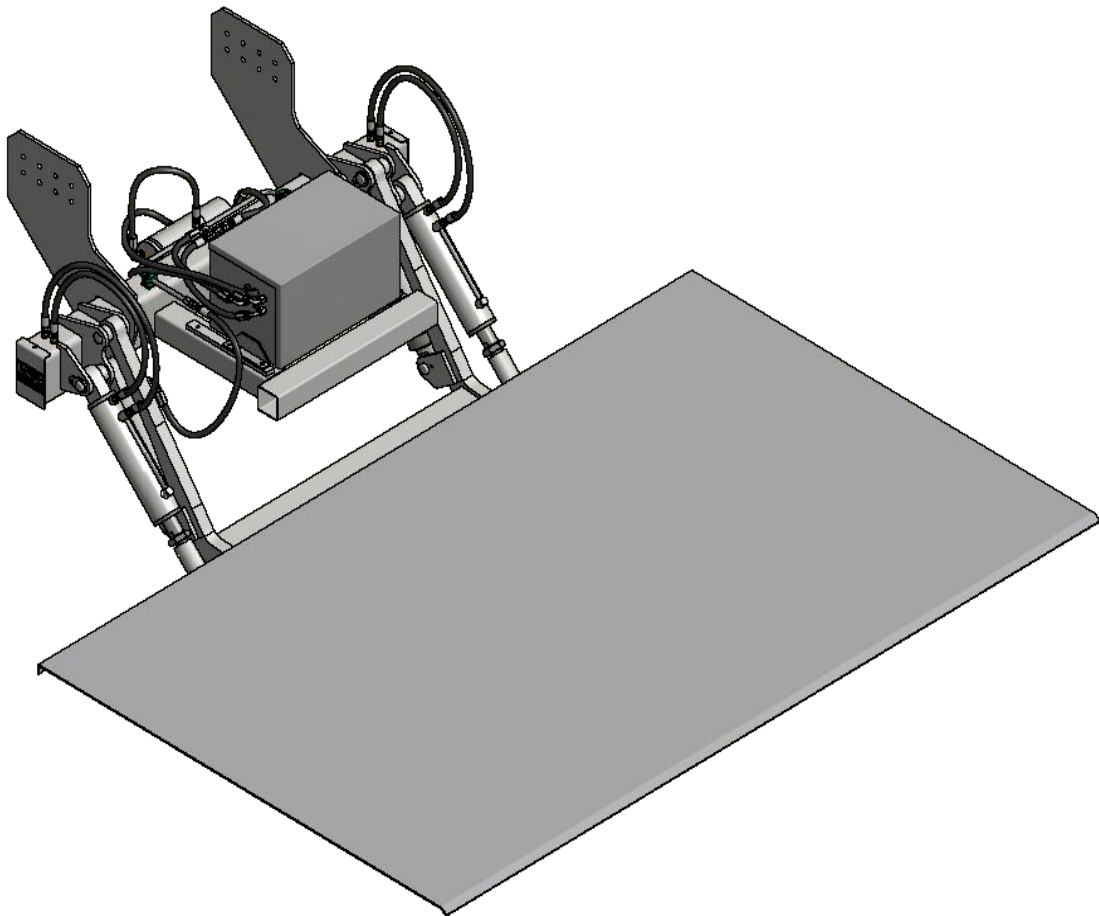




# TAIL LIFT

## OPERATION & MAINTENANCE MANUAL

750 KG, 1 TON, 1.5 TON, 2 TON



**POWERMATICS HYDRAULICS & ENGINEERING (M) SDN. BHD.**

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## **TAIL LIFT DESCRIPTION AND FEATURES**

### **1. Description of Tail Lift**

For heavy-duty and stable operation, PHE Tail Lifts come with 4-cylinders, 2-cylinders for lifting and 2 for tilting operation.

### **2. Lifting Cylinders (Safety feature: with hose burst valve)**

The two lifting cylinders are used to raise and lower the platform. Each cylinder is fitted with a hose burst valve, which prevents the platform being lowered if any hose burst. This will protect the operator and also the goods on the platform.

### **3. Tilting Cylinders - Auto-leveling function (optional)**

The two tilting cylinders are used to lift and lower the platform tip. When the platform is lowered to reach the ground, the auto-leveling operation is activated to tilt and position itself on the ground

### **4. Tilting Cylinders - Manual function**

Manually push button to tilt the platform to the ground.

### **5. Steel / Aluminum Platform**

#### **Steel**

The platform welding construction is made from steel. The chequered plate rough surface will prevent carried product from slipping away.

#### **Aluminum**

The aluminum platform have less weight compare to the steel ones. Constructed by using high strength profiles aluminum and with anti skid surface.

### **6. Safety Warning Flags**

PHE Tail Lift warning flags are highly visible for maximum safety, Made of high strength reflective PVC leather for maximum durability.

### **7. Silent Operation**

Features an electro-hydraulic power pack encased in rugged housing for silent operation.

### **8. Easy-to-use Controls**

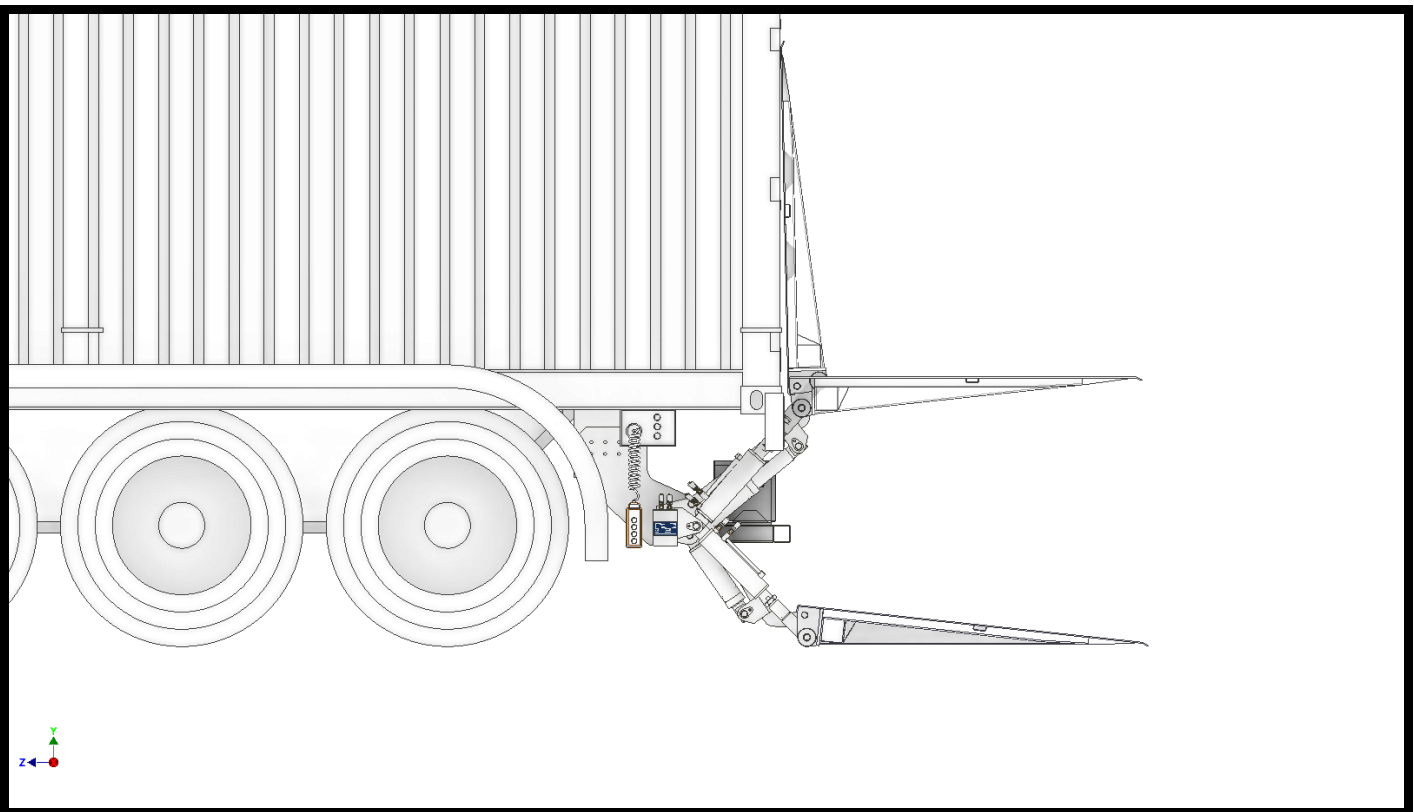
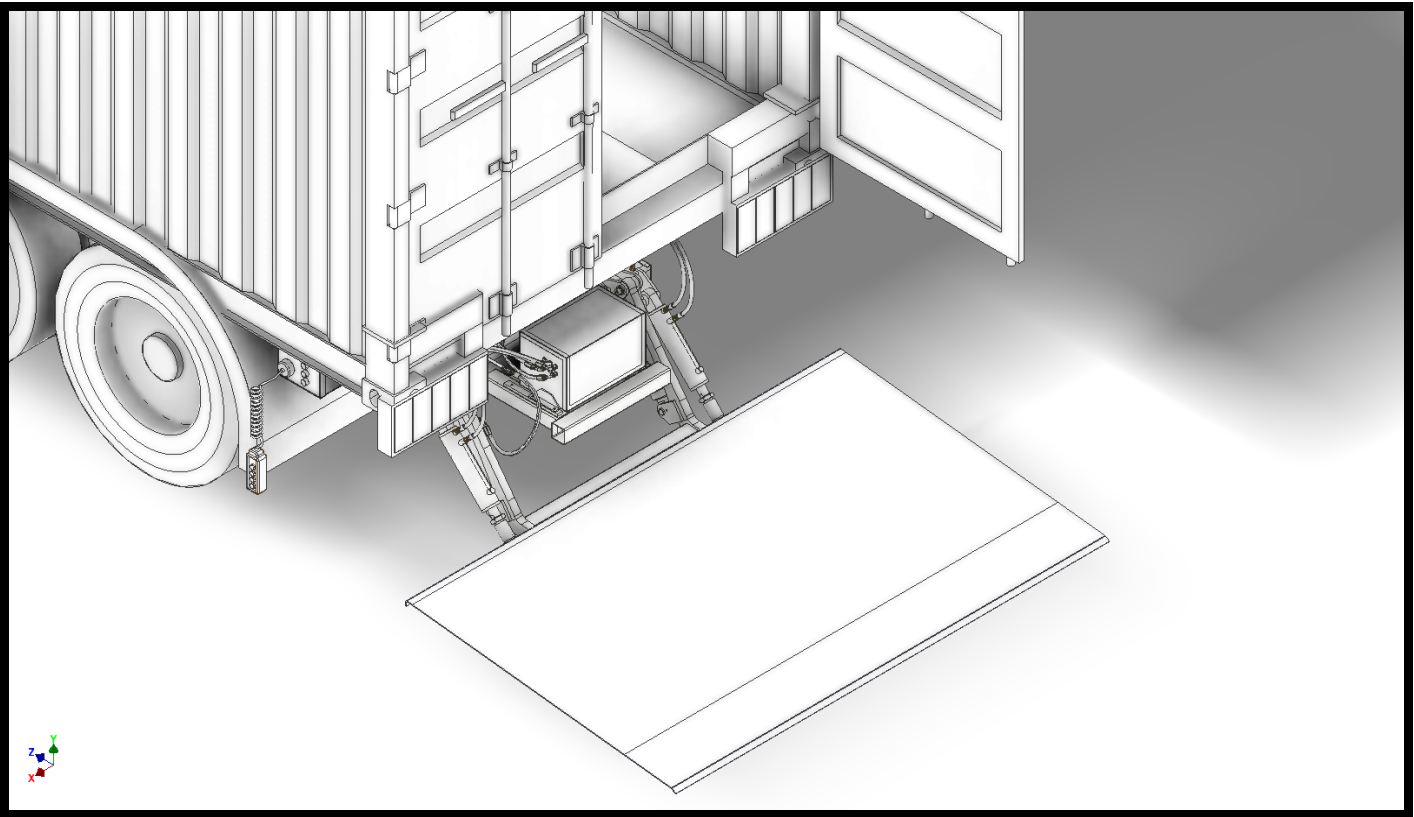
Features simple mounted push buttons with a built-in safety mechanism that minimizes lifting error. Also comes with a wired remote control for an even safer and convenient operation.

### **9. Platform Foot Switch**

Switch installed on platform that can be operated by foot. Step on the switch to lift and lower the platform to desired level of height.

### **10. Warranty**

Each PHE Tail Lift comes with 12 months manufacturer's warranty to give you assurance of quality and durability. (Terms and Conditions apply, details refers booklet **Warranty Information and Maintenance Record**)

**GENERAL VIEW**

**GENERAL OPERATING INSTRUCTION**



- Following are some instructions for operating hydraulic equipment:
- Never work on the hydraulic system while it is under pressure.
- Hydraulic equipment should always be kept as clean as possible.
- Always clean the power pack before servicing, and always work on the unit with clean hands.
- If you wish to paint the equipment, tape off all moving parts; flexible connections and nameplate.
- Before mounting the power pack, please check for correct positioning, ambient temperature, operating voltage, etc.
- Do not use pipe dope, tape or sealing compound as they will cause problems.
- Do not direct high pressure water to power pack when cleaning the truck.

**Please check the following points;**

- Check power pack for any damage during shipment.
- Check the direction of rotation of the motor. Pump will be damaged if the rotation is wrong.
- Cleanliness is very important when filling the reservoir. Use only clean and fresh hydraulic oil.
- Always recheck the oil level after using the unit and refill if necessary.
- Avoid getting air into the hydraulic system. If you do, it is very important to remove all the air from the system.
- The air must be removed at the highest point of the hydraulic system. There is usually a relief screw.
- Energize the power pack and actuate each of the valves to be sure they are operating properly.
- Please check the operating temperature regularly. It should not increase by more than -15°C to +70°C.
- Check the new power pack for any leakage after short period of time. Tighten any fittings that may be leaking.

Operating instructions must be read and fully understood by all personnel authorized to use the PHE tail lift.

**UNAUTHORIZED PERSONNEL SHOULD NEVER USE THE TAIL LIFT.**

 <b>CAUTION</b>	ENSURE NO PERSON OR PROPERTY IS ON RISK AT THE AREA WHERE THE PLATFORM WILL BE OPEN. ENSURE LOAD IS SECURED ON PLATFORM DURING LOADING/UNLOADING.
 <b>CAUTION</b>	VEHICLE ENGINE MUST BE RUNNING TO OPERATE THE TAIL LIFT. FAILURE TO COMPLY MIGHT DAMAGE THE TAIL LIFT COMPONENTS AND EVEN VOID THE WARRANTY!

**1. Disengage the tail lift**

Disengage the handles on the platform before operate the tail lift.

**2. Operate the tail lift**

Operate the tail lift by using either side control box or remote control (that plugged into side control box) to operate the tail lift.

**3. To open the platform**

Press and hold both “**DOWN**” and “**TILT**” buttons until the platform is lowered to horizontal position.

**4. To lower the platform (with Auto-leveling option)**

Press and hold “**DOWN**” button until the platform descends to required level.

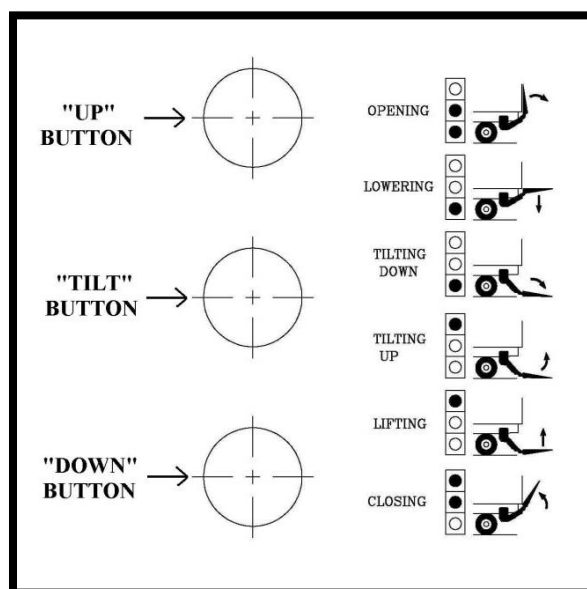
When platform reaches the ground at lowering positions, it will automatically level to the ground.

**5. To raise the platform (with Auto-leveling option)**

Press and hold “**UP**” button until the platform raised to horizontal position.

**6. To close the platform**

Press and hold both “**UP**” and “**TILT**” buttons until the platform closes against vehicle body. Finally engage the platform securely with handles.



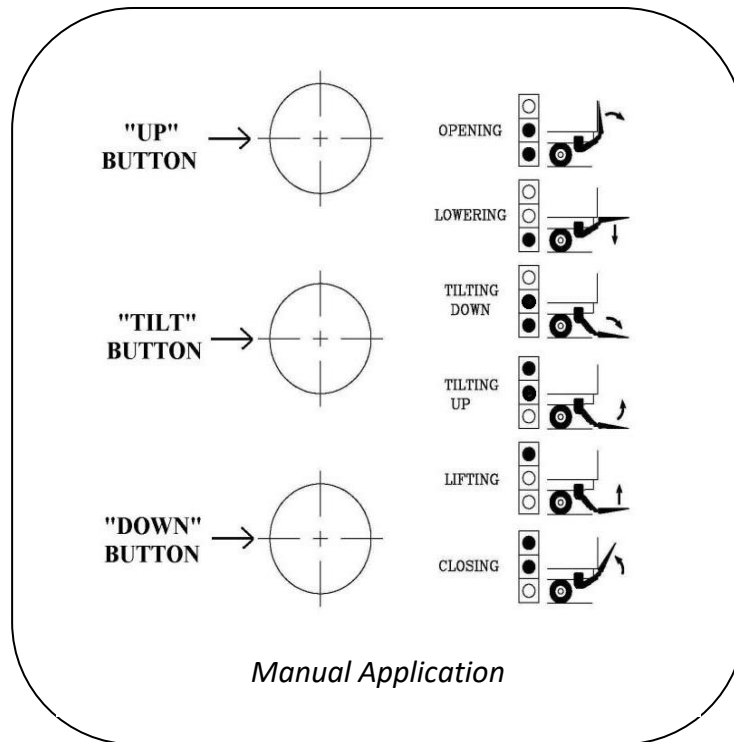
*Auto levelling application*

**7. To lower the platform (manual)**

Press and hold **"DOWN"** button until the platform reach floor level. Followed with **"DOWN"** and **"TILT"** buttons together to have platform lies flat on the floor.

