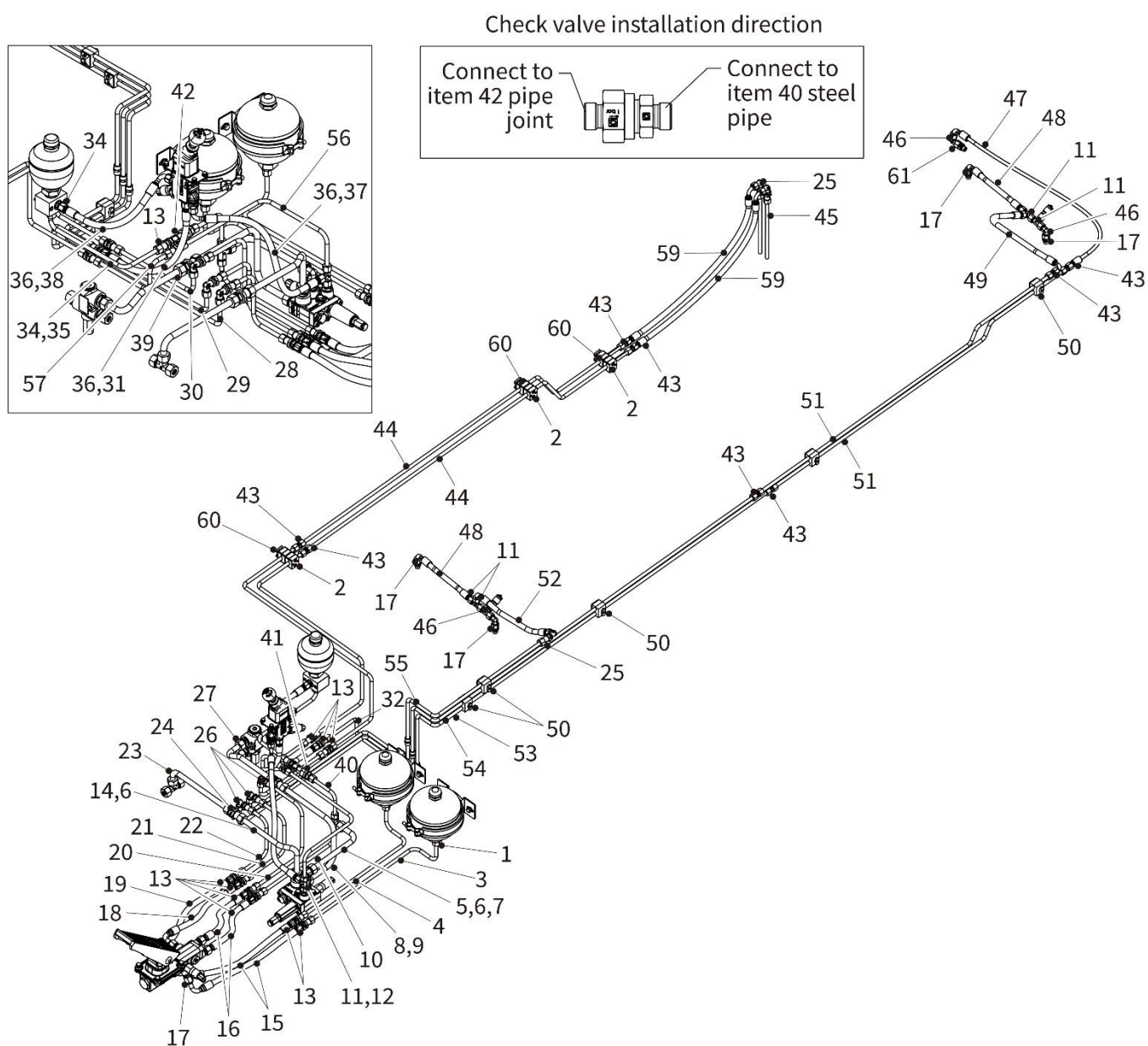
Item	Part No.	Description	Qty	Remarks
1	PRPW03012	Oil Return Filter Assembly	1	
2	PRFA00008	Bolt, M10 x 30 mm	6	
3	PRFA00012	Washer, Lock, M10	14	
4	PRFA00011	Washer, Flat, M10	14	
5	PRPW03015	Air Breather	1	
6	PRFA00026	Bolt, M10 x 35 mm	8	
7	PRPW03017	Fluid Level Gauge	1	
8	T160C4-50100	Oil Tank, Welded	1	
9	T160C4-50001	Bracket	2	
10	PRFA00258	Bolt, M12 x 25 mm	4	
11	PRFA00034	Washer, Lock, M12	4	
12	PRFA00030	Washer, Flat, M12	4	
13	PRPW00751	Oil Drain Plug	1	
14	GJT-1CT-30-16	Hydraulic Adapter, Metric to BSPT male, metric thread M30 x 2.0, BSPT thread 1 in. x 11	1	
15	PRPW02994	Shut-Off Valve	1	
16	PRPW02995	Hydraulic Transition Joint	1	
17	8KB00-30053	Access Cover Gasket, 300 x 5.3 mm	1	
18	PRPW3019	Access Cover	1	
19	PRFA00012	Washer, Lock, M10	4	
20	PRFA00011	Washer, Flat, M10	4	
21	T160B4-50300	Oil Suction Filter/Strainer (Located inside hydraulic oil tank)	1	
22	PRPW02712	Filter Element, Hydraulic	1	