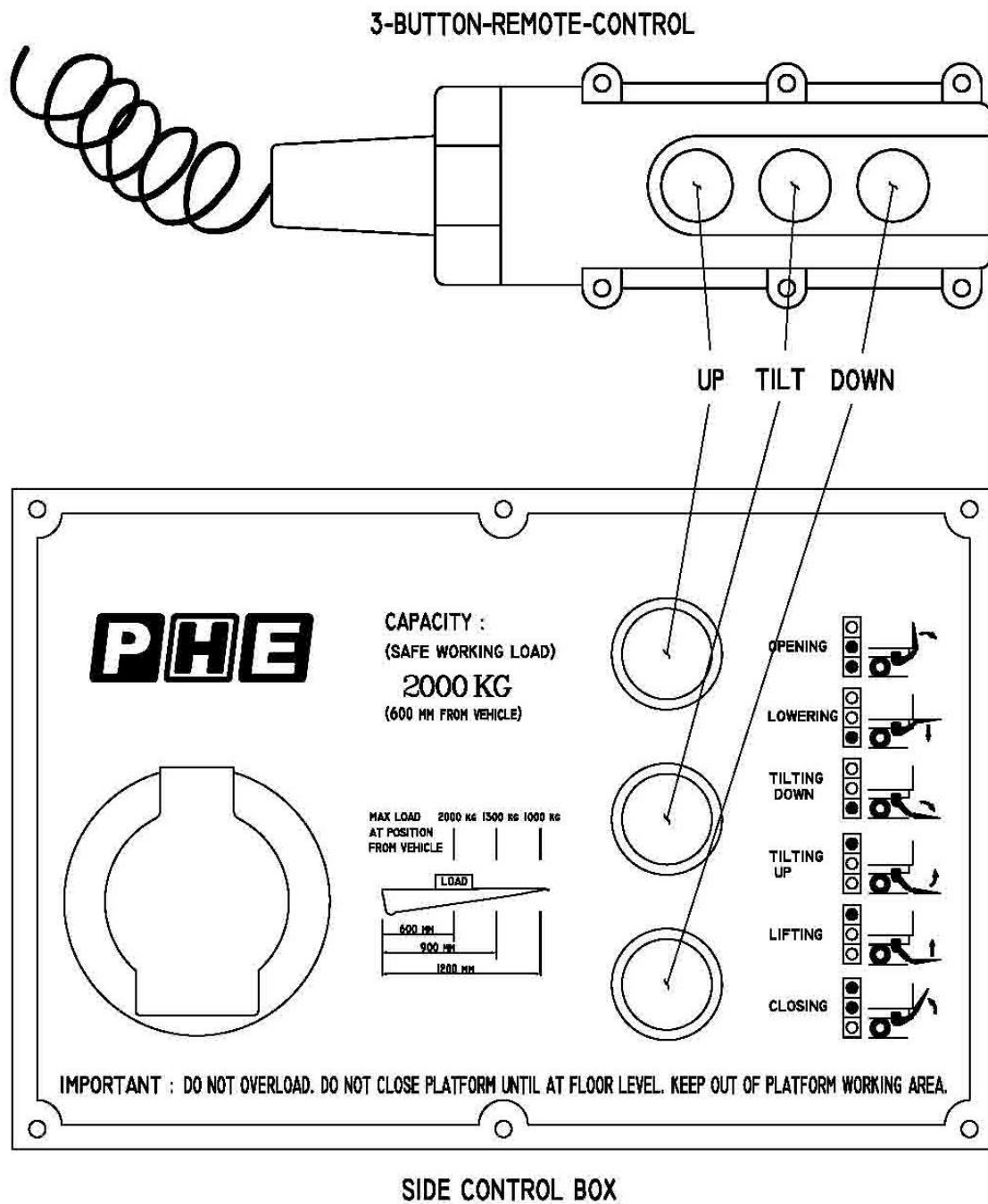
**8. To raise the platform (manual)**

Press and hold **"UP"** and **"TILT"** buttons until the platform being lifted up against floor. Press and hold **"UP"** button until the platform raised to horizontal position.



Power Consumption Max					
				<b>12 Volts</b>	<b>24 Volts</b>
Pump				200 A	115 A
Lowering Valve				4.8 A	2.4 A
Dir. Control Valve				4.8 A	2.4 A
Motor Contactor				2.5 A	1.2 A
Cable size					
Remote control				15 A	15 A
Main Line				300 A	300 A

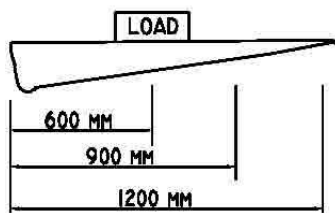
*Power Consumption Table*

**SIDE CONTROL BOX & 3-BUTTON-REMOTE-CONTROL**

**LOADING DIAGRAM****MODEL: 750 KG**

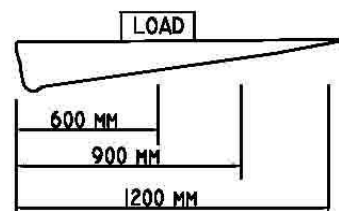
(600 MM FROM VEHICLE)

MAX LOAD	750 kg	500 kg	375 kg
AT POSITION			
FROM VEHICLE			

**MODEL: 1000 KG**

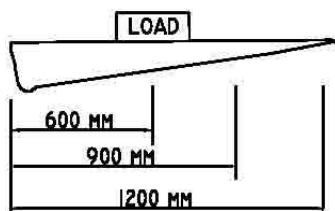
(600 MM FROM VEHICLE)

MAX LOAD	1000 kg	650 kg	450 kg
AT POSITION			
FROM VEHICLE			

**MODEL: 1500 KG**

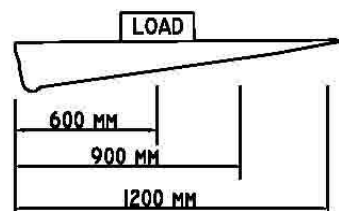
(600 MM FROM VEHICLE)

MAX LOAD	1500 kg	1000 kg	750 kg
AT POSITION			
FROM VEHICLE			

**MODEL: 2000 KG**

(600 MM FROM VEHICLE)

MAX LOAD	2000 kg	1300 kg	1000 kg
AT POSITION			
FROM VEHICLE			



**PRECAUTIONS IN HANDLING**

The driver and operator should be well trained in proper procedure for operating the PHE tail lift.

Read through the manual BEFORE starts to operate the PHE tail lift.

1. **DO NOT** load the PHE tail lift more than the SWL (Safe Working Load). Refer to the tagging on tail lift for the actual SWL.
2. Inspection and maintenance on tail lift periodically for longer service life (Please refer to Maintenance, page 36).
3. **DO NOT** stand under the tail lift when it is in operation.
4. **DO NOT** operates the tail lift if you are intoxicated or physically exhausted. You may not able to take the necessary emergency measures under these conditions.
5. The operator should not be physically handicapped. (Bad eyesight or hearing)
6. The load must be stabilized on the platform to avoid damage to equipment or personnel.
7. **NEVER** work on the hydraulic system while it is under pressure.
8. **NEVER** use tape, pipe dope or sealing compound on the hydraulic fittings as they will cause problems.
9. **NEVER** direct high pressure water on power pack during cleaning the truck. Hydraulic equipment should be kept clean all the times.
10. If you wish to paint the equipment, tape off all moving parts, flexible connections and etch plate.



**ACCIDENTS AND INJURIES MAY HAPPEN DUE TO YOUR CARELESSNESS.**

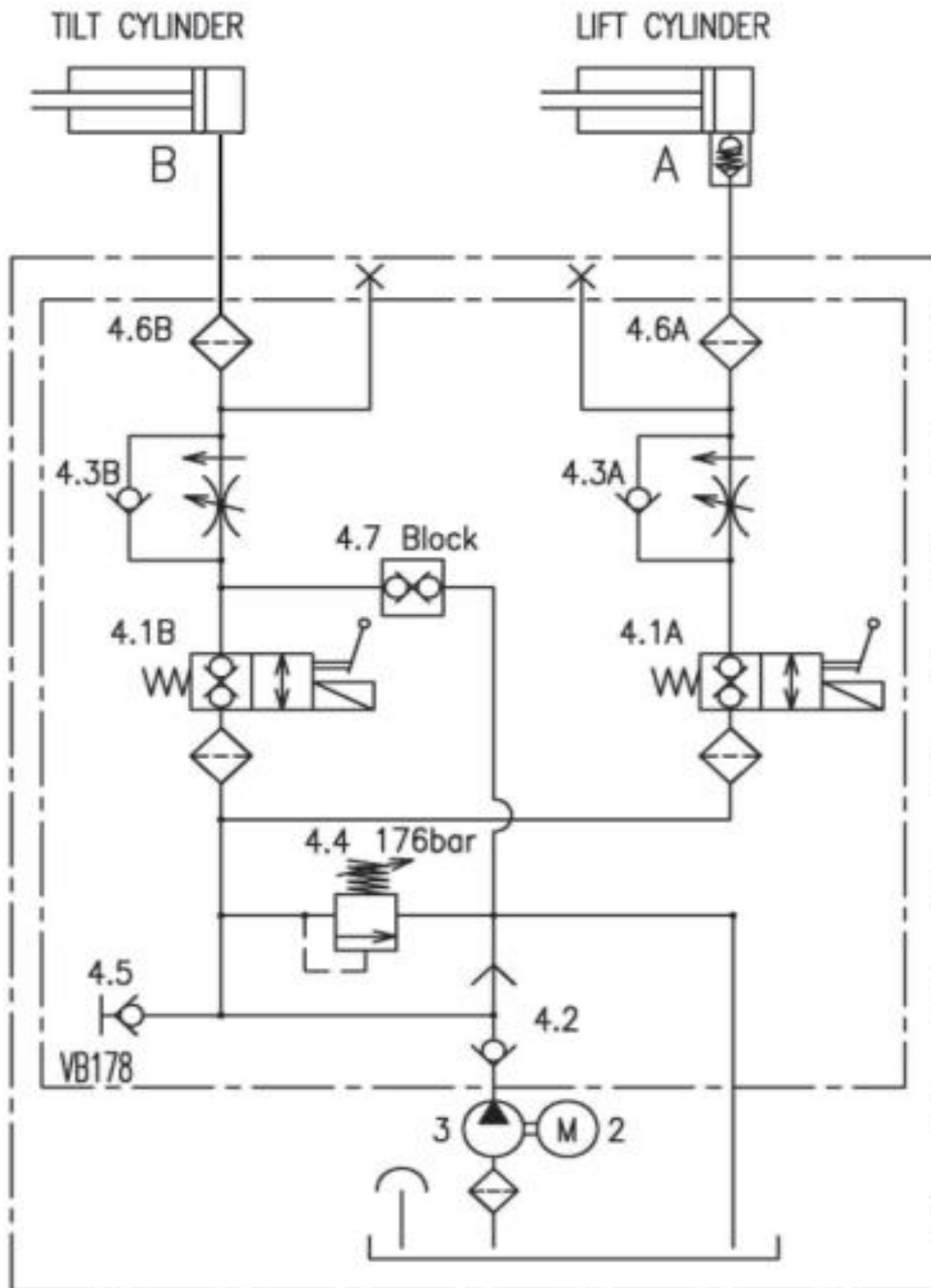
**FAILURE TO FOLLOW LISTED INSTRUCTIONS WILL RISK IN SEVERE INJURIES OR PROPERTY DAMAGE.**



VEHICLE ENGINE MUST BE RUNNING TO OPERATE THE TAIL LIFT.  
FAILURE TO COMPLY MIGHT DAMAGE THE TAIL LIFT COMPONENTS AND  
EVEN VOID THE WARRANTY!

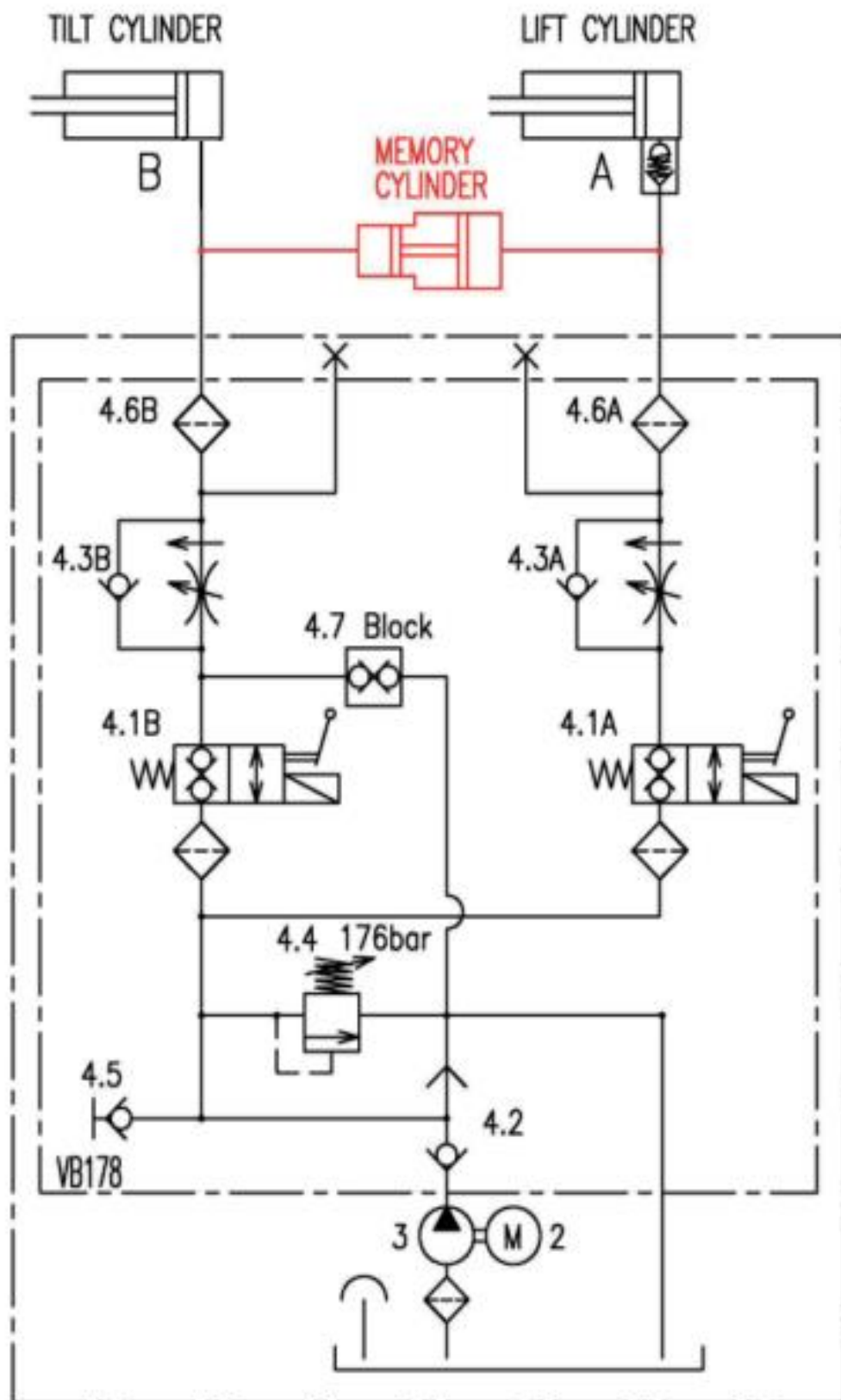
**TECHNICAL INFORMATION & INSTRUCTIONS****HYDRAULIC SCHEMATIC DIAGRAM**

WITHOUT AUTOMATIC LEVELLING



FOR MECHANICAL HOSE BURST VALVE

WITH AUTOMATIC LEVELLING



FOR MECHANICAL HOSE BURST VALVE

## **ELECTRICAL FITTING**

As it is preferable to be able to operate the tail lift during mechanical fitting, the electrical wiring should be carried out first.

### **2.1 Heavy Duty Electric**

#### **2.1.1 Single pole wiring – connecting power cable to battery**

Disconnect the live terminal from the vehicle battery, crimp or solder a terminal lug to one end of the heavy-duty electrical cable provided. Attach the terminal lug on the cable to the terminal lug clamp bolt on the battery live terminal, but **DO NOT** reconnects the battery.

Check that the existing earth lead from the battery to the chassis is at least 40mm<sup>2</sup>(300-Amp) and does not show any signs of wear. If the lead is smaller, or is worn, replace with a new lead of at least 300-Amp capacity.

#### **2.1.2 Insulated earth wiring; connecting to battery**

Disconnect both terminals from the vehicle battery. The heavy-duty electrical cables provided are in 2 equal lengths. Crimp or solder terminal lug to one end of each cable. Attach the terminal lug on the cables to the terminal lug clamp bolts on the battery terminals. **DO NOT** reconnects the battery.

#### **2.1.3 Running the cables to the rear of the vehicle**

Route cables neatly to the rear of the vehicle, ensuring the cables are:

- a) Well supported, safe and not vulnerable.
- b) At least 50mm (2 inch) away from any brake line.
- c) Well away from exhaust pipe.
- d) Securely clipped and free from any chafing hazard.
- e) Protected when passing through any holes, by grommet the hole.

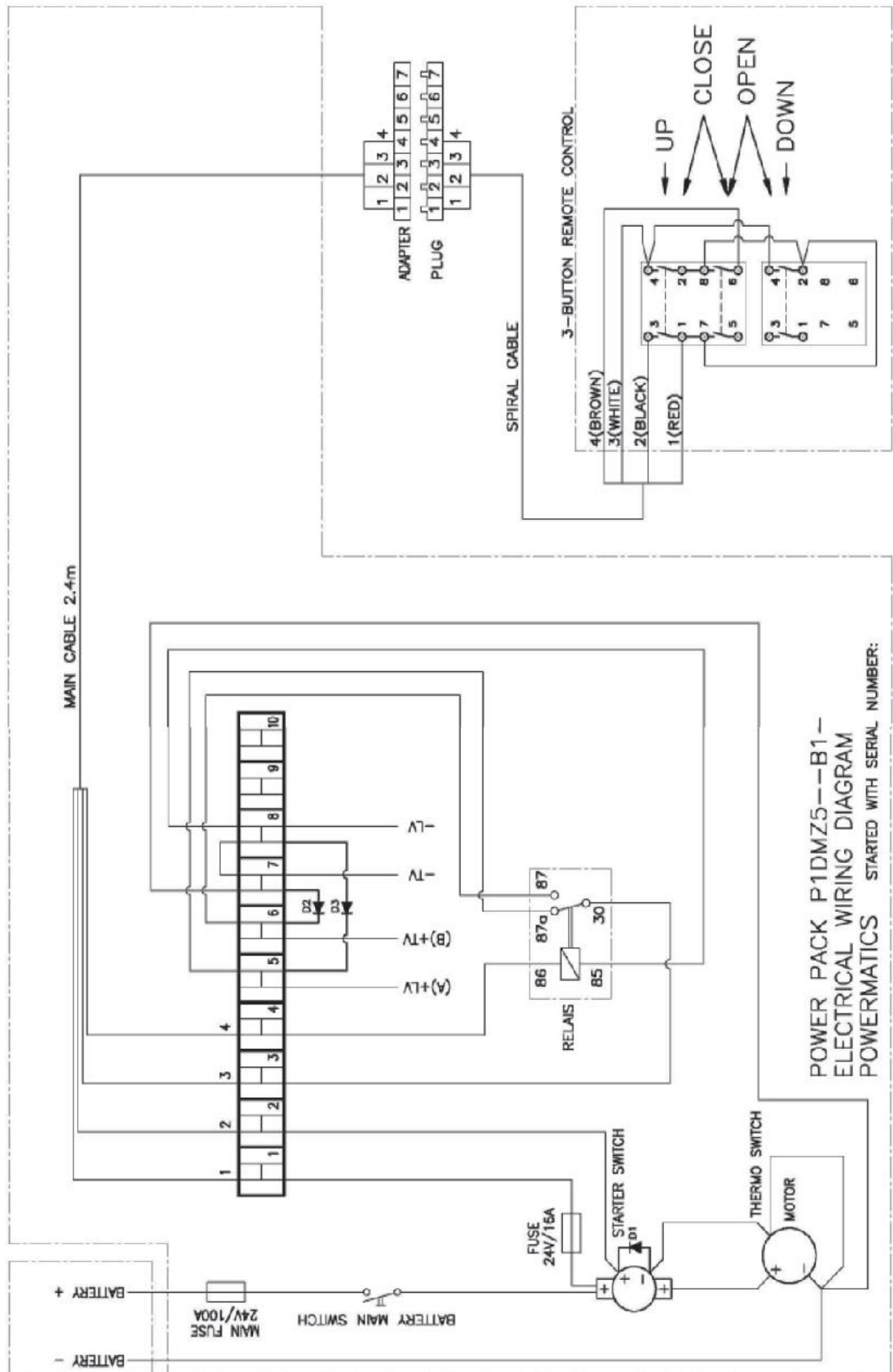
### **2.2 Light Duty Electric**

#### **2.2.1 Sitting and wiring controls**

Route the cable to power unit. Connect the power unit and valves as shown in respective diagrams, using crimp terminals and sleeves supplied.

#### **2.2.2 3-Button-Remote-Control**

2.2.2 When tail lift control is required from inside the vehicle body, 3-button-remote-control are used: this simply plugs into the control station socket.

**ELECTRICAL WIRING DIAGRAM**

**ELECTRO – HYDRAULIC POWER PACK**

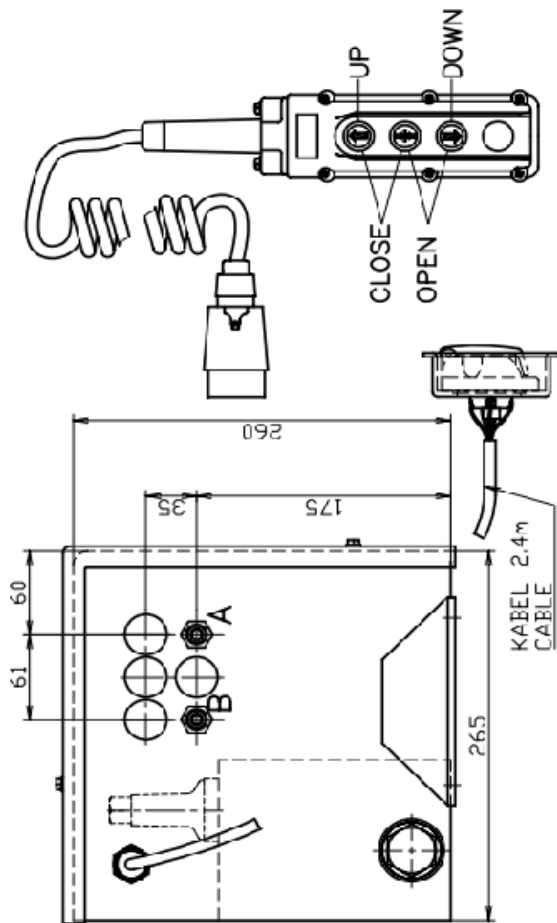
The power pack will be received fitted with all the hydraulic piping and oil reservoir is ready filled.

Information given here is for reference purpose. For further details, please refer to PHE tail lift manufacturer.

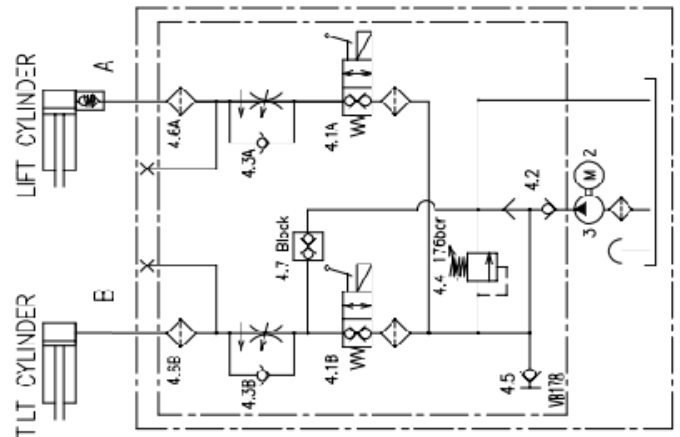
When connecting hydraulic hose etc, great care must be taken to ensure that the system is not contaminated with dust, grit etc.

**IMPORTANT:**

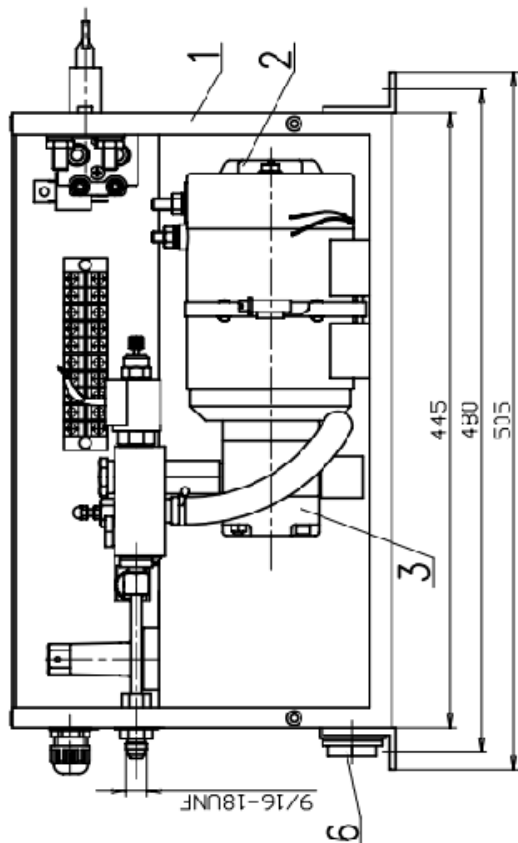
As the power pack is filled with hydraulic oil, please ensure the power pack is kept upright at all times to prevent spillage.



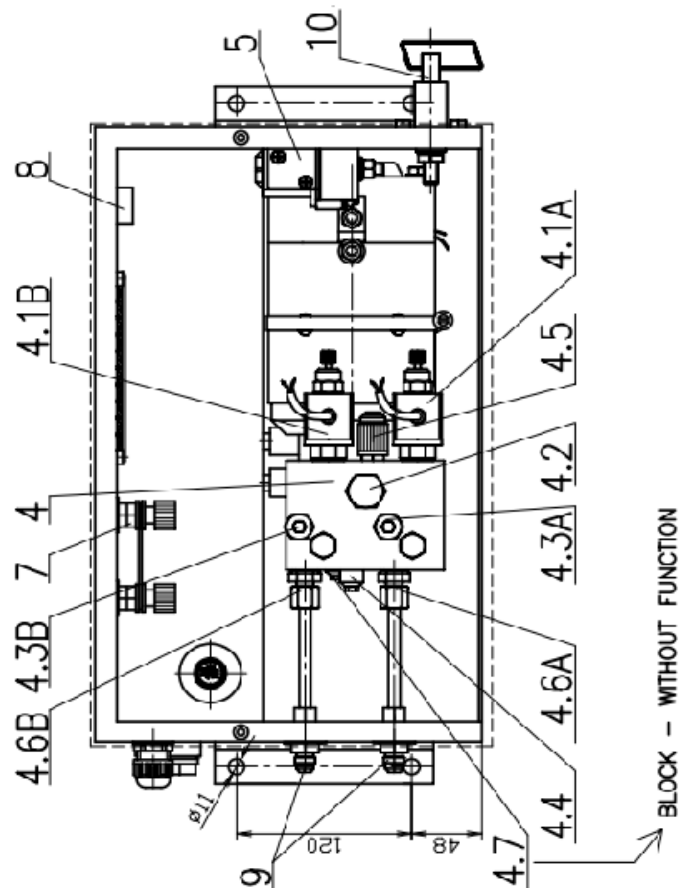
### HYDRAULISCHES SCHALTSCHHEMA HYDRAULIC SCHEMATIC



- 1 AGGREGATGEHÄUSE PN-13-1-1
- 2 SPLASH PROOF CASE FOR POWER JACK
- 3 MOTOR 24V, 24V WITH THERMO SWITCH
- 4 PUMPE 1.6cm<sup>3</sup>/U
- 4.1 VALVE BLOCK
- 4.1A, B 2/2-WEGEVENTIL MHW-C-40FDK
- 4.2 WECHSELVENTIL MHW-W/-1
- 4.3A, B 3/2-WEGEVENTIL MHW-W/-1
- 4.4 SICHERSHEITSVENTIL MHW-SV7x1 176bar
- 4.5 MESSANSCHLUSS MMKx1
- 4.6A, B TEST POINT PLUG
- 4.7 FINSCHRAUBVERSCHÄUBLING MIT FILTER
- 4.7A, B DE-GE-R3/8" 7/8
- 4.7C PIPE UNION WITH FILTER
- 4.7D SICHERSHEITSVENTIL MHW-SV7x1 ELKOK
- 5 RELIEF VALVE
- 5A MAGNETSTARTSCHALTER 24V
- 6 STARTERSWITCH
- 6A ANSAUGFILTER (AUSTAUSCHBAR)
- 6B CHANGEABLE SUCTION FILTER
- 7 HAUPTVERSCHÄUBLING
- 8 MAIN FUSE
- 8A RELAYS FÜR FERNSTEUERUNG
- 8B RELAYS FOR REMOTE CONTROL
- 9 VERSCHRAUBUNG DE-IM-9.16-8
- 10 SÖRENING
- 10A BATTERIEHAUPT/SCHALTE
- 10B BATTERY MAIN SWITCH



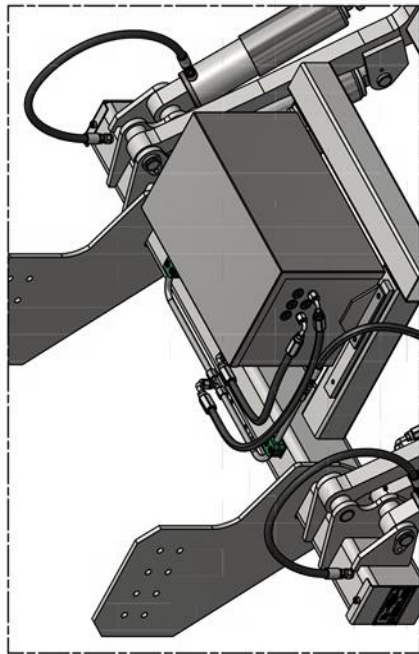
### ÜBERLAUFVOLUMEN: 7.6LITER OVERFLOW VOLUME



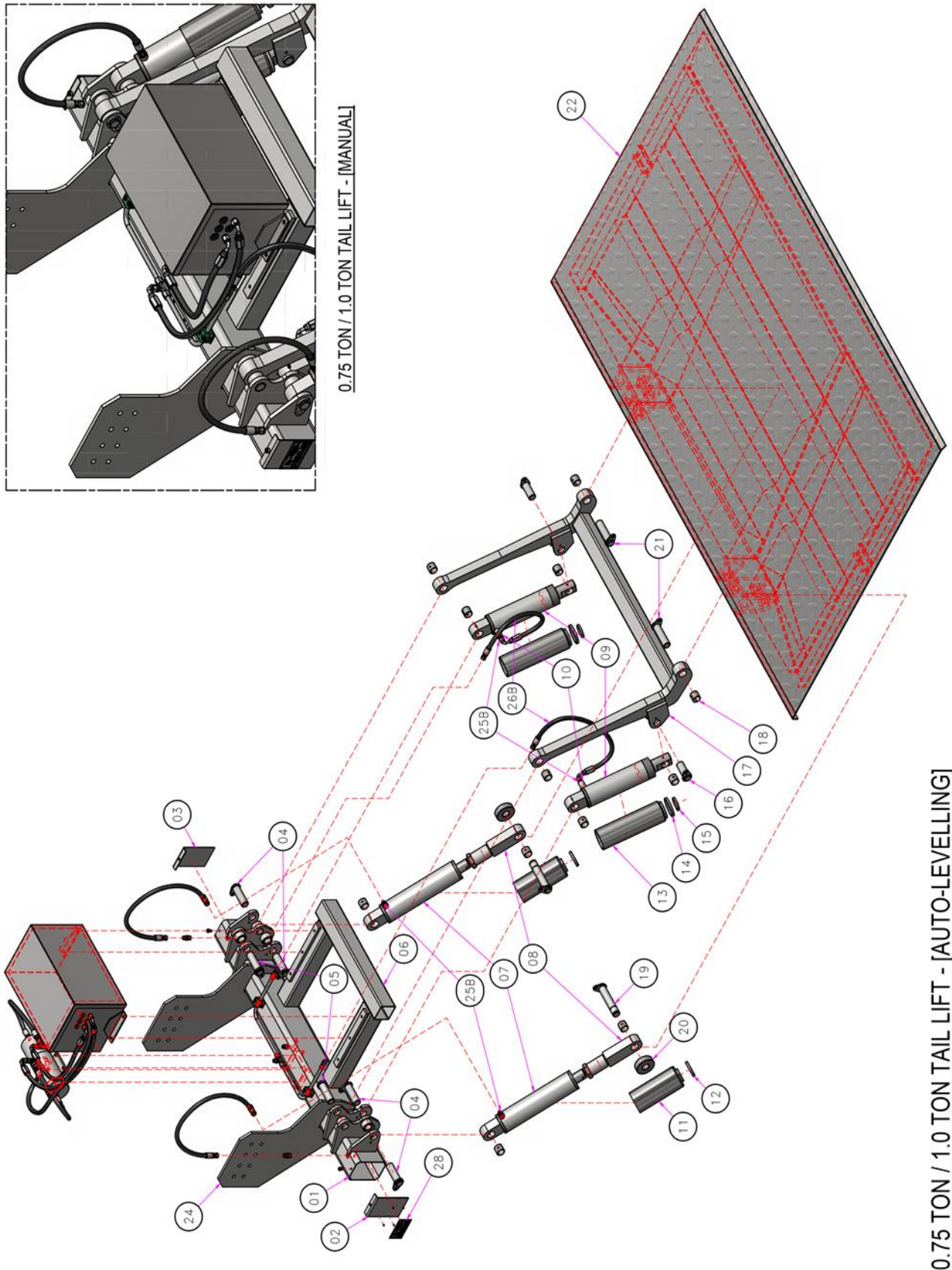
BLOCK - WITHOUT FUNCTION

The power pack consist of the following components:

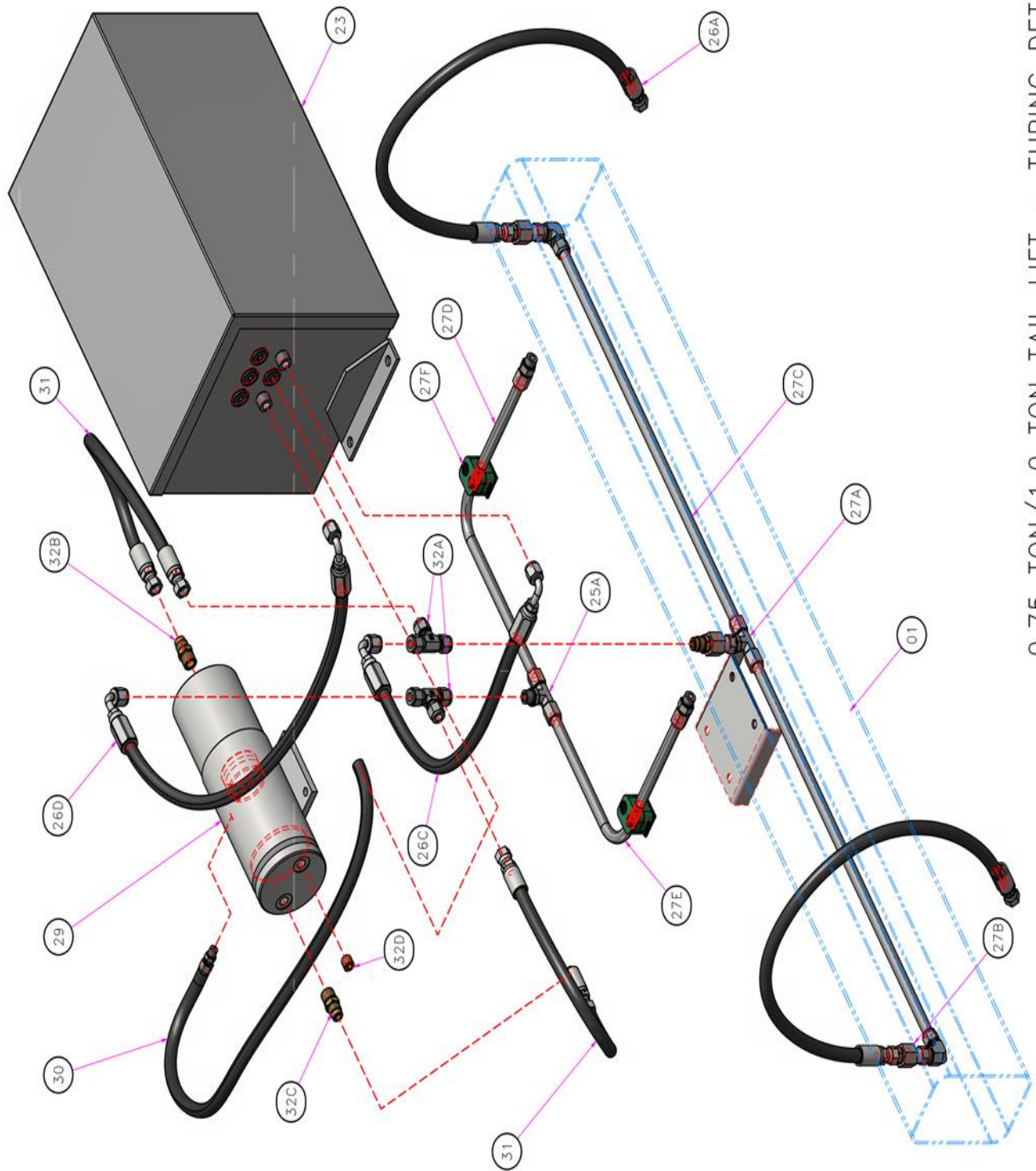
- 1) **Weatherproof case** with secure cover
- 2) **DC-Motor** 12V or 24V, 2kW with thermos switch
- 3) Pressure compensated gear pump 1.6cc/rev
- 4) **Valve block**, all aluminum valve block, including all valves;
  - 1.1) **2/2-way-valve**
  - 1.2) **Shuttle valve**
  - 1.3) **Flow control valve**
  - 1.4) **Relief Valve**
  - 1.5) **Test point plug**
  - 1.6) **Pipe union with filter**
  - 1.7) **Relief valve**
- 5) **Starter switch**
- 6) **Changeable suction filter**
- 7) **Main fuse**
- 8) **Relays** for remote control
- 9) **Pipe connection**
- 10) **Battery main switch**