Hydraulic Brake System - Exploded Parts View

Hydraulic Brake System – Spare Parts List

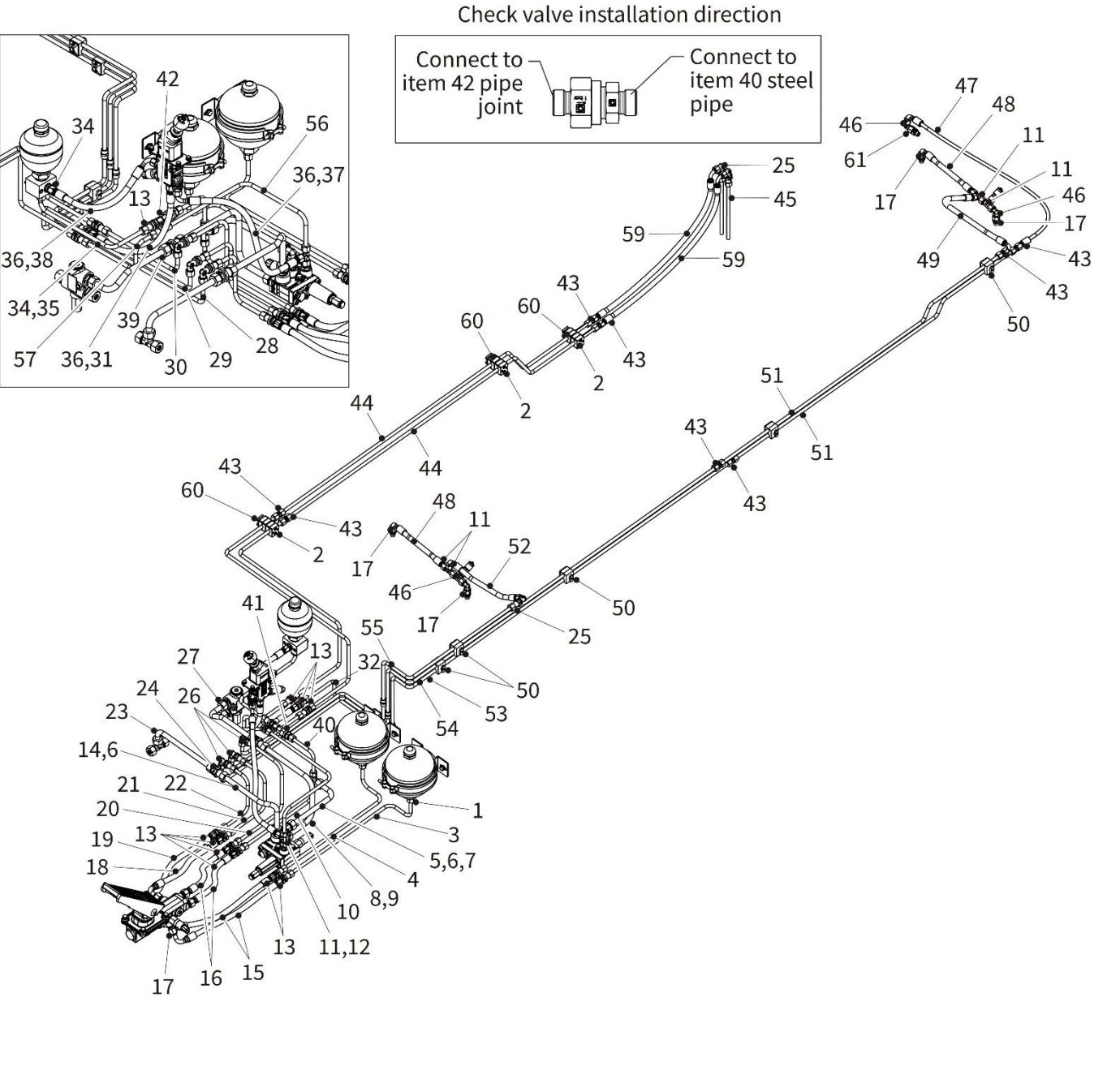
Item	Part No.	Description	Qty	Remarks
1	GJT-1CB-16-08WD	Hydraulic Stud Fitting Adapter, Metric to BSP with captive seal, metric thread M16 x 1.5, BSP thread G1/2 in. x 14, pipe o.d. 15 mm	2	
2	PRPW03003	Pipe Clamp, Single, M10	3	
3	T160A4-00017	Pipe Assembly, Steel	1	
4	T160A4-00022	Pipe Assembly, Steel	1	
5	T160A4-00027	Pipe Assembly, Steel	1	
6	GJT-1CH-22-18	Hydraulic DIN Stud Fitting, ISO 6149, Metric to Metric with captive seal, metric thread M22 x 1.5, metric thread M18 x 1.5, pipe o.d. 15 mm	2	
7	PRPW03041	Hydraulic Adapter, 90-Degree Elbow, Compression Metric Fitting, female to male, thread M22 x 1.5, for pipe o.d. 15 mm	2	
8	T160A4-00016	Pipe Assembly, Steel	1	
9	GJT-1CH-22	Hydraulic DIN Stud Fitting, ISO 6149, Metric to Metric with captive seal, metric thread M22 x 1.5, metric thread M22 x 1.5, pipe o.d. 15 mm	1	