**PARTS LIST****TAIL LIFT PARTS AND COMPONENT ASSEMBLY**

0.75 TON / 1.0 TON TAIL LIFT - [MANUAL]



0.75 TON / 1.0 TON TAIL LIFT - [AUTO-LEVELLING]



0.75 TON/1.0 TON TAIL LIFT – TUBING DETAILS

**0.75 TON/1.0 TON TAIL LIFT BOM LIST**

ITEM	DESCRIPTION	QTY	PART NO.
01	MAIN SUPPORT HOLLOW	1	TLA10101
02	MAIN SUPPORT COVER	1	TLA10201
03	MAIN SUPPORT COVER WITH HOLE	1	TLA10202
04	MAIN SUPPORT PIN ASSEMBLY	4	TLA10301
05	MAIN SUPPORT ARM PIN ASSEMBLY	2	TLA10302
06	REAR PROTECTION HOLLOW	1	TLA10102
07	TILTING CYLINDER	2	TLC10100
08	ADAPTOR ASSEMBLY	2	TLC10101
09	LIFTING CYLINDER	2	TLC10200
10	3/8" VELOCITY FUSE	2	TLC10201
11	TILTING CYLINDER SLEEVE	2	TLC10102
12	TILT LIFT CYLINDER SLEEVE COLLAR	2	TLC10103
13	LIFTING CYLINDER SLEEVE	2	TLC10202
14	TILT LIFT CYLINDER SLEEVE COLLAR	2	TLC10203
15	TILT LIFT CYLINDER SLEEVE SPACER	2	TLC10204
16	ARM LIFTING PIN ASSEMBLY	2	TLC10301
17	ARM ASSEMBLY	1	TLC10400
18	OIL BUSH	4	TLC10401
19	PLATFORM TILTING PIN ASSEMBLY	2	TLC10301
20	ROLLER	2	TLC10102
21	PLATFORM ARM PIN ASSEMBLY	2	TLC10302
22	PLATFORM	1	TLC10101
23	POWERPACK	1	TLC10202
23	POWERPACK	1	TLC10201
24	TAIL LIFT MOUNTING BRACKET	2	TLC10400
25	FITTING (SET)	1	TLF10100
26	HOSE (SET)	1	TLH10100
27	TUBING (SET)	1	TLT10100
28	ETCH PLATE	1	TLC10500
29	BOOSTER CYLINDER - AUTO LEVELLING ONLY	1	TLB10100
30	PNEUMATIC HOSE - AUTO LEVELLING ONLY	1	TLB10101
31	FITING (SET) - AUTO LEVELLING ONLY	2	TLBH10102
32	HOSE (SET) - AUTO LEVELLING ONLY	1	TLBF10200

**ASSEMBLY FITTING (TLF10100)**

ITEM	DESCRIPTION	QTY	PART NO.
25A	EQUAL TEE	1	TLF10101
25B	BONDED WASHER	4	TLF10102

**ASSEMBLY HOSE (TLH10100)**

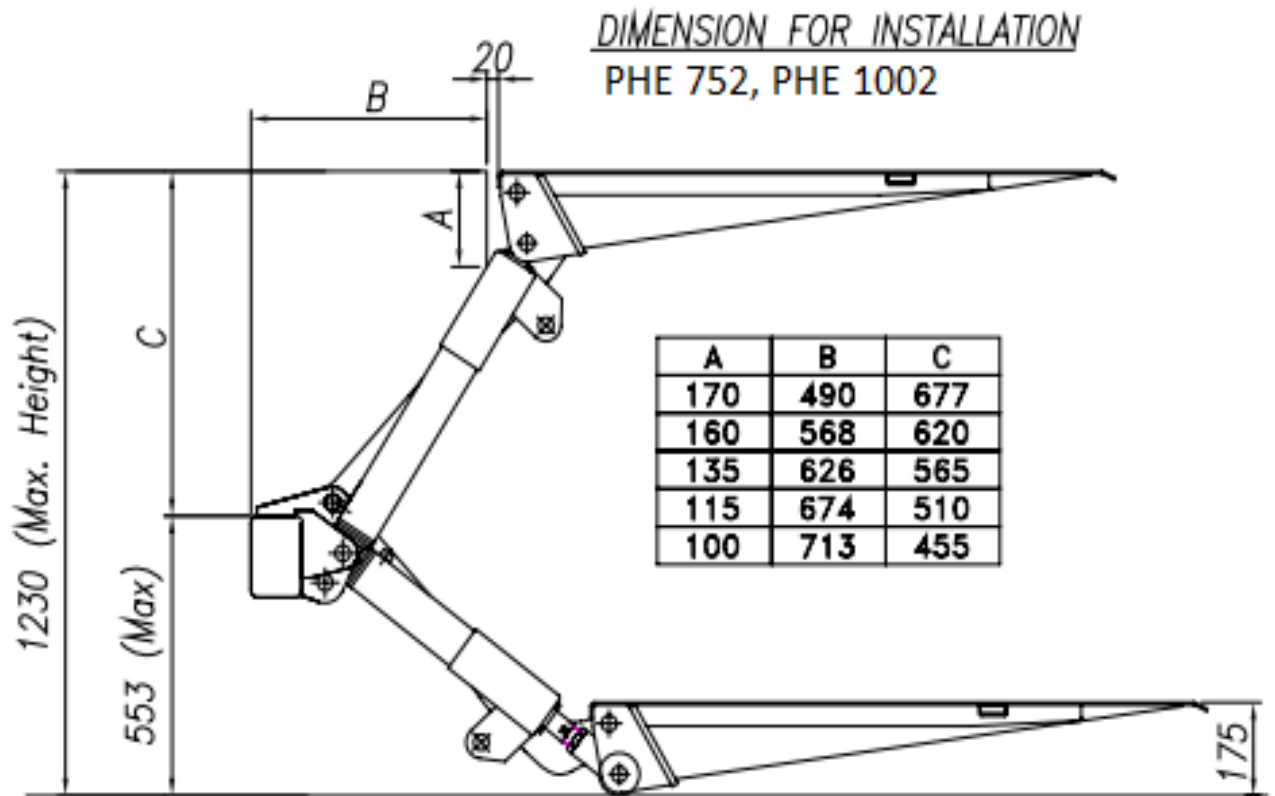
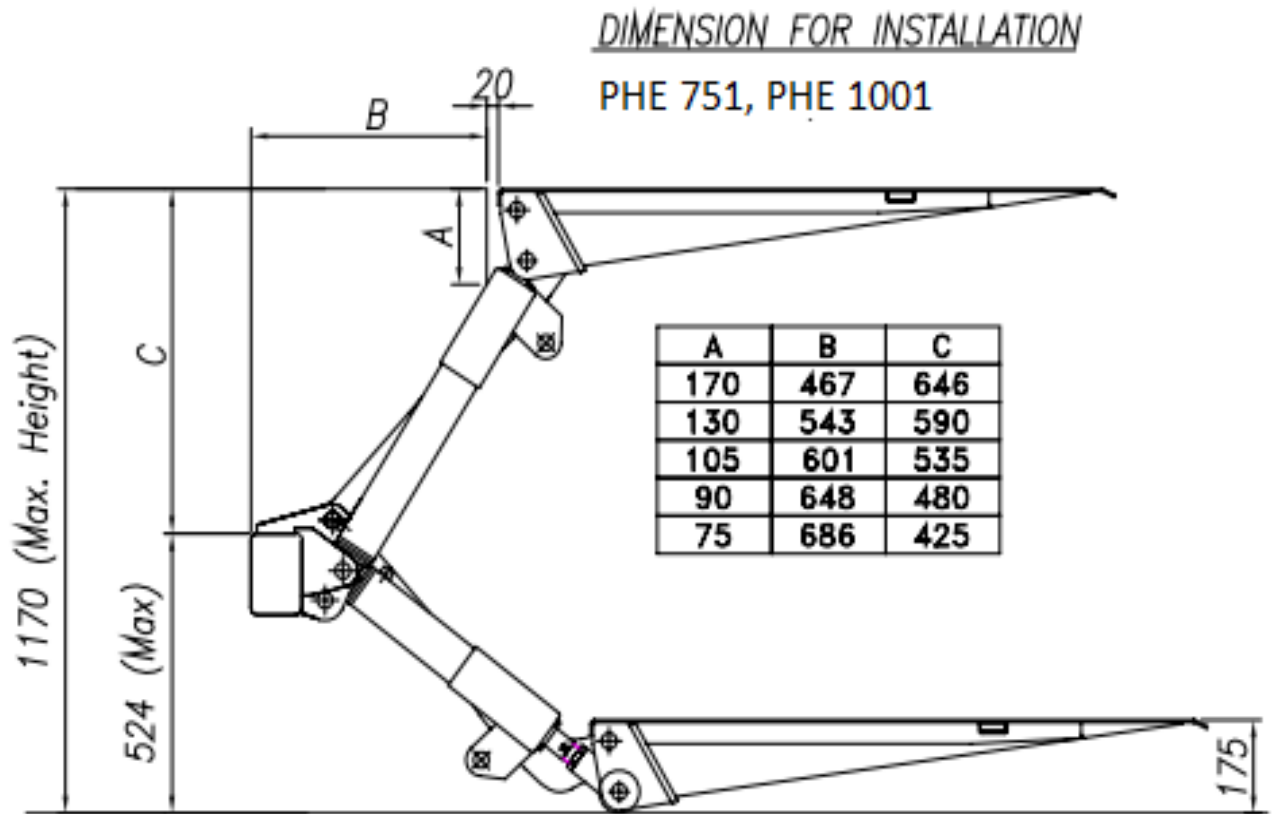
ITEM	DESCRIPTION	QTY	PART NO.
26A	HYDRAULIC HOSE	2	TLH10101
26B	HYDRAULIC HOSE	2	TLH10102
26C	HYDRAULIC HOSE	1	TLH10103
26D	HYDRAULIC HOSE	1	TLH10104

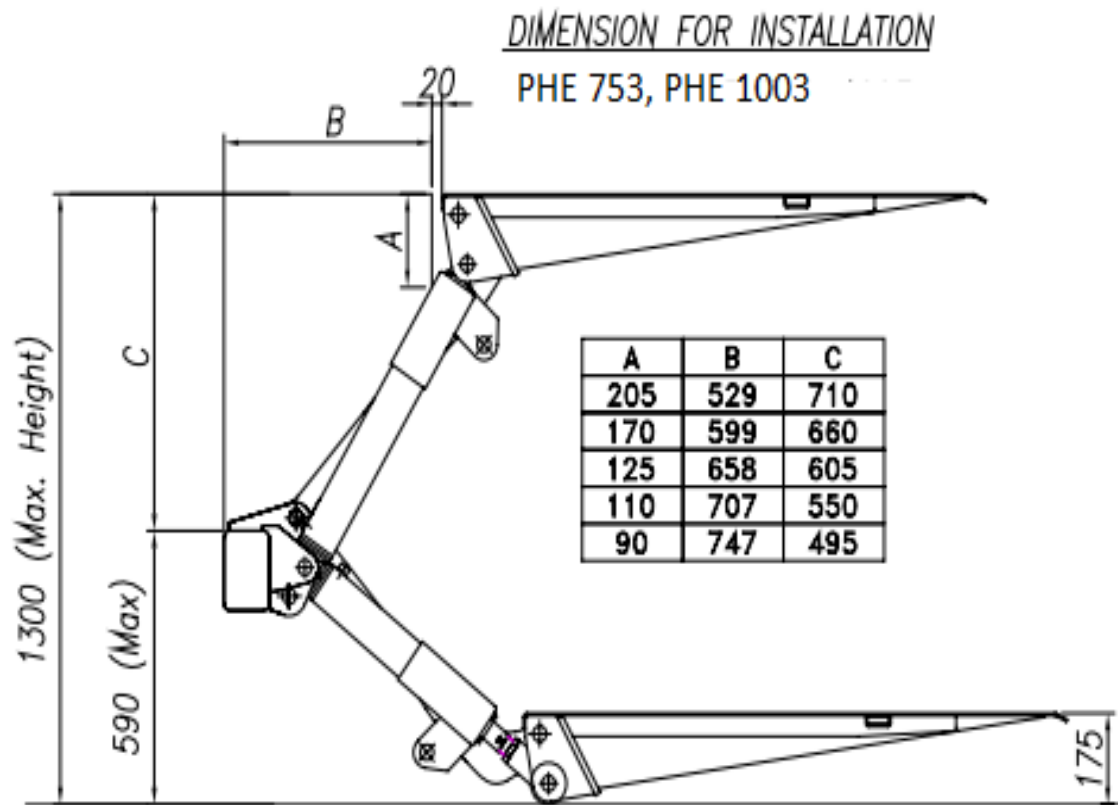
**ASSEMBLY TUBING (TLT10100)**

ITEM	DESCRIPTION	QTY	PART NO.
27A	TEE BUCKHEAD	1	TLT10101
27B	BULKHEAD	2	TLT10102
27C	TUBING	2	TLT10103
27D	TUBING	1	TLT10104
27E	TUBING	1	TLT10105
27F	TUBING CLAMP	2	TLT10108

**BOOSTER FITTING (TLBF10200)**

ITEM	DESCRIPTION	QTY	PART NO.
32A	RUN TEE	2	TLBF10201
32B	BONDED WASHER	1	TLBF10202
32C	BONDED WASHER	1	TLBF10203
32D	PLUG	1	TLBF10204