10	T160A4-00030	Pipe Assembly, Steel	1	
11	GJT-CC-16W	Tee Joint, Hydraulic, with swivel nut, metric, M16 x 1.5, for pipes o.d. 10 mm	5	
12	GJT-1CH-16-18	Hydraulic DIN Stud Fitting, ISO 6149, Metric to Metric with captive seal, metric thread M16 x 1.5, metric thread M18 x 1.5, pipe o.d. 10 mm	1	
13	PRPW03056	Hydraulic Bulkhead Adapter, metric, 24-degree cone, M16 x 1.5, for pipe o.d. 10 mm	11	
14	T160A4-00006	Pipe Assembly, Steel	1	
15	TGLFII-08040-H33*J	Hose, Hydraulic, High-pressure	2	
16	TGLFII-08035*J	Hose, Hydraulic, High-pressure	2	
17	GJT-1CH-16-14	Hydraulic DIN Stud Fitting, ISO 6149, Metric to Metric with captive seal, metric thread M16 x 1.5, metric thread M14 x 1.5, pipe o.d. 10 mm	10	
18	TGLFII-08036-H33*J	Hose, Hydraulic, High-pressure	1	
19	TGLFII-08042-H33*J	Hose, Hydraulic, High-pressure	1	
20	T160A4-00005	Pipe Assembly, Steel	1	
21	T160A4-00020	Pipe Assembly, Steel	1	
22	T160A4-00019	Pipe Assembly, Steel	1	



Hydraulic Brake System - Exploded Parts View

Hydraulic Brake System – Spare Parts List

Item	Part No.	Description	Qty	Remarks
23	T160A4-00021	Pipe Assembly, Steel	1	
24	GJT-6C-22LN	Hydraulic Bulkhead Adapter, metric, 24-degree cone, M22 x 1.5, for pipe o.d. 16 mm	2	
25	PRPW03064	Hydraulic Adapter, 90-Degree Elbow, High Pressure, Metric, thread M16 x 1.5, for pipes o.d. 10 mm	6	
26	T160A4-00055	Pipe Assembly, Steel	1	
27	PRPW03020	Hydraulic Stud Fitting Adapter, Metric to BSP with captive seal, metric thread M22 x 1.5, BSP thread G1/2 in. x 14, pipe o.d. 15 mm	1	
28	T160C4-70007	Pipe Assembly, Steel	1	
29	T160C4-70005	Pipe Assembly, Steel	1	
30	T160A4-00039	Pipe Assembly, Steel	1	
31	TGLFII-080340*J	Hose, Hydraulic, High-pressure	1	
32	T160C4-70009	Pipe Assembly, Steel	1	
33	T160C4-70011	Pipe Assembly, Steel	1	
34	GJT-1CM-16-14WD	Hydraulic Stud Adapter, Straight Joint, Metric to Metric with captive seal, metric threads M16 x 1.5 mm to M14 x 1.5mm, hose o.d. 10 mm	2	
35	T160B4-70025	Pipe Assembly, Steel	1	
36	GJT-1CH-16	Hydraulic DIN Stud Fitting, ISO 6149, Metric to Metric with captive seal, metric thread M16 x 1.5, metric thread M16 x 1.5, pipe o.d. 10 mm	3	
37	TGLFII-08050-H33*J	Hose, Hydraulic, High-pressure	1	
38	TGLFII-08035-H33*J	Hose, Hydraulic, High-pressure	1	
39	GJT-AC-16-22-16	Tee Reducer, metric threads M16 x 1.5, M22 x1.5, M16 x 1.5, pipe o.d. 10 mm/15 mm/10 mm	1	
40	T160C4-70001	Pipe Assembly, Steel	1	
41	PRPW03320	Hydraulic Control Valve	1	
42	GJT-3C-16	Hydraulic DIN Connector, Straight, with swivel nut, M16 x 1.5 to M16 x 1.5, pipe o.d. 10 mm	1	
43	PRPW03034	Hydraulic Adapter, Straight, male M16 x 1.5 to male M16 x 1.5	11	
44	T160B4-70008	Pipe Assembly, Steel	2	
45	T160C4-70004	Pipe Assembly, Steel	2	



Hydraulic Brake System - Exploded Parts View

Hydraulic Brake System – Spare Parts List

Item	Part No.	Description	Qty	Remarks
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46	PRPW03040	Hydraulic Adapter, 90-Degree Elbow, Compression Metric Fitting, female to male, thread M16 x 1.5, for pipe o.d. 10 mm	3	
47	TGLFII-08088-H33*J	Hose, Hydraulic, High-pressure	1	
48	TGLFII-08026-H33*J	Hose, Hydraulic, High-pressure	2	
49	TGLFII-08050-H33*J	Hose, Hydraulic, High-pressure	1	Same as item 37
50	TTPG4-110	Pipe Clamp, twin tube, polypropylene, inside grooved, pipe o.d. 10 mm (comprising 2 clamp halves, rail nut, cover plate, and hex head screw)	8	
51	T160B4-10025	Pipe Assembly, Steel	2	
52	TGLFII-06035-H33*J	Hose, Hydraulic, High-pressure	1	
53	T160C4-70010	Pipe Assembly, Steel	1	
54	T160C4-70008	Pipe Assembly, Steel	1	
55	T160C4-70006	Pipe Assembly, Steel	1	
56	T160C4-00001	Pipe Assembly, Steel	1	
57	T160C4-00002	Pipe Assembly, Steel	1	
58	T160C4-70012	Pipe Assembly, Steel	1	
59	TGLFII-08071-H33*J	Hose, Hydraulic, High-pressure	2	
60	SHLPG13-110	Pipe Clamp, Single, polypropylene, M10	3	
61	PRPW03037	Hydraulic Stud Fitting Adapter, Metric to BSP with captive seal, metric thread M16 x 1.5, BSP thread G1/4 in. x 19, pipe o.d. 10 mm	1	