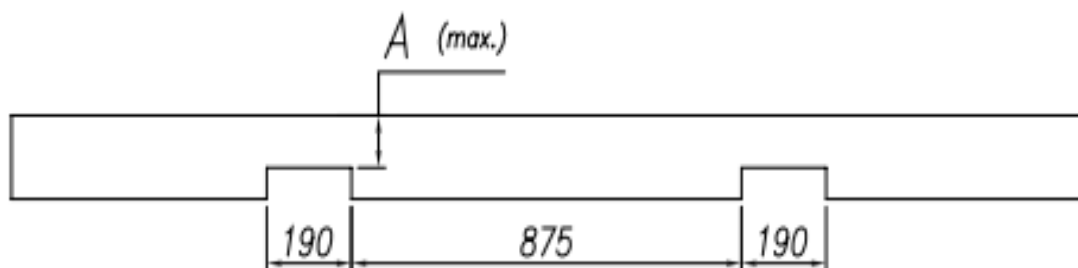


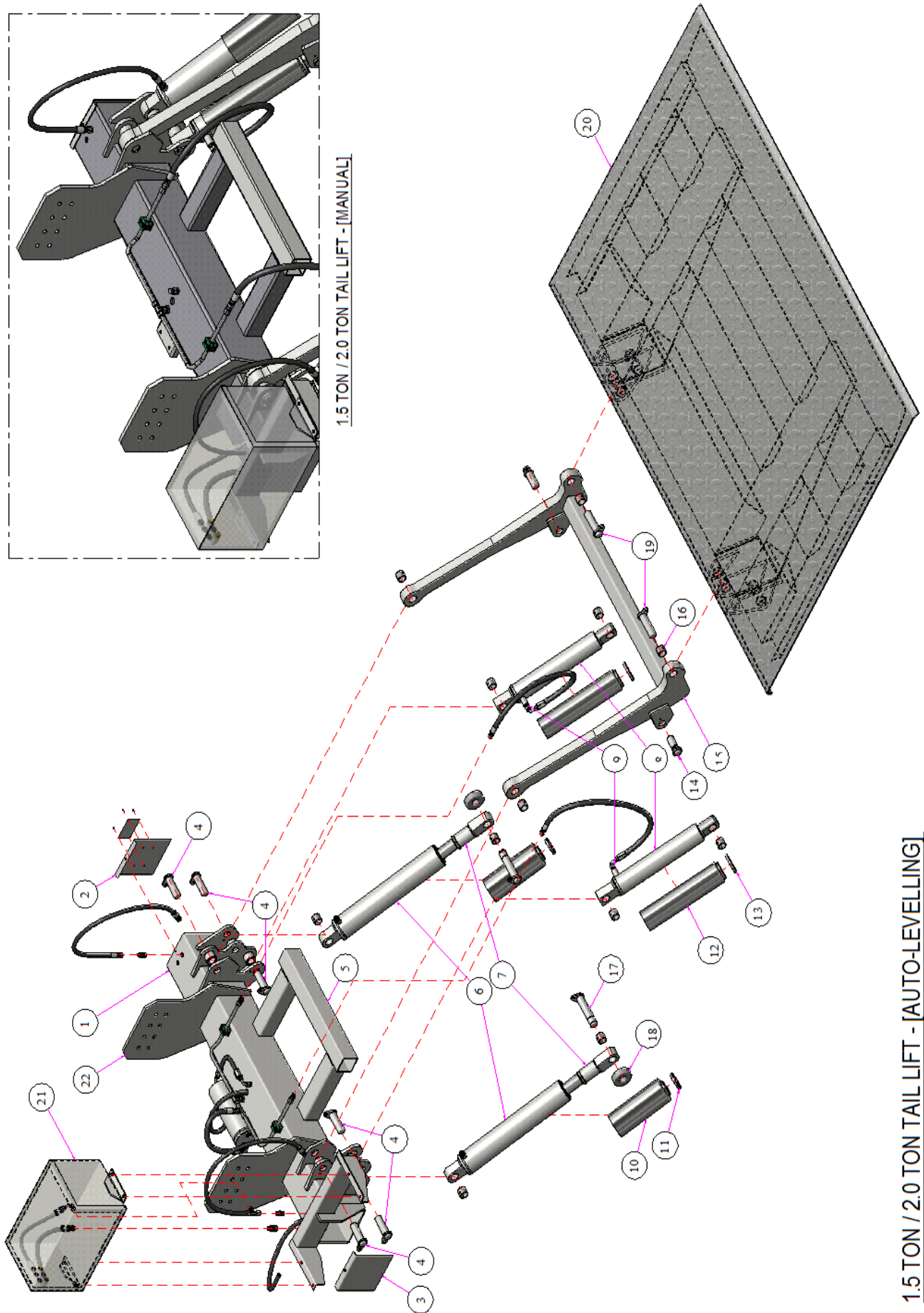


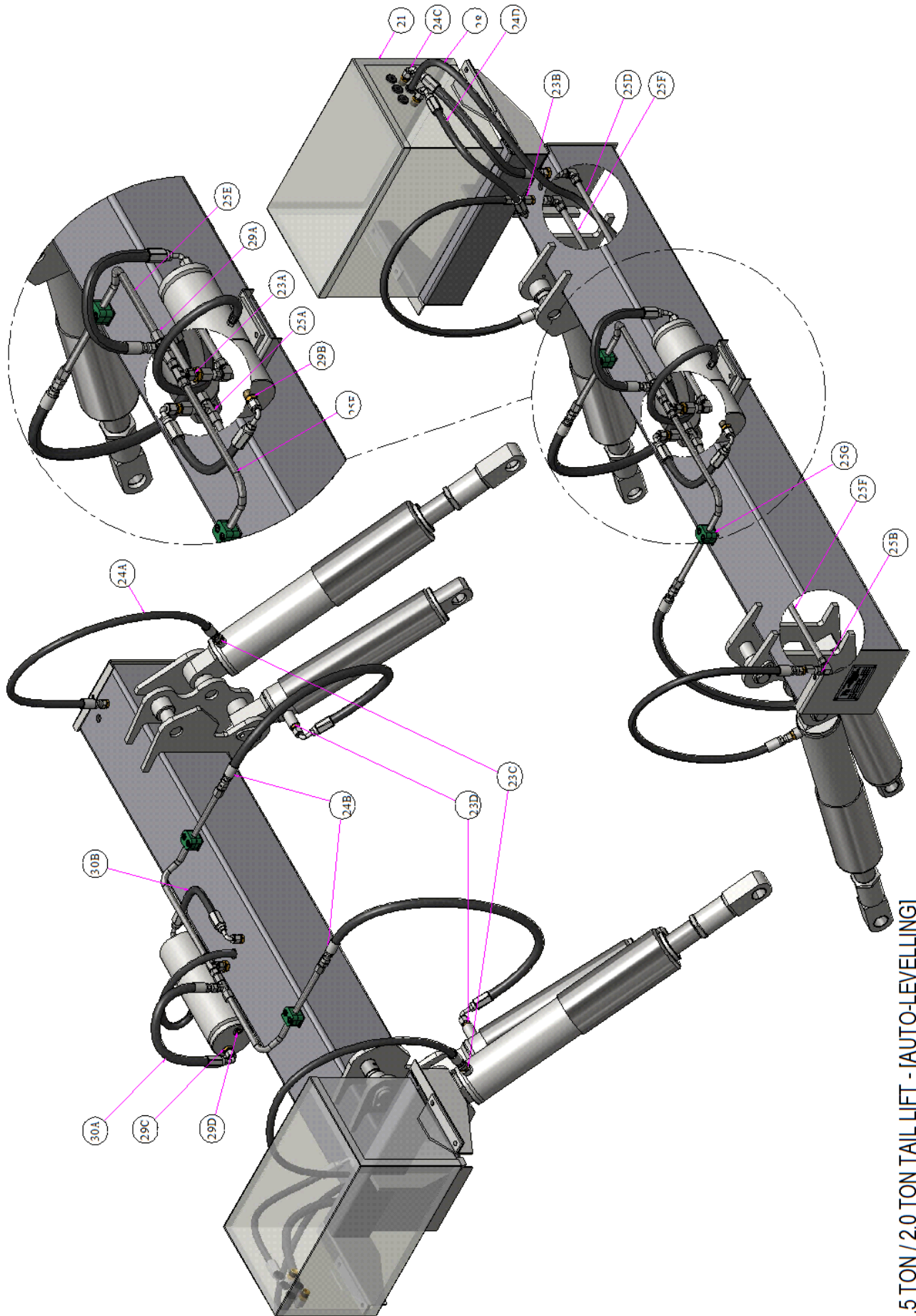
PHE 751, PHE 1001

PHE 752, PHE 1002

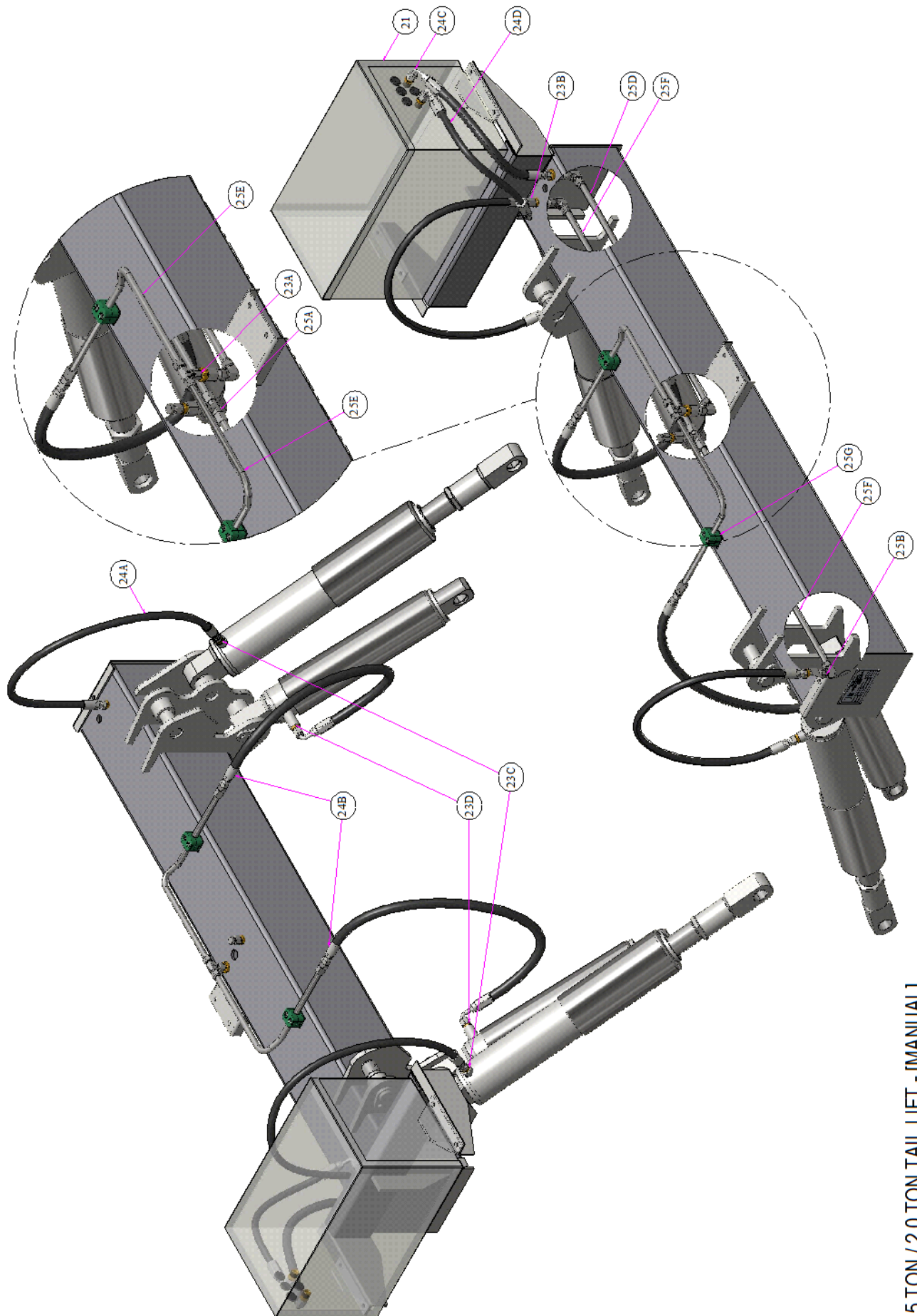
PHE 753, PHE 1003







1.5 TON / 2.0 TON TAIL LIFT - [AUTO-LEVELLING]



1.5 TON / 2.0 TON TAIL LIFT - [MANUAL]

**1.5 TON / 2.0 TON TAIL LIFT BOM LIST**

ITEM	DESCRIPTION	QTY	PART NO.
01	MAIN SUPPORT HOLLOW	1	TLA15101
02	MAIN SUPPORT COVER	1	TLA15201
03	MAIN SUPPORT COVER WITH HOLE	1	TLA15202
04	MAIN SUPPORT ARM PIN ASSEMBLY	6	TLA15302
05	REAR PROTECTION HOLLOW	1	TLA15102
06	TILTING CYLINDER	2	TLC15100
07	ADAPTOR ASSEMBLY	2	TLC15101
08	LIFTING CYLINDER	2	TLC15200
09	VELOCITY FUSE	2	TLC15201
10	TILTING CYLINDER SLEEVE	2	TLC15102
11	TILT LIFT CYLINDER SLEEVE COLLAR	2	TLC15103
12	LIFTING CYLINDER SLEEVE	2	TLC15202
13	TILT LIFT CYLINDER SLEEVE COLLAR	2	TLC15203
14	ARM LIFTING PIN ASSEMBLY	2	TLC15301
15	ARM ASSEMBLY	1	TLC15400
16	OIL BUSH	4	TLC15401
17	PLATFORM TILTING PIN ASSEMBLY	2	TLCA15301
18	ROLLER	2	TLCA15102
19	PLATFORM ARM PIN ASSEMBLY	2	TLCA15302
20	PLATFORM	1	TLCA15101
21	POWERPACK	1	TLCA10202
21	POWERPACK	1	TLCA10201
22	TAIL LIFT MOUNTING BRACKET	2	TLCA15400
23	FITTING (SET)	1	TLF15100
24	HOSE (SET)	1	TLH15100
25	TUBING (SET)	1	TLT15100
26	SERIAL NUMBER PLATE	1	TLCA15500
27	BOOSTER CYLINDER - AUTO LEVELLING ONLY	1	TLB10100
28	PNEUMATIC HOSE - AUTO LEVELLING ONLY	1	TLB15101
29	FITTING (SET) - AUTO LEVELLING ONLY	1	TLBF15100
30	HOSE (SET) - AUTO LEVELLING ONLY	2	TLBH15100

**ASSEMBLY FITTING [TLF15100]**

ITEM	DESCRIPTION	QTY	PART NO.
23A	BRANCH TEE	1	TLF15101
23B	RUN TEE	1	TLF15102
23C	BONDED WASHER	2	TLF15103
23D	BONDED WASHER	2	TLF15104

**ASSEMBLY HOSE [TLH15100]**

ITEM	DESCRIPTION	QTY	PART NO.
24A	HYDRAULIC HOSE	2	TLH15101
24B	HYDRAULIC HOSE	2	TLH15102
24C	HYDRAULIC HOSE	1	TLH15103
24D	HYDRAULIC HOSE	1	TLH15104

**ASSEMBLY TUBING [TLT15100]**

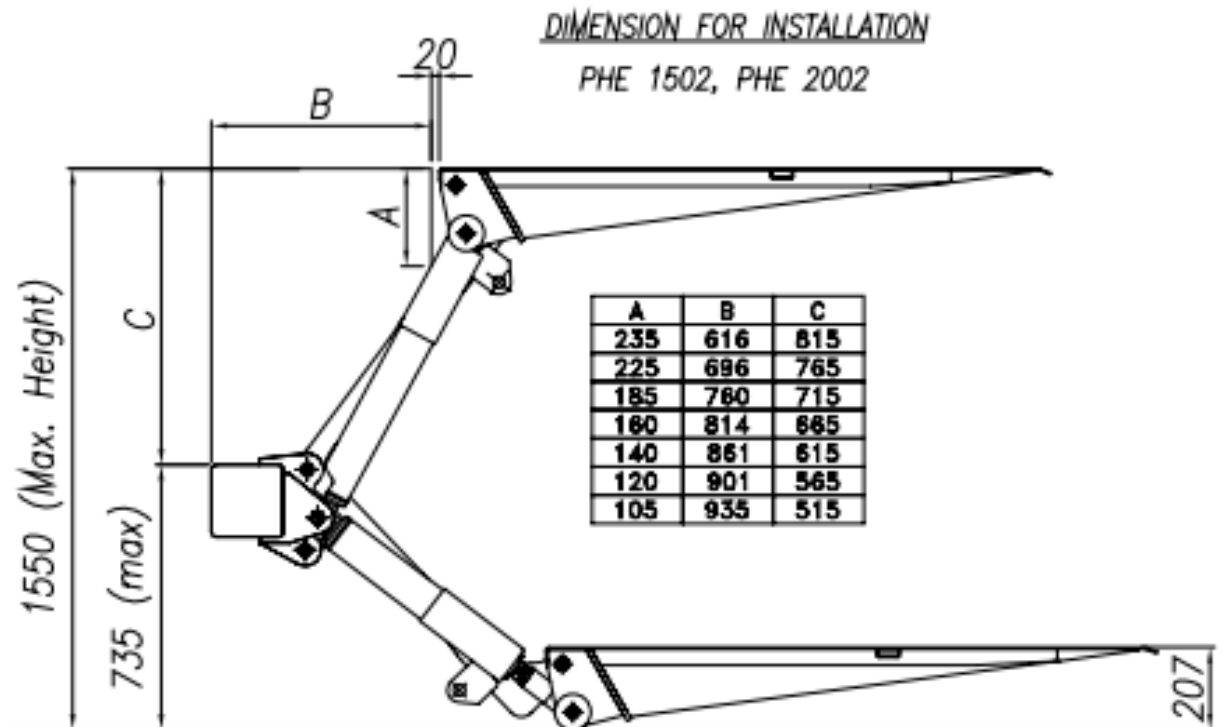
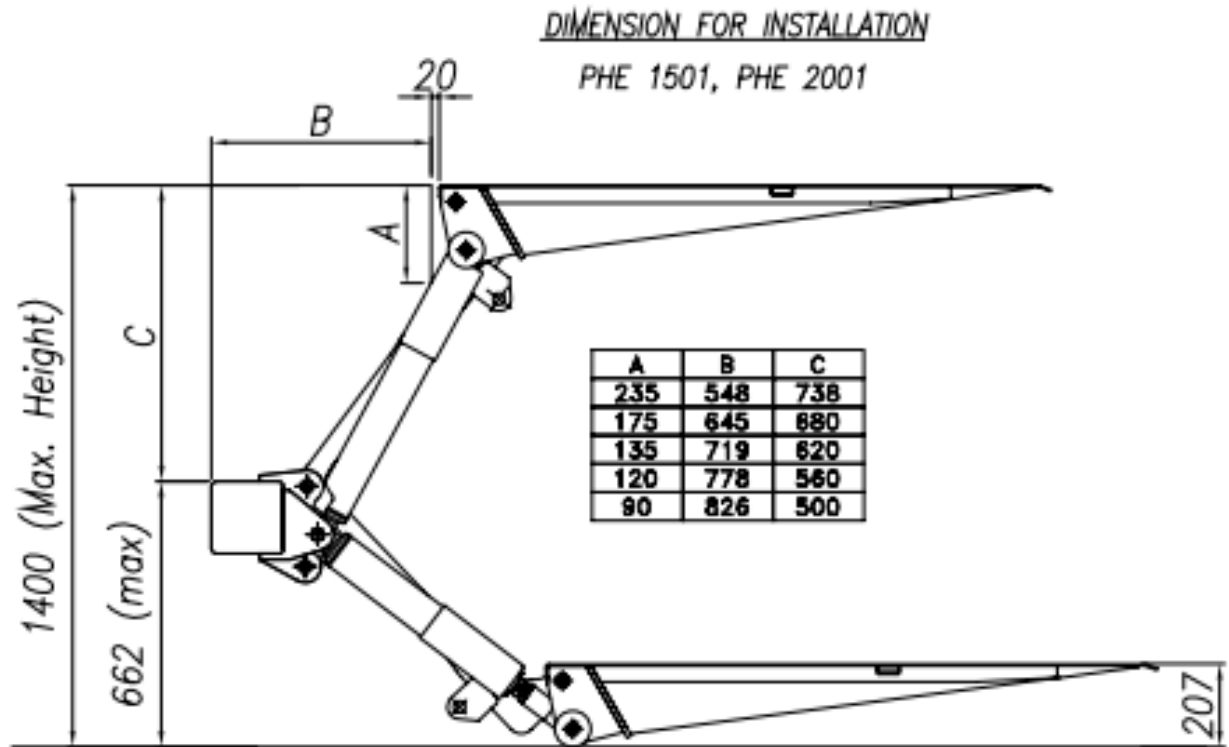
ITEM	DESCRIPTION	QTY	PART NO.
25A	TEE BULKHEAD	1	TLT15101
25B	BULKHEAD	2	TLT15102
25C	BULKHEAD	2	TLT15103
25D	TUBING	2	TLT15104
25E	TUBING	1	TLT15105
25F	TUBING	1	TLT15106
25G	TUBING CLAMP	2	TLT15107

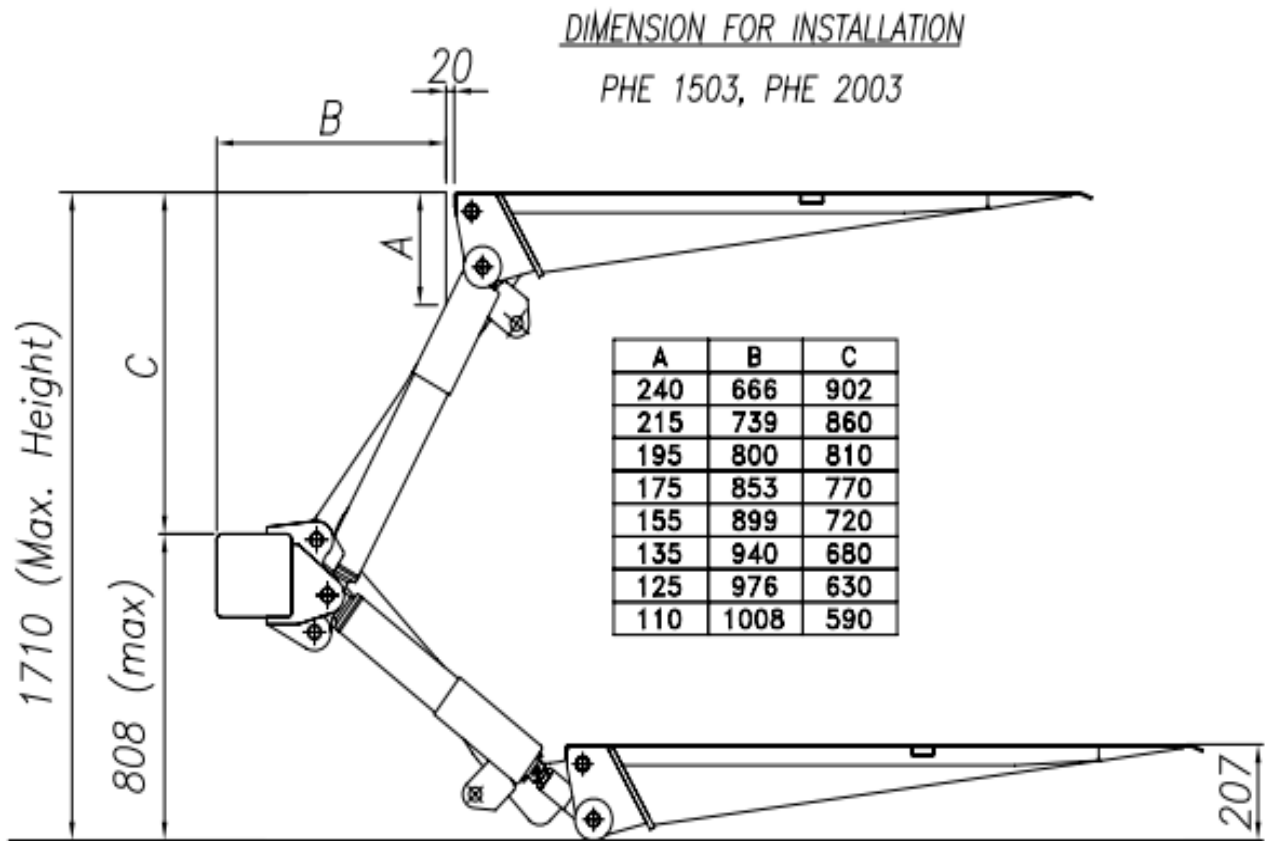
**TAIL LIFT HYD FITTING [TLBF15100]**

ITEM	DESCRIPTION	QTY	PART NO.
29A	RUN TEE	1	TLBF15101
29B	BONDED WASHER	1	TLBF15102
29C	BONDED WASHER	1	TLBF15103
29D	PLUG	1	TLBF15104