Hydraulic Steering Pipe System – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	TGLFII-06063-H33*J	Hose, Hydraulic, High-pressure	1	
2	TGVFII-10058*J	Hose, Hydraulic, High-pressure	1	
3	TGVFII-10072*J	Hose, Hydraulic, High-pressure	1	
4	TGVFII-10065*J	Hose, Hydraulic, High-pressure	2	
5	PRPW03020	Hydraulic Stud Fitting Adapter, Metric to BSP with captive seal, metric thread M22 x 1.5, BSP thread G1/2 in. x 14, pipe o.d. 15 mm	7	
6	PRPW03037	Hydraulic Stud Fitting Adapter, Metric to BSP with captive seal, metric thread M16 x 1.5, BSP thread G1/4 in. x 19, pipe o.d. 10 mm	1	
7	PRPW03064	Hydraulic Adapter, 90-Degree Elbow, High Pressure, Metric, thread M16 x 1.5, for pipes o.d. 10 mm	1	
8	GJT-6C9-22LN	Hydraulic Adapter, 90-Degree Elbow, High Pressure, Metric, thread M22 x 1.5, for pipes o.d. 15 mm	4	
9	T160B4-10009	Pipe Assembly, Steel	1	
10	T160B4-10032	Pipe Assembly, Steel	1	
11	T160A4-00015	Pipe Assembly, Steel	1	
12	T160A4-00014	Pipe Assembly, Steel	1	
13	TGIFII-08105*J	Hose, Hydraulic, High-pressure	1	
14	PRPW03006	Pipe Clamp, Double, M15	4	
15	GJT-AC-22	Tee Joint, Hydraulic, 3-Way, metric, M22 x 1.5, for pipes o.d. 15 mm	2	
16	T160B4-10008	Pipe Assembly, Steel	1	
17	GJT-1CG9-16-04OG	Hydraulic Adapter, 90-Degree Elbow, Metric to BSP with captive seal, adjustable stud ends, metric thread M16 x 1.5, BSP thread G1/4 in. x 19, pipe o.d. 10 mm	1	
18	T160C4-10003	Pipe Assembly, Steel	1	
19	PRPW03029	Hydraulic Adapter, Straight, male M22 x 1.5 to male M22 x 1.5	4	
20	T160C4-10002	Pipe Assembly, Steel	1	
21	T160C4-10001	Pipe Assembly, Steel	1	
22	GJT-9C-22	Plug, Hydraulic, M22, female, with captive cone seal, pipe o.d. 15 mm	1	
23	T160B4-10026	Pipe Assembly, Steel	1	



Hydraulic Steering Pipe System – Spare Parts List

Item	Part No.	Description	Qty	Remarks
24	PRPW03005	Pipe Clamp, Single, M15	8	
25	T160B4-10006	Pipe Assembly, Steel	1	
26	T160B4-10005	Pipe Assembly, Steel	1	
27	GJT-1CM-30-22WD	Hydraulic Stud Adapter, Straight Joint, Metric to Metric with captive seal, metric threads M30 x 2 mm to M22 x 1.5mm, pipe o.d. 22 mm	1	
28	GJT-2C9-30W	Hydraulic Adapter, 90-Degree Elbow, Compression Metric Fitting, female to male, thread M30 x 2, for pipe o.d. 22 mm	1	
29	PRPW03041	Hydraulic Adapter, 90-Degree Elbow, Compression Metric Fitting, female to male, thread M22 x 1.5, for pipe o.d. 15 mm	1	
30	T160B4-00700	Check Valve	1	
31	T160B4-00800	Check Valve	1	
32	T160C4-10004	Pipe Assembly, Steel	1	
33	T160C4-00020	Hose, Hydraulic, High-pressure	1	
34	FL-12	Split Flange Clamp, SAE, 3/4 inch	1	
35	TGLFII-13093-H40*J	Hose, Hydraulic, High-pressure	1	
36	TGLFII-13073-H40*J	Hose, Hydraulic, High-pressure	1	
37	PRPW03071	Hydraulic Adapter, 90-Degree Elbow, Metric to BSP with captive seal, metric thread M22 x 1.5, BSP thread G1/2 in. x 14	1	
38	GJT-CC-30	Tee Joint, Hydraulic, with swivel nut, metric, M30 x 2, for pipes o.d. 22 mm		
39	GJT-2C-22-30	Hydraulic Reducer Tube Adapter with swivel nut, Metric, threads M22 x 1.5 to M30 x 2, pipe o.d. 15 mm	1	
40	T160C4-00010	Hose, Hydraulic, High-pressure	1	
41	FL-16	Split Flange Clamp, SAE, 1 inch	1	
42	GB/T 70.1	Screw, Hex Socket Head Cap, M10 x 30 mm	8	
43	PRFA00012	Washer, Lock, M10	8	
44	PRFA00011	Washer, Flat, M10	8	
45	TGVFII-10070-H25*J	Hose, Hydraulic, High-pressure	1	
46	TGVFII-10086-H25*J	Hose, Hydraulic, High-pressure	1	