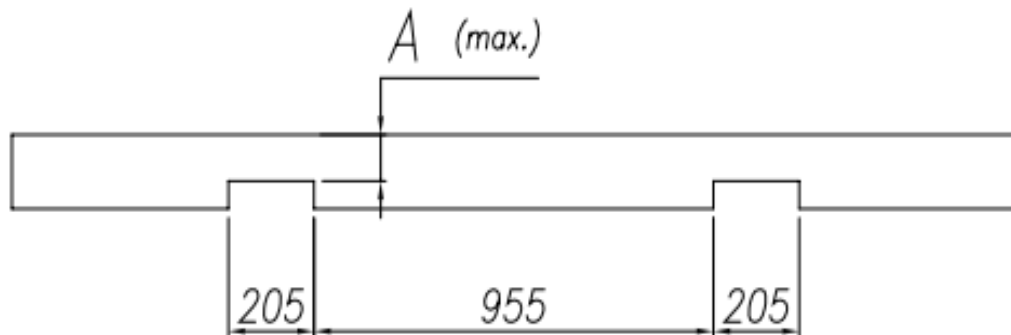
**TAIL LIFT HYD HOSE [TLBH15100]**

ITEM	DESCRIPTION	QTY	PART NO.
30A	HYDRAULIC HOSE	1	TLBH15101
30B	HYDRAULIC HOSE	1	TLBH15102

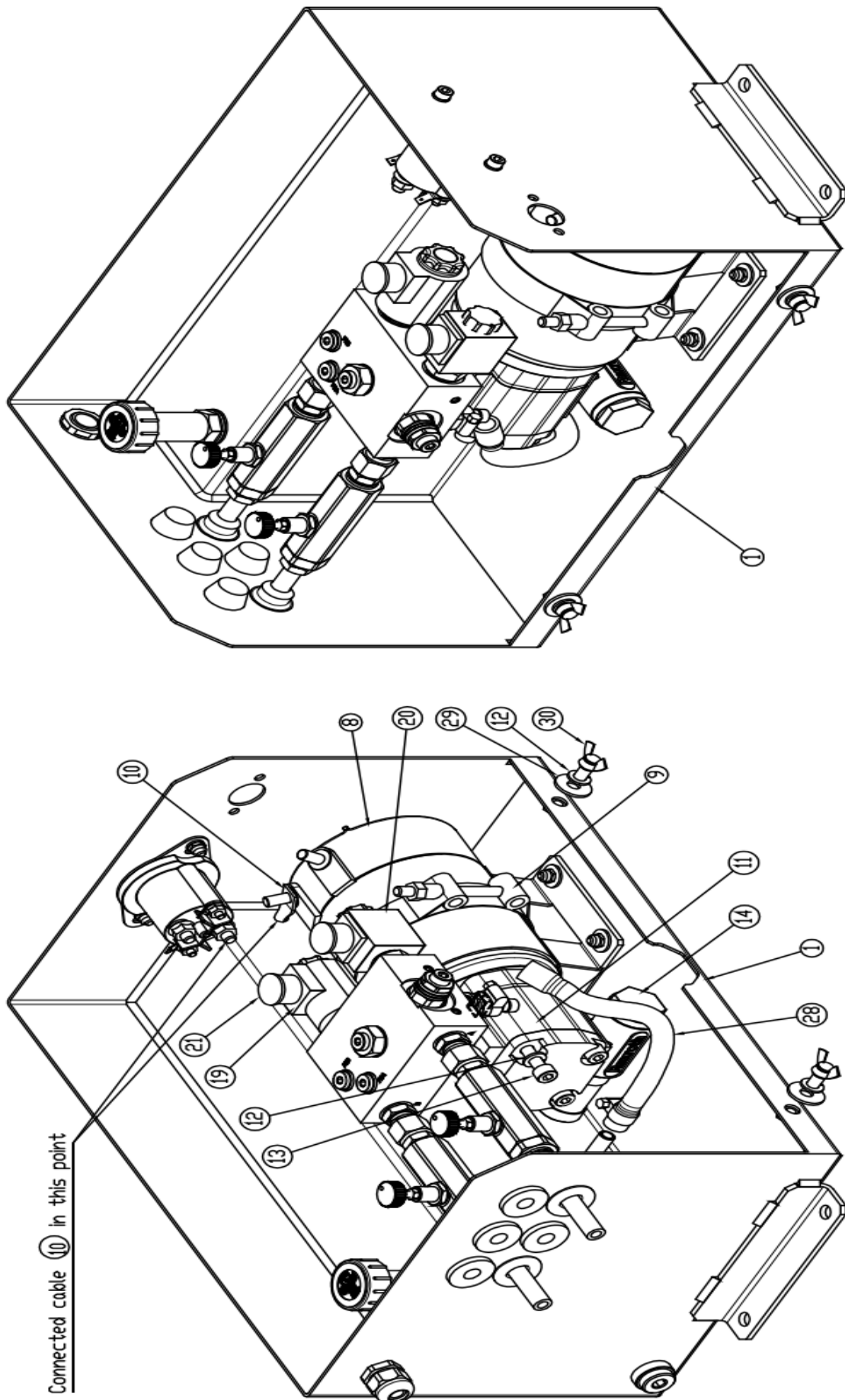


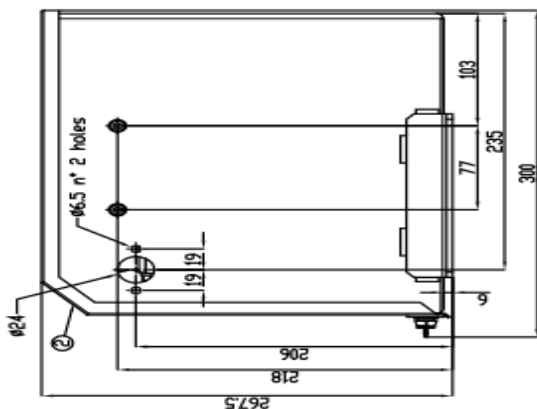
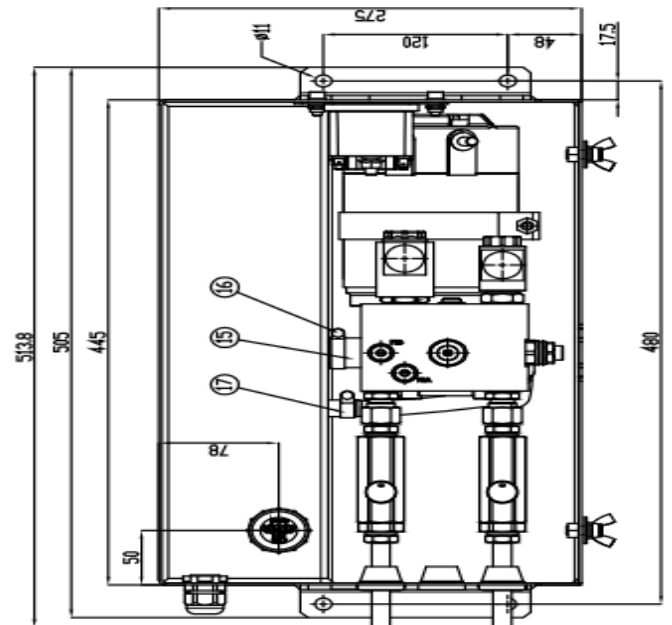
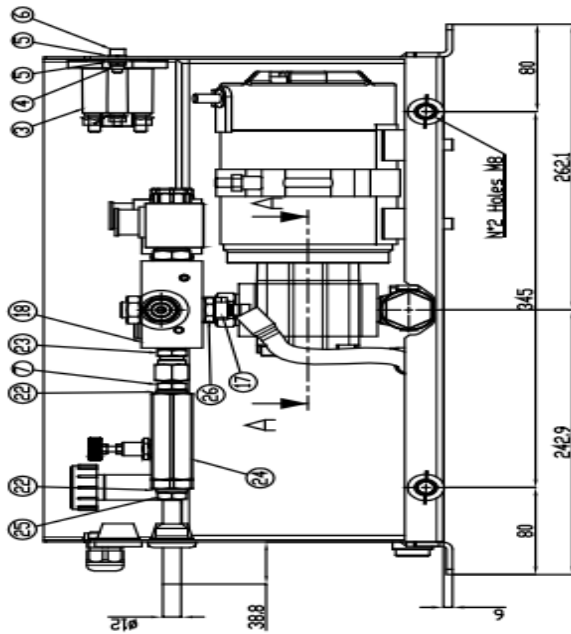
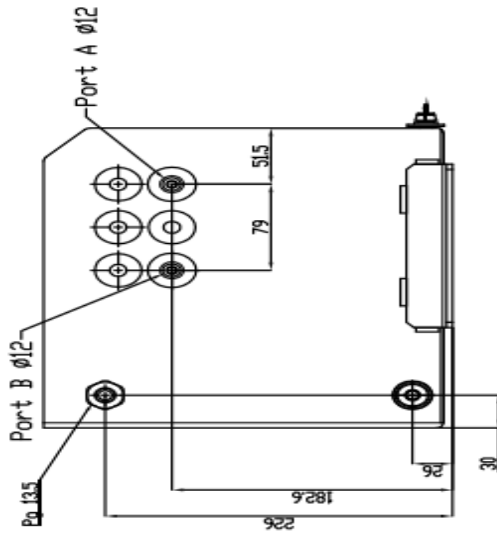


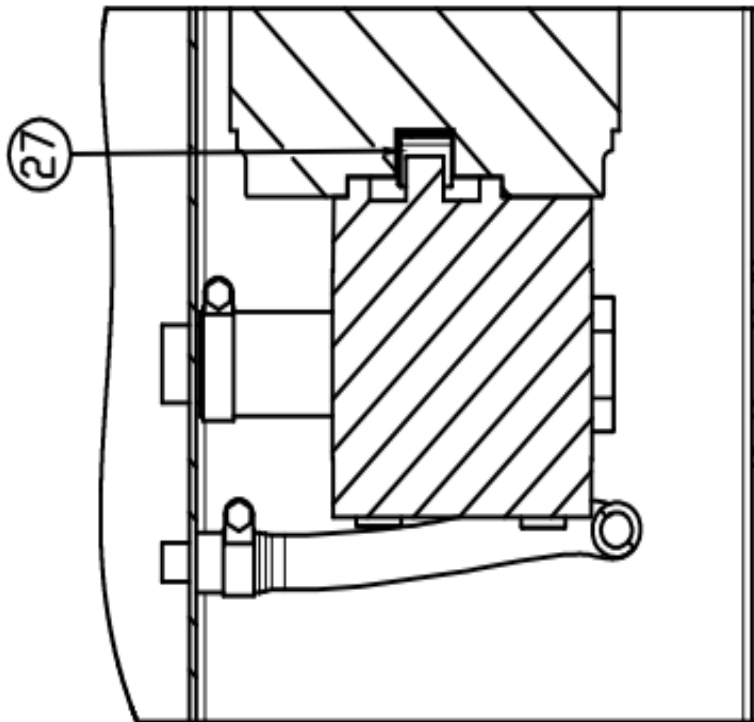
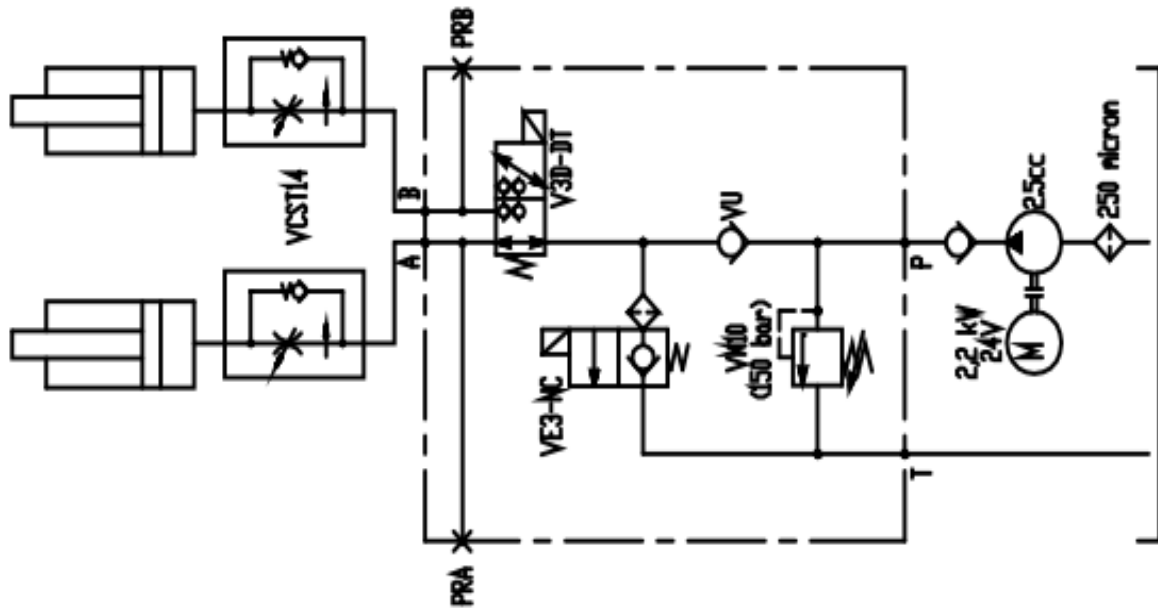
*PHE 1501, PHE 2001*  
*PHE 1502, PHE 2002*  
*PHE 1503, PHE 2003*



**Power Pack (Bosch Rexroth model)**



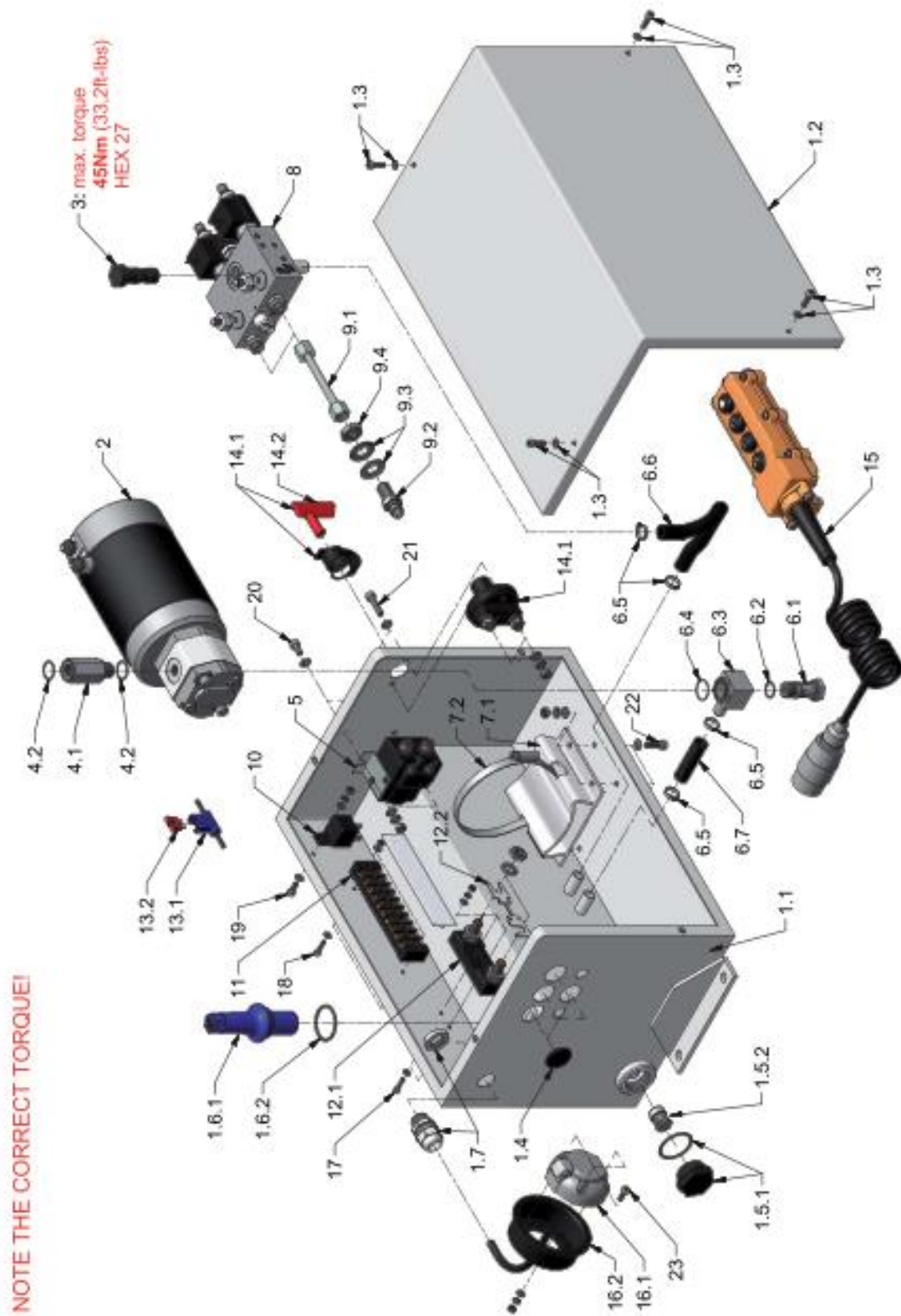




A-A

Pos.	Qty	Code	R-Number	Apache code	Description
1	1	PR120081			Box
2	1	PR12008L	R930056063		Cover
3	1	C165538000	R932008488		Start contactor 24V 150A
4	2	C010711000			Self-locking nut M6 UNI 7474
5	4	C012504000	R932007971		Curved spring washer DIN128A for M6
6	2	C010018000	R932007533		Screw M6x16-8.8 UNI 5931
7	2	F239010000			Special Adaptor 1/4" BSP pipe Ø12
8	1	C162087000			C88 Electric motor 24V-2200W with thermal switch
9	1	C162803000	R930040641		Steel clamp for fixing motor
10	1	K224732000	R932006369		Cable 25 mm2
11	1	C1640S1279			Pump 148 (10A25X551-3RG) 2.5 cc
12	4	C012506000	R932006844		Washer Ø8 DIN128A
13	2	C010046000			Screw M8x90-8.8 UNI 5931
14	1	F2501S1247A			Suction filter assembly
15	1	9999999192			Rubber pipe EURORD P.E.10 BAR ISO1307 NBR 19x27
16	2	C162804000	R930040642		Metal clamp W2 FSD015-25-9 15-25
17	2	C162804000	R930040642		Metal clamp W2 FSD015-25-9 15-25
18	1	PR12008D			Modular block
19	1	C1664370C1	R932000790		S4-CEI Coil 24Vdc 26W
20	1	C1664550C1	R932000805		S-CE coil 24Vdc 18W
21	2	R3897CA253	R932008015		Plastic protection for solenoid
22	5	C012402000	R932006375	110503012000000	Bonded seal 1/4"BSPP
23	2	C014106000		120601004000000	Male stud connector 1/4"BSPP - Ø12
24	2	VCST14			Pressure compensated adjust. flow regulator G1/4
25	2	F239018000			Special adaptor 1/4"BSPP pipe Ø12 l=78
26	1	PR12008G			Drain pipe 1/4" BSPP
27	1	F226158000			Coupling for gear pump
28	1	9999999191			Rubber pipe EURORD P.E.10 BAR ISO1307 NBR 10x17
29	2	C012609000	R930030450	100407013000000	Washer Ø8.5x24x2
30	2	C009901000			Screw M8x15 UNI 5449