Hydraulic Steering Pipe System – Spare Parts List

Item	Part No.	Description	Qty	Remarks
47	GJT-6C-22LN	Hydraulic Bulkhead Adapter, metric, 24-degree cone, M22 x 1.5, for pipe o.d. 16 mm	2	
48	GJT-1CB-30-12WD	Hydraulic Stud Fitting Adapter, Metric to BSP with captive seal, metric thread M30 x 2, BSP thread G3/4 in. x 14, pipe o.d. 22 mm		
49	GJT-1CM-22-18WD	Hydraulic Stud Adapter, Straight Joint, Metric to Metric with captive seal, metric threads M22 x 1.5 mm to M18 x 1.5mm, hose o.d. 15 mm	2	
50	GJT-1CM-22WD	Hydraulic Stud Adapter, Straight Joint, Metric to Metric with captive seal, metric threads M22 x 1.5 mm to M22 x 1.5mm, hose o.d. 15 mm	2	

This exploded view diagram illustrates the assembly of a vehicle chassis, specifically the front and rear axle assemblies. The diagram shows the following components and their assembly sequence:

- Front Axle Assembly (Left Side):**
 - 1:** Points to a set of bolts/nuts for the front wheel hub.
 - 2:** Points to the front wheel hub.
 - 3:** Points to the front tire.
- Rear Axle Assembly (Right Side):**
 - 4:** Points to a set of bolts/nuts for the rear wheel hub.
 - 5:** Points to the rear wheel hub.
 - 6:** Points to the rear tire.
- Central Chassis Components:**
 - 7:** Points to the central differential housing.
 - 8:** Points to the central axle shafts.
 - 9:** Points to the central suspension components, including the shock absorbers and control arms.
 - 10:** Points to the central frame rails.

The diagram shows the front and rear axle assemblies being attached to the central chassis. The front axle assembly is shown on the left, and the rear axle assembly is shown on the right. The central chassis components are shown in the middle, with the front and rear axle assemblies being attached to them. The diagram includes various bolts, nuts, and other fasteners that are used to assemble the components.

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Wheels and Tires – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	T160A5-00010	Rim Nut, M22 x 1.5 mm	32	
2	PRPW02255	Wheel Assembly	4	
3	PRPW00115	Tire, 315/70R15	4	

LABELS

Manual emergency operation instructions

How to manually raise the belt frame:
 1. Procedure to raise the front end: screw the pressure building valve (1) to the end, then press the solenoid valve manual button (2), and use the afterburner to repeatedly shake the manual pump to manually raise the front end of the belt frame. Let go or stop shaking to stop the lifting.
 2. Procedure to raise the rear end: screw the pressure building valve (1), then press the solenoid valve manual button (3), and use the afterburner to repeatedly shake the manual pump. Raise the rear end of the belt frame manually, and stop lifting when you let go or stop shaking.

Electronic control integrated valve group

Note
 After the vehicle completes the emergency evacuation, be sure to reset the used solenoid valve in an emergency stop position to avoid the lowered belt holder.

Belt carrier cylinder solenoid valve

Operation instructions for belt forward and backward transmission
 When watching the conveying direction of the belt forward and backward, please press the belt stop button first.

Operation instructions for belt forward and backward transmission
 When watching the conveying direction of the belt forward and backward, please press the belt stop button first.

Lubrication points for bulk cargo loader

① Front roller bearing seat ② Front roller bearing seat ③ Front roller bearing seat ④ Front roller bearing seat ⑤ Front roller bearing seat ⑥ Front roller bearing seat ⑦ Front roller bearing seat ⑧ Front roller bearing seat ⑨ Front roller bearing seat ⑩ Front roller bearing seat ⑪ Front roller bearing seat

① Upper pin of front lift cylinder ② Lower bearing seat of front lift frame ③ Lower bearing seat of rear lift frame ④ Lower bearing seat of rear lift frame ⑤ Upper pin of rear lift cylinder ⑥ Rear roller bearing seat

warning!

When personnel work under the belt frame for maintenance, they must insert the safety pin.

Carrying instructions

- When the belt frame is at the minimum inclination angle, the maximum allowable uniform load is 1000kg;
- When the belt frame is at the maximum inclination angle, the maximum allowable uniform load is 600kg;
- When the belt frame is at any angle, the maximum allowable concentrated load is 400kg, and the goods over 200kg must be transported in a single piece.