### Power Pack (MHW model)



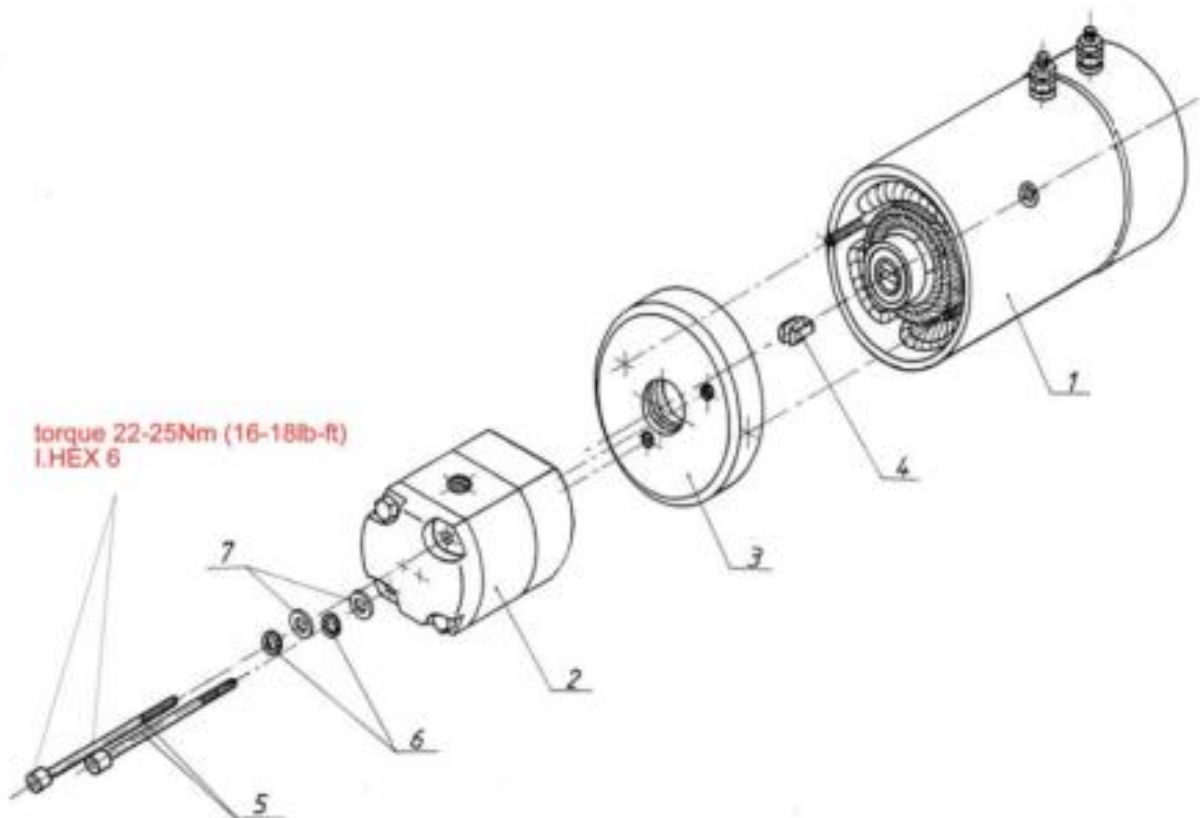
No.	Part Number	Description	Pcs	Drawing No.
-	0PW1P1DMZ5-B1-	Power pack 12V, assembly	1	MHW-P1DMZ5-B1-12V
-	0PW2P1DMZ5-B1-	Power pack 24V; assembly	1	MHW-P1DMZ5-B1-24V
1.1	0IK30411	Case for power pack & oil reservoir	1	MHW-PM-13-1-1S-1
1.2	0IK30413	Cover for power pack	1	MHW-PM-13-1-1S-2
1.3	0KK10155A2	Allen key screw	4	M5x16 (stainless steel)
	0KK10606A2	Flat washer	4	ø5 (stainless steel)
1.4	0UK10146	Rubber sleeve	4	ø26/12
1.5.1	0UK00049	Oil drain plug G1"	1	TSN-1
1.5.2	0NK10001	Suction filter	1	MHW-AFS-15.9/1
1.6.1	0UK00042K	Dipstick G1", oil reservoir	1	MHW-TVST-3
1.6.2	0LK11876	O-Ring for dipstick	1	ø35x2
1.7	0SK10700	PG-Screwing	1	PG13.5
2	0PG29009	Motor with pump 12V	1	MHW-2000-1-2 12V/2.1
	0PG29010	Motor with pump 24V	1	MHW-2000-1-2 24V/2.1
3	0FV21097	Shuttle valve	1	MHW-WV-1FO
4.1	0RK25235	Adaptor; shuttle valve - pump	1	MHW-VS-KL1PG
4.2	0LK11050	O-Ring for adaptor	2	ø18x1.5
5	0BK00002	Starter solenoid 12V	1	JK102
	0BK00004	Starter solenoid 24V	1	JK202
6.1	0RK25102	Screw for suction cube	1	MHW-BFS-KL1PG
6.2	0LK10874	O-Ring for screw	1	ø15x1.5
6.3	0RK25188	Suction cube	1	MHW-AW-KL1PG
6.4	0LK11170	O-Ring for suction cube	1	ø20x1.5
6.5	0OK10006	Clamp; suction tube & return tube	4	ø12-22/9
6.6	0OK10126	Return tube	1	13/20 - L=230mm
6.7	0OK10126	Suction tube	1	13/20 - L=60mm
7.1	0UK10153	Motor base	1	MHW-ML-130
7.2	0OK10040	Clamp; motor	1	ø100-120/12
8	0EK20483F12PM	Valve block; assembly 12V	1	MHW-VB-178ATS/PM 12V
	0EK20483F24PM	Valve block; assembly 24V	1	MHW-VB-178ATS/PM 24V

No.	Part Number	Description	Pcs	Drawing No.
9.1	0XR19655	Connection pipe	2	ø8x1, L=105mm
9.2	0RK72065	Fitting	2	DFV-TM-9.16-8-1
9.3		Mounting disc	4	DFV-TM-9.16-8-2
9.4	0KK10656	Nut	2	M14x1.5 DIN 439B
10	0SK11180	Relays 12VDC	1	JD1912CJ
	0SK11181	Relays 24VDC	1	JD2912CJ
11	0SK11215	Terminal box	1	10 pole
12.1	0SK10604	Main fuse holder	1	
12.2	0SK10608	Main fuse for 12VDC	1	125A - (12V)
	0SK10606	Main fuse for 24VDC	1	80A - (24V)
13.1	0SK11175	Fuse holder	1	
13.2	0SK11177	Fuse for 12VDC	1	24A - (12V)
	0SK11176	Fuse for 24VDC	1	16A - (24V)
14.1	0SK11151	Battery main switch with key	1	
14.2	0SK11150	Key for battery main swicht	1	
15	0SK18522PM-EW	3-button-remote-control with plug	1	
16.1	0SK20010	Adapter, 3-button-remote-control	1	7 pole
16.2	0RK71101K	Recessed cover for adapter	1	MHW-SBR-90
17	0KK10067	Allen key screw	2	M4x16
	0KK10605	Flat washer	4	ø4
	0KK10685	Spring washer	2	ø4
	0KK10645	Nut	2	M4
18	0KK10067	Allen key screw	2	M4x16
	0KK10605	Flat washer	4	ø4
	0KK10645	Nut	2	M4
19	0KK10143	Allen key screw	1	M5x12
	0KK10606	Flat washer	2	ø5
	0KK10686	Spring washer	1	ø5
	0KK10646	Nut	1	M5
20	0KK10250	Allen key screw	2	M6x12
	0KK10607	Flat washer	4	ø6
	0KK10687	Spring washer	2	ø6
	0KK10647	Nut	2	M6

No.	Part Number	Description	Pcs	Drawing No.
21	0KK10268	Allen key screw	2	M6x20
	0KK10607	Flat washer	4	ø6
	0KK10687	Spring washer	2	ø6
	0KK10647	Nut	2	M6
22	0KK10268	Allen key screw	4	M6x20
	0KK10607	Flat washer	8	ø6
	0KK10687	Spring washer	4	ø6
	0KK10647	Nut	4	M6
23	0KK10143	Allen key screw	3	M5x12
	0KK10606	Flat washer	3	ø5
	0KK10686	Spring washer	3	ø5
	0KK10646	Nut	3	M5

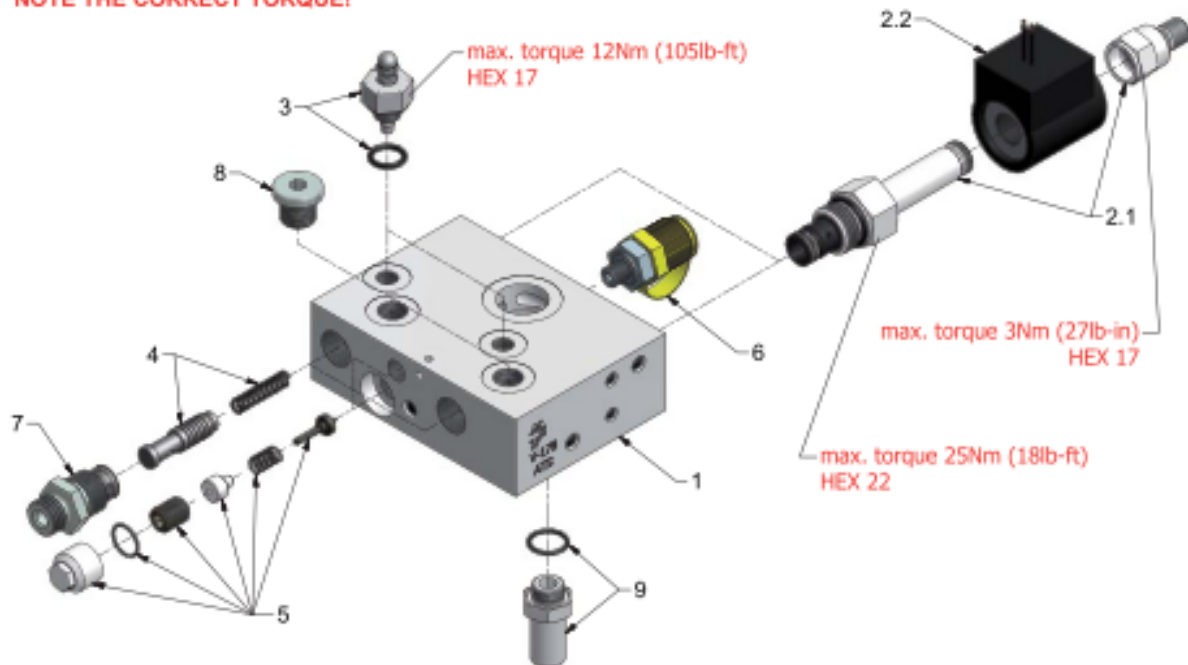
**Motor Pump Unit**

No.	Part Number	Description	Pcs	Drawing No.
-	0PG29009	Motor-pump-unit 12V, assembly	1	MHW-2000-1-2 12V/2.1
-	0PG29010	Motor-pump-unit 24V, assembly	1	MHW-2000-1-2 24V/2.1
1	0AK01025	DC-motor 12V	1	2kW; 12V
	0AK01030	DC-motor 24V	1	2kW; 24V
2	0CK06089	Pump 1.6ccm, assembly	1	MHW10AR1.6
3	0RK40010	Adapter disc	1	MHW-2000-7.2.3
4	0TK20288	Coupling	1	L=14; AD=20 (LBW)
5	0KK10403	Allen key screw	2	M8x80
6	0KK10688	Spring washer	2	ø8
7	0KK10609	Flat washer	2	ø8



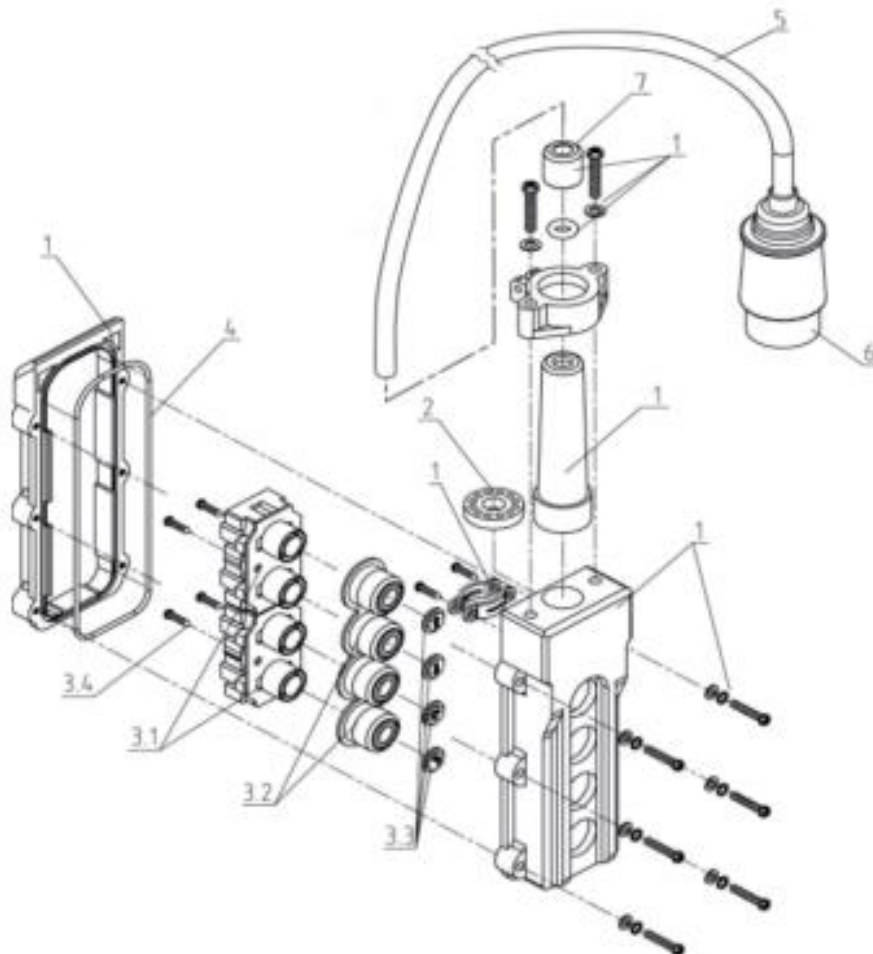
**Valve Block**

No.	Part Number	Description	Pcs	Drawing No.
-	0EK20483F12PM	Valve block 12V, assembly	1	MHW-VB-178ATS/PM 12V
-	0EK20483F24PM	Valve block 24V, assembly	1	MHW-VB-178ATS/PM 24V
1	0EK20483	Valve block without valves	1	MHW-VB-178ATS
2.1	0FV20135	2/2-way valve	2	MHW-C-40FDK/H0.4
2.2	0GK01001	Solenoid 12V	2	M33/L300/12VDC/25W
	0GK01006	Solenoid 24V	2	M33/L300/24VDC/25W
3	0FV21020	Adjustable throttle	2	MHW-EMRV-2
4	0FV21130	Piston and spring for flow control valve	2	MHW-EMRV-5SB
5	0FV21067	Relief valve	2	MHW-SV7x1
6	0UK00001	Test point plug	1	MHW-MM8x1
7	0RK72060	Fitting with filter	2	DFV-GE-G3/8"/8
8	0JK10286	Plug	2	G1/4"
9	0RK25056	Adapter, return with o-ring	1	MHW-RS-M12x1

**NOTE THE CORRECT TORQUE!**

**3-Button Remote Control**

No.	Part Number	Description	Pcs	Drawing No.
-	0SK18522PM-EW	3-button-remote-control, assembly	1	3-KOSK-PM
1	0SK18515	Housing, assembly	1	MHW-4KO-2002-1
2	0SK18506	Cable pull out protection	1	MHW-KZE-1
3.1	0SK18545K	Contact Block	2	MHW-2KSM-2002
3.2	0SK18542	Protective cover, rubber	1	MHW-2KSM-2002-4
3.3	0SK18620	Label „up“	1	
		Label „down“	1	
		Label for closing circuit	1	
3.4		Screw	4	M3.5x15
4	0LK14122	O-ring	1	ø124x2.5
5	0SK11021	Spiral cable for remote-control	1	7x1.5mm <sup>2</sup>
6	0SK20011	Plug 7-pol	1	
7	0SK18507	Seal for cable	1	MHW-2KO-2002-4.1A

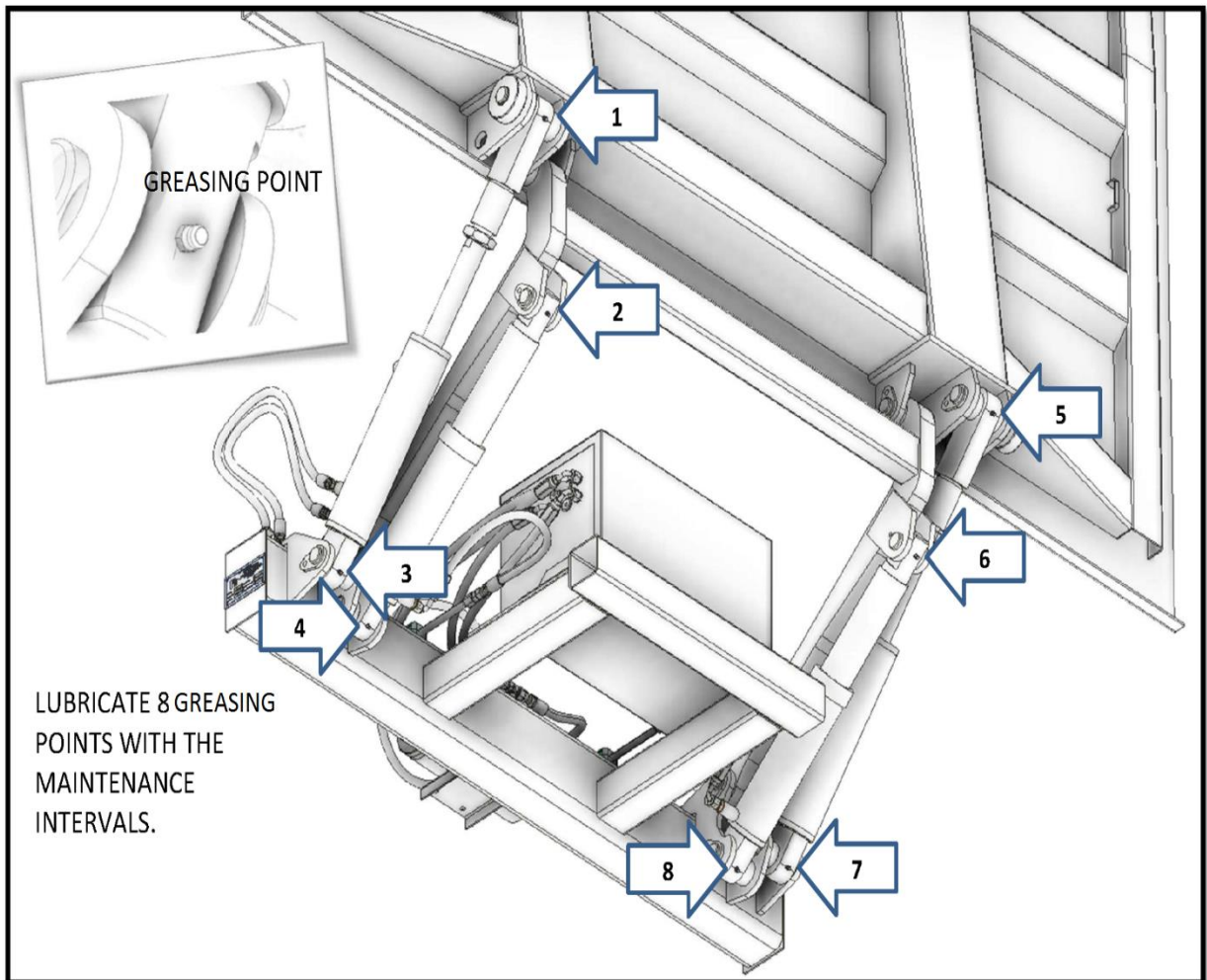


**MAINTENANCE****PERIODIC INSPECTION & MAINTENANCE (GENERAL)**

PHE series tail lift require minimal maintenance, but service at 6 monthly intervals (refer to SERVICE, page 41) will prolong their working life, avoid breakdowns and improve performance. Tail lift that operates very frequently should be check more often. It is imperative that this maintenance routine is carried out during the first 12 months of service to comply with warranty requirement.