Charging steps and precautions

- Open the cover of the charging base;
- Insert the charging gun and make sure the connection is reliable;
- After charging is completed, pull out the charging gun and cover the cover;
- The vehicle can be used normally.

Important notice: before the cover is covered, be careful with water.

Belt speed control knob description

Turn the knob clockwise to accelerate the belt, turn the knob counterclockwise to decelerate the belt.

Hydraulic oil

L-HM46	-15 ~ 45°C
L-HV32	-35 ~ 35°C
Aviation10W	-50 ~ 25°C

Effective volume: 65 L
 Cleanliness: NAS 1638 9
 First replacement cycle of hydraulic oil and filter element: 200 hours or 1 month
 Subsequent hydraulic oil and filter element replacement cycle: 200 hours or 1 year

Warning

It is strictly forbidden to stand under the belt rack

Warning

It is strictly forbidden to stand under the belt rack

Warning

It is strictly forbidden to stand under the belt rack

Warning Crushing

Warning Belt

Warning Hands Pinching

Warning Crushing

Warning Belt

Warning Hands Pinching

Warning Crushing

Warning Belt

Warning Hands Pinching

Warning Crushing

Warning Belt

Warning Hands Pinching

Note: During the maintenance process, if the belt holder is lifted by external force, air will be mixed into the cylinder. If the belt holder is operated hydraulically at this time, the front end of the belt holder will fall. Therefore, it is necessary to suspend the belt frame by external force, make it fall and reset until the air in the cylinder is exhausted, the belt frame can resume normal hydraulic operation.

Note: During the maintenance process, if the belt holder is lifted by external force, air will be mixed into the cylinder. If the belt holder is operated hydraulically at this time, the front end of the belt holder will fall. Therefore, it is necessary to suspend the belt frame by external force, make it fall and reset until the air in the cylinder is exhausted, the belt frame can resume normal hydraulic operation.

Lifting position MIN MAX

Vacuum pump failure alarm Low battery alarm Brake fluid level alarm

Description of the left side bezel

- Lower the left baffle: Pull out the limit pin and rotate it 90° to lock the limit pin, then hold the handle on the left baffle and pull it back to lower the left baffle;
- Raise the left side baffle: Hold the handle to pull up the left side baffle forward, and then rotate the limit pin 90°. When the limit pin pops into the limit hole, try to pull the handle backwards to ensure that the limit pin is reliable limit.

WARNING Caution scald

HYDRAULIC OIL

DESEL FUEL

GASOLINE FUEL

PT2690D Sheet of Labels

Labels – Spare Parts List

Item	Part No.	Description	Qty	Remarks
1	PRPW03314	PT2690D Warning Labels for Printing (A complete set of labels for the PT2690D)	1	Label sheet shown is generic example only

SUPPLEMENTARY INFORMATION

LIFTING/SHIPPING THE PT2690D PUSH BACK TRACTOR

When lifting the PT2690D Push Back Tractor, observe ALL the safety precautions specified in this section of the manual.

When lifting the PT2690D Push Back Tractor, ALWAYS use a crane and a four-leg lifting sling or chain, as shown in the Lifting Diagram below. The Safe Working Load (SWL), also known as Rated Capacity, of the crane and four-leg lifting sling or chain MUST be at least 20,000 kg (20 Tons).

ALWAYS attach the lifting sling or chain to the four lifting points provided on the body of the Tractor, as shown in the lifting diagram, below.

LEATHAL WARNING – USE CORRECT LIFTING POINTS



When lifting the Push Back Tractor, always use the four lifting points provided on the body of the Tractor. NEVER use the lifting points on top of the Cab, they are only for fitting and removing the Cab, and are not capable of holding the weight of the Tractor.