To ensure the efficiency, durability, safe and trouble free service of PHE tail lift, periodic inspection & maintenance below are strongly recommended.

Components/Parts	Service Required
<b>Daily</b>	
Hoses, tubings, fittings, hydraulic power pack	Visual check for leaks under truck and inside power pack
Electrical (Functional check)	Check the switches, RAISE and LOWER for proper operation
Hydraulic oil reservoir	Check the hydraulic oil level, <b>if</b> any leaks are notice.
<b>Monthly</b>	
Perform all daily maintenance	
All bolts and pins	Visual check all bolts and pins for tightness(Especially chassis mounting bolts)
All parts/components	Inspect all parts. Replace all worn or damaged parts.
Cleaning on structure, cylinders, power pack	Pressures wash the tail lift structure, cylinders and power pack enclosure. ( <b>DO NOT</b> pressures wash inside power pack!). After cleaning, all bearings and grease fittings should be grease again.
Hydraulic oil reservoir	Lower the tail lift to fully tilt to the ground. Check the oil level and top up to the top mark on dipstick. Raise the tail lift to fully up. If rough running noise is detected at power pack during operation, fully tilt down and allow time for air to percolate to the top. Top up oil if required. Then repeat operation for smooth running.
Greasing (Refer to greasing points on page 29)	Ideally using grease containing Molybdenum Disulphide (MoS <sub>2</sub> ), but any good quality brand may be employed. All rubbing surfaces should be greased (platform hinges and accessories if fitted).
<b>Yearly</b>	
Perform all daily maintenance	
Perform all monthly maintenance	
Electrical control system	Check all electrical cables and connection. Replace or repair if necessary
Wear plate and rollers	Check all wear plate and rollers. Replace all worn or broken parts.

**GREASING POINTS**

**INSPECTION & SERVICING (POWER PACK)**

PHE power pack and all its components are built for long and efficient service. Minimal maintenance is required, but a regular maintenance program should be performed periodically and at regular intervals.

A large percentage of hydraulic problems arise from dirt, faulty servicing and using the wrong oil.

You must always check the quality of the hydraulic oil and also the oil level. When the oil level is very low (below the filter), air will be injected into the system and the temperature will rise considerably. This will greatly reduce the life span of the pump, and therefore the oil level must be checked on a regular basis.

Operating temperature depends on the surroundings, i.e. methods of operation, operating conditions, ambient temperature, etc.

Operating temperature from -15°C to +70°C is acceptable.

Testing has proven that the ideal operating temperature is **not more than +60°C**.

Higher temperatures will cause the oil to age faster, causing the life of hoses and seals to be shortened.

Be sure that the viscosity of the oil does not fall below 9 CST. This will cause pump failure.



THE CLEANLINESS OF THE HYDRAULIC OIL IS VERY IMPORTANT TO HYDRAULIC POWER PACK. DIRTY HYDRAULIC OIL MIGHT INTERRUPT THE OPERATION AND EVEN DAMAGES THE COMPONENT.

<u>SITUATION</u>	<u>CONTAMINATION</u>	<u>REASON</u>
Dark colored oil	Oxidation of product	Overheating
Milkiness	Water	Water or air in system
Air bubbles	Air	Loose connection or low oil
Floating contamination	Hard substance	Abrasion, dirt or aging products
Odor of burning oil	Aging products	Overheating

Other checks:

Routine inspections are necessary to eliminate problems along the way. Always rectify any problems as soon as they are known.

Look for:

- Contamination
- Leakage at the couplings
- Visual damage
- Noise in the power pack

### Types of Hydraulic Fluids

The efficient function, working life, operating reliability and economy of the hydraulic equipment depend on the proper selection of the correct hydraulic fluids.

Generally, mineral oil based hydraulic oil is selected, but the PHE power pack can also be operated with “non-polluting” bio-degradable oil.

#### Designation of hydraulic oil:

In conformity to DIN 51524 and DIN 51525 and CETOP proposition there are identification letters for hydraulic oils using mineral oil base.

H... Aging resistance mineral oil without additives

L... Effective substance for increasing the protection against corrosion and/or aging

P... Effective substance for decreasing the abrasion and/or increasing the capacity

V... Effective substance L + P (according to CETOP)

M... Effective substance and high polymeric additions for improving the viscosity

D... Effective substance for cleaning and to increase the aging feature

#### The often used combinations:

HL... For specification for operating pressure < 200 bar

HLP... For specification for operating pressure > 200 bar

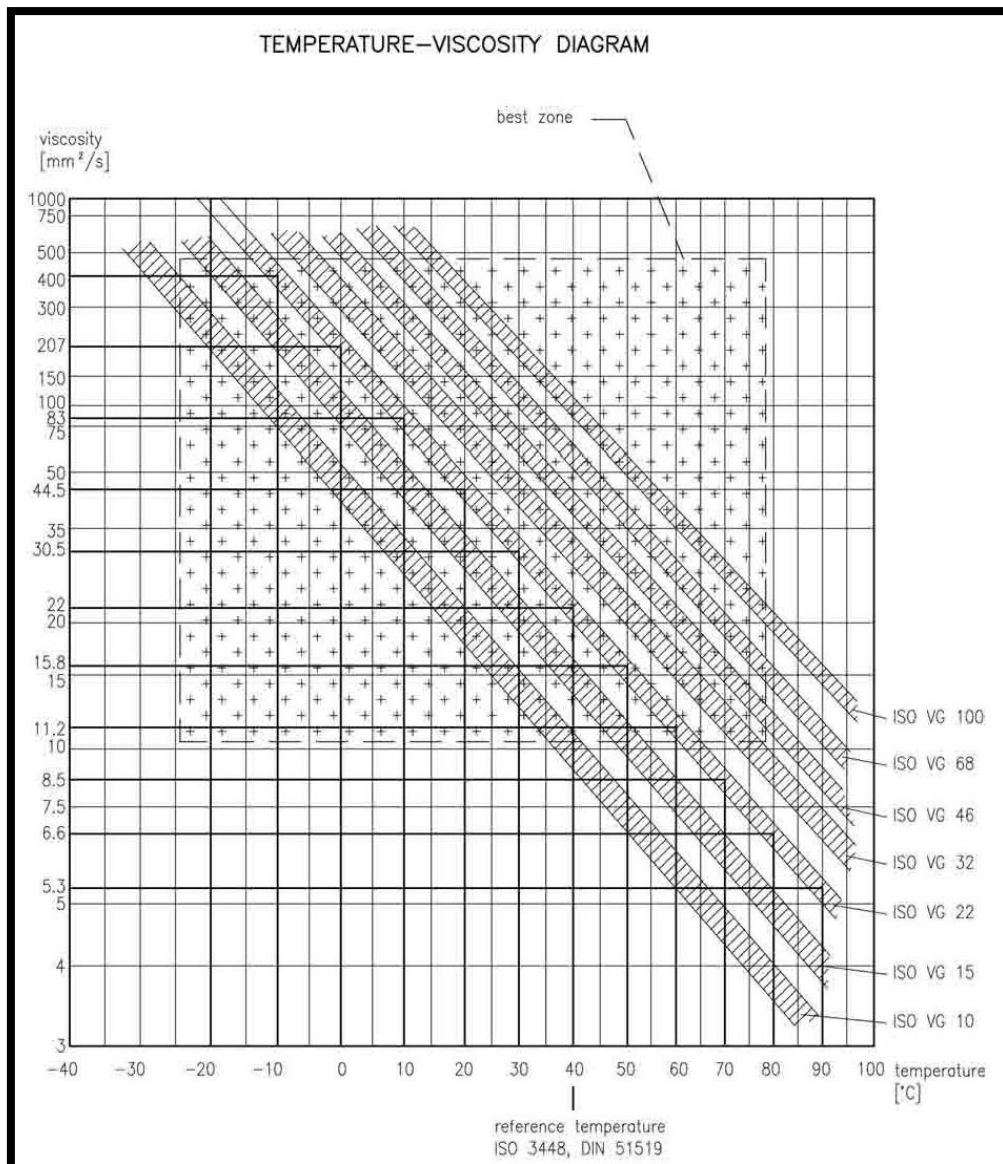
#### Useable hydraulic oils

Clean hydraulic oil 46 CST. We recommend SHELL TELLUS Grade 46.

Be sure that the viscosity does not fall below 7 CST because the pump will be damaged.

Temperature of hydraulic oil ranges from -15°C to +70°C are allowable.

When the temperature fall below -15°C or go above +70°C, please call the dealer or manufacturer.

Diagram for oil viscosity

## **SERVICE INFORMATION**

All PHE tail lifts are entitled to one free service (inspection & maintenance) during the first 6 months of service.

Service reminder sticker will be provided during installation/servicing.

## **PHE Tail Lift Manufacturer and Service Center**

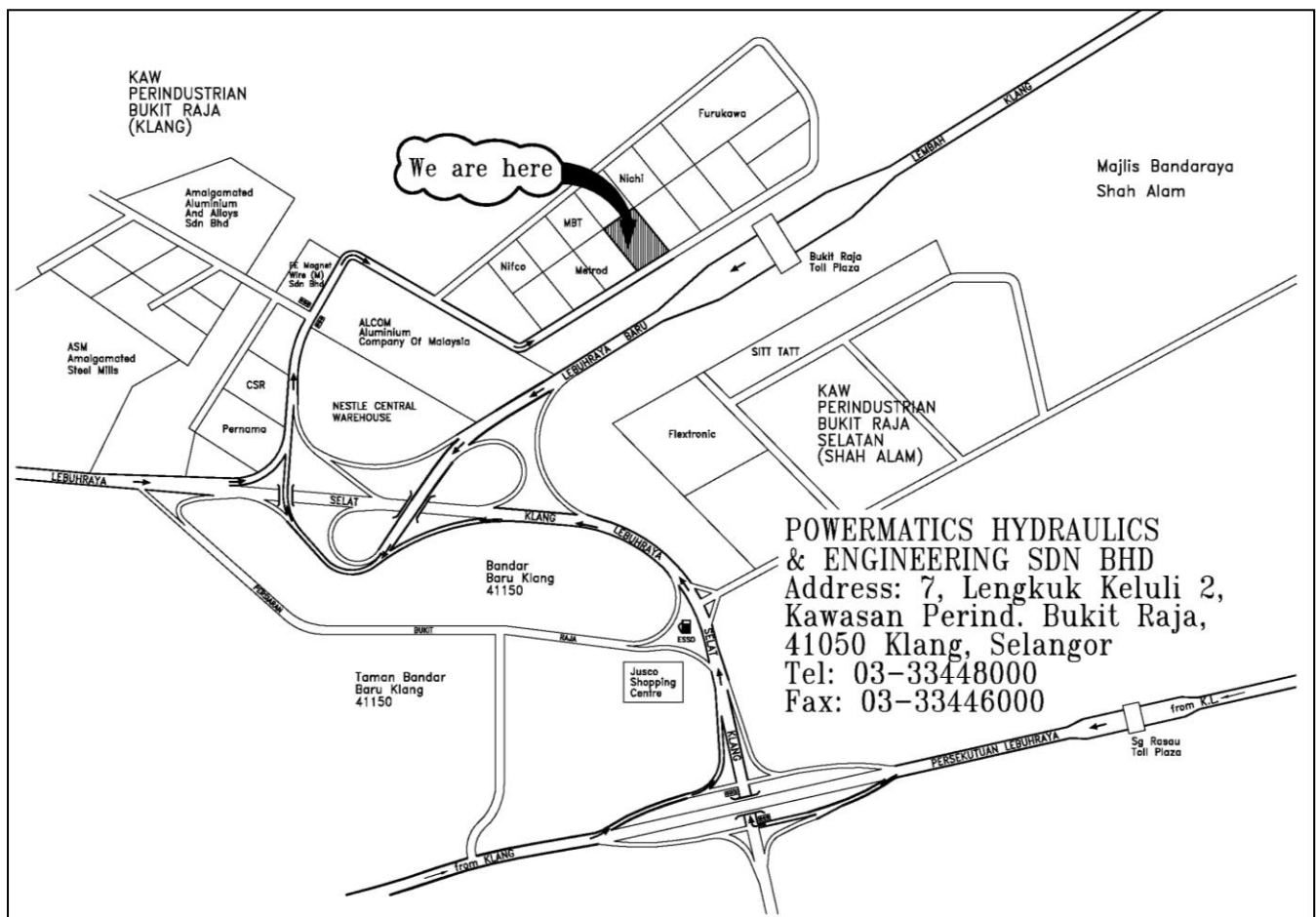
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**FAULT LOCATING PROCEDURE**

IF THE CORRECTIVE MEASURE DOES NOT SOLVE THE PROBLEM, PLEASE CONSULT PHE TAIL LIFT MANUFACTURER (REFER PAGE 25) FOR TECHNICAL SUPPORT.

Fault can be located by the following procedure.

1. Check for any mechanical damage to the tail lift, any mechanical damage of the vehicle that fouling the tail lift operation, and nothing is impede the tail lift in its travel.
2. Check the battery voltage.
3. Check electrical supply to the power pack motor.
4. Check actual voltage of solenoid of motor. (Minimum voltage required is 9V for 12V systems while 18V is required for 24V systems)
5. Check system pressure.
6. Check the operation of the tail lift with load and without load.

FAULT	POSSIBLE CAUSE	CORRECTIVE MEASURE
Motor will not start	<ol style="list-style-type: none"> <li>1. Battery dead</li> <li>2. Push buttons lack negative contact</li> <li>3. No negative contact at motor</li> <li>4. Defective starter solenoid</li> </ol>	<ol style="list-style-type: none"> <li>1. Charge or replace battery</li> <li>2. Connect negative lead</li> <li>3. Connect negative lead to unit</li> <li>4. Check starter solenoid, replace if necessary</li> </ol>
Motor runs too slowly	<ol style="list-style-type: none"> <li>1. Inadequate battery capacity</li> <li>2. Brushes damaged by oil</li> </ol>	<ol style="list-style-type: none"> <li>1. Charge or replace battery</li> <li>2. Replace brushes, clean commutator</li> </ol>
Motor runs but lift does not rise, or does not reach vehicle floor	<ol style="list-style-type: none"> <li>1. Not enough oil in tank</li> <li>2. Pin between motor and pump sheared</li> <li>3. No control current at solenoids</li> <li>4. Burnt out control contacts</li> </ol>	<ol style="list-style-type: none"> <li>1. Check oil level</li> <li>2. Replace oil pump</li> <li>3. Change fuse and/or control contacts</li> <li>4. Change control contacts</li> </ol>
Motor runs but lift operate sluggishly and does not reach vehicle floor accompanied by a loud noise	<ol style="list-style-type: none"> <li>1. Relief valve open</li> <li>2. Excessive loading</li> <li>3. Started solenoid not functioning properly</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust relief valve</li> <li>2. Remove load</li> <li>3. Check voltage at solenoid (see #4 above) Check solenoid contacts, replace solenoid if required</li> </ol>
Lift rise slowly	<ol style="list-style-type: none"> <li>1. Not enough oil in tank</li> <li>2. Voltage drop</li> <li>3. Leaking pump</li> <li>4. Relief valves setting too low</li> </ol>	<ol style="list-style-type: none"> <li>1. Add oil &amp; check for leaks</li> <li>2. Check voltage/charging level</li> <li>3. Replace pump</li> <li>4. Adjust valve</li> </ol>

	<ol style="list-style-type: none"> <li>Relief valve damaged</li> <li>Damaged hydraulic hose</li> </ol>	<ol style="list-style-type: none"> <li>Replace valve</li> <li>Replace damaged hydraulic hose</li> </ol>
Lift descends too slowly	<ol style="list-style-type: none"> <li>Flow control valve faulty</li> <li>Oil too thick</li> <li>Release valve not functioning</li> <li>Damaged hydraulic hose</li> </ol>	<ol style="list-style-type: none"> <li>Replace valve, check valve</li> <li>Replace with thinner oil</li> <li>Check voltage/coil, replace if necessary</li> <li>Replace hydraulic hose</li> </ol>
Unloaded lift does not rise to highest position	<ol style="list-style-type: none"> <li>Oil level too low</li> <li>Mechanical damage</li> </ol>	<ol style="list-style-type: none"> <li>Check oil level, top up if required</li> <li>Check platform, alignment, mountings etc for physical damage, repair any damage found</li> </ol>
Loading lift does not rise to highest position	<ol style="list-style-type: none"> <li>Oil level too low</li> <li>Relief valve setting too low</li> <li>Overflow valve damaged</li> <li>Poor lubrication</li> </ol>	<ol style="list-style-type: none"> <li>Check oil level, top up if required</li> <li>Adjust to correct setting</li> <li>Replace valve</li> <li>Lubricate</li> </ol>
Platform sinks under load	<ol style="list-style-type: none"> <li>Leaking pipelines/joint</li> <li>Leaking check valve</li> <li>Leaking system valve</li> </ol>	<ol style="list-style-type: none"> <li>Replace hose, tighten joints</li> <li>Replace check valve</li> <li>Replace system valve</li> </ol>