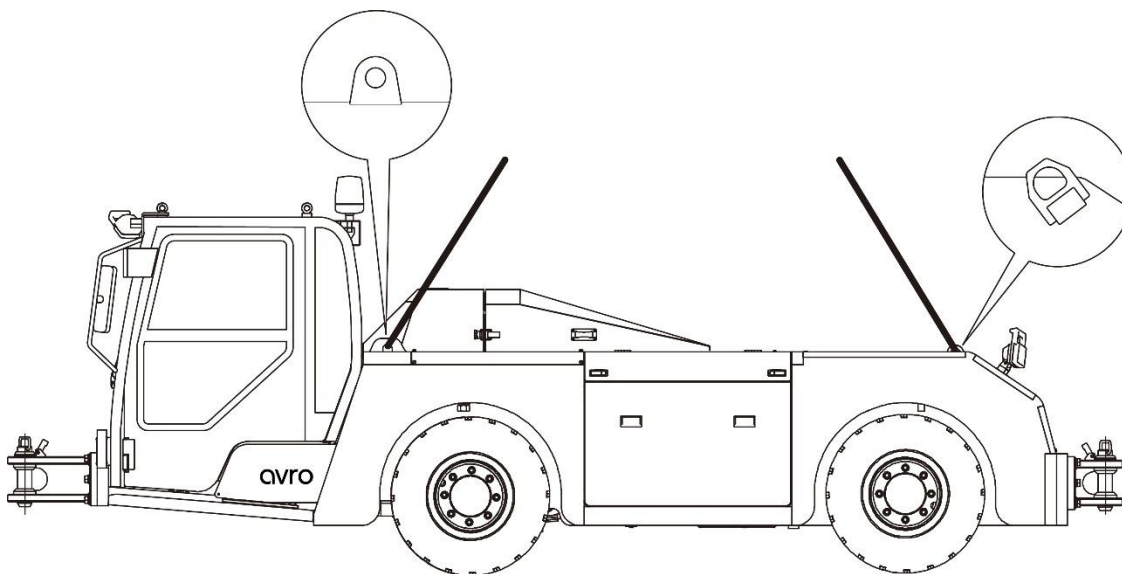


Figure 16 - Lifting diagram

NEVER attempt to lift the Tractor using a forklift. The size and weight of the Tractor is an unstable load on a forklift, and it is beyond the lifting capacity of most forklifts. Also, there are NO bearing plates on the underside of the Tractor suitable for engaging the forks of a forklift.

LETHAL WARNING – SIZE AND WEIGHT OF PUSH BACK TRACTOR



The Push Back Tractor is 5.66 m (18 ft 6.8 in.) long and weighs 16,500 kg (36,376 lbs). When lifting the Tractor, always use a crane and a four-leg lifting sling or chain with a Safe Working Load (SWL) of at least 20,000 kg (20 Tons). Always attach all four legs of the lifting sling or chain to the four lifting points on the Tractor.

Before commencing a lifting operation, make sure that:

- (3) The lifting equipment is in good condition. Do not use lifting equipment whose condition is suspect.
- (4) The lifting equipment has been regularly inspected, maintained, and certified, in accordance with the applicable National and Local regulations and codes. Do not use lifting equipment that does not meet this requirement, or which has exceeded the mandated time between inspections.

The Tractor must always be towed or moved using a suitable vehicle.

WARNING – LIFTING OPERATIONS



Lifting operations must **ONLY** be done by personnel who are trained and authorised to perform lifting operations.

DO NOT reach or stand beneath a Tractor that is suspended by a crane.

Wear a hard hat, high visibility clothing, and suitable footwear during lifting operations.

WARNING – DO NOT LIFT TRACTOR WITH A FORKLIFT



The Push Back Tractor is 5.66 m (18 ft 6.8 in.) long and weighs 16,500 kg (36,376 lbs). Due to the size and weight of the Tractor, **DO NOT** attempt to use a forklift truck to lift the Tractor.

The Tractor is not designed to be lifted with a forklift.

WARRENTY

All Avro GSE products are covered by our Warranty Policy. If you require a copy of our Warranty Policy, please contact us using the contact details given on page 2 of this manual.

DISPOSAL

The PT2690D Push Back Tractor contains electrical components, including a vehicle battery. A Tractor that is damaged beyond economic repair, or worn out, should be recycled at a metal recycling facility.

APPENDICES

**CUMMINS OPERATION AND MAINTENANCE MANUAL
QSF3.8 CM2350 F107**

**CUMMINS ENGINE TROUBLE AND FAULT CODES
DOCUMENT**

CUMMINS QST38T4 OWNERS MANUAL

**DANA SPICER T 12000 POWERSHIFT TRANSMISSION
MAINTENANCE & SERVICE MANUAL**

DANA SPICER AXLE 212 MAINT & REPAIR MANUAL

**DANA SPICER FRONT AXLE 212-927 SERVICE PARTS LIST -
APL-2167 2011-11-17**

**DANA SPICER REAR AXLE 212-928 SERVICE PARTS LIST -
APL-2168 2011-11-17**

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Published in Canada by Avro GSE™ Limited.