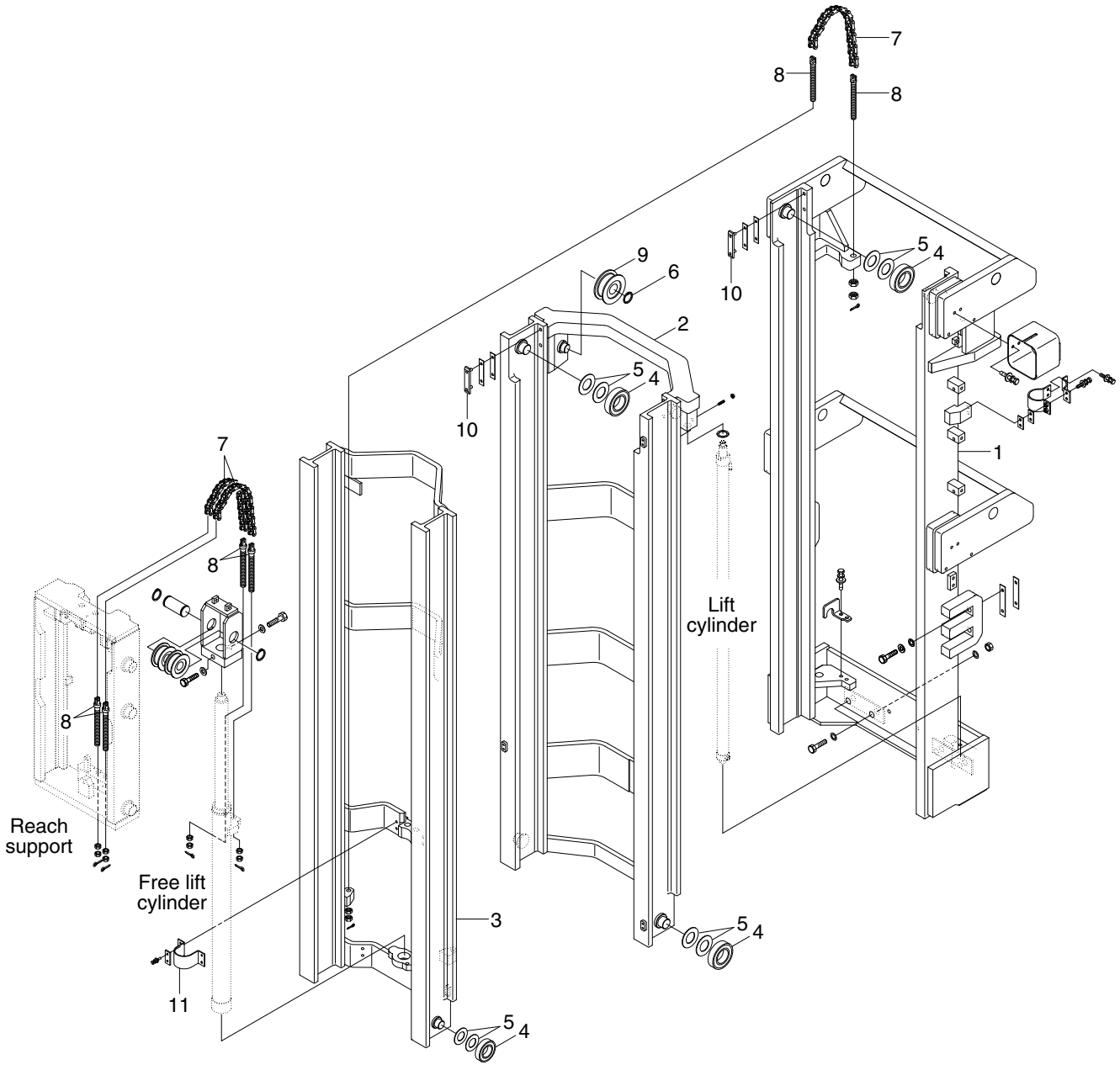
SECTION 8 MAST

GROUP 1 STRUCTURE

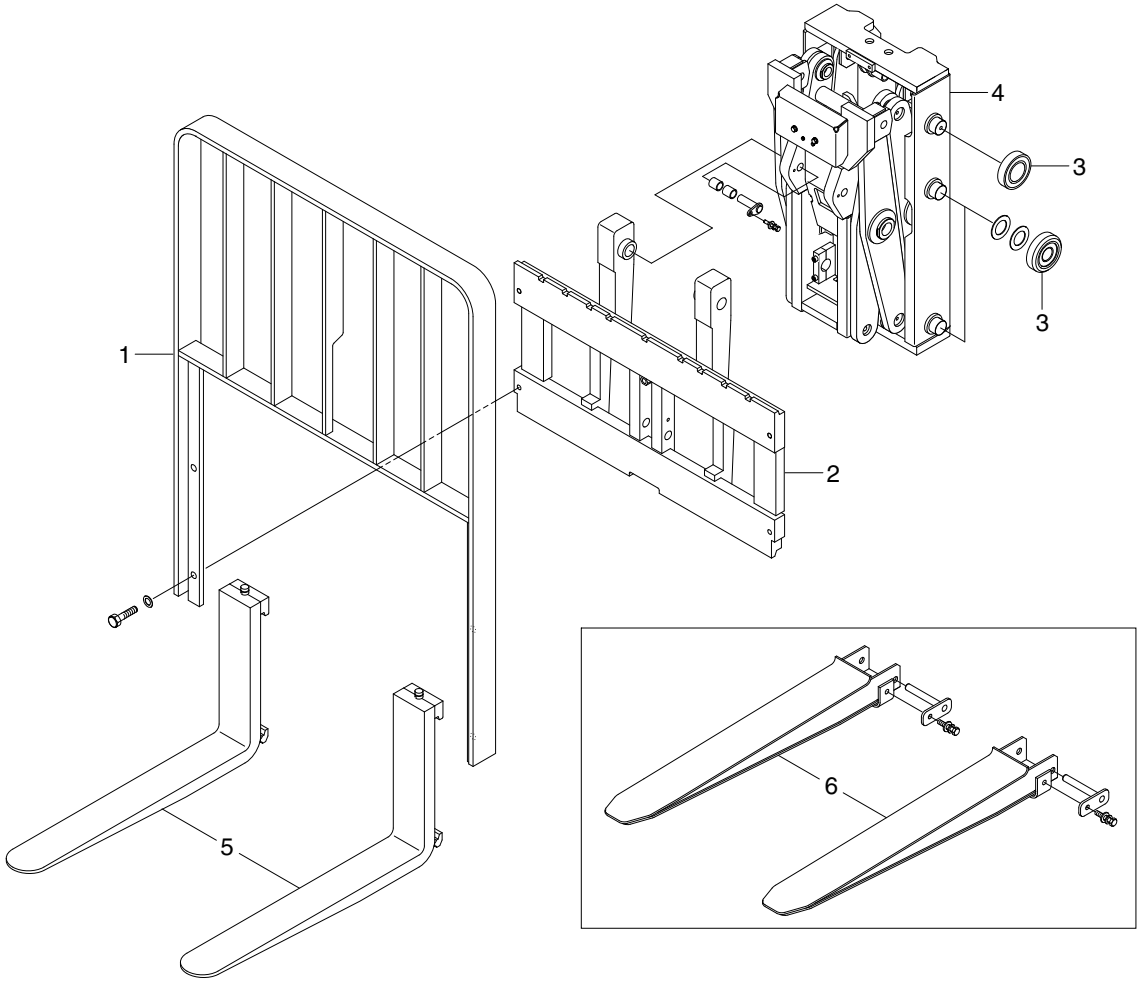
1. 3 STAGE MAST (TF MAST)



BRP9MS03

1	Outer mast	5	Shim (0.5, 1.0t)	9	Chain sheave
2	Middle mast	6	Retaining ring	10	Back up liner
3	Inner mast	7	Lift chain	11	Clamp
4	Roller	8	Anchor bolt		

2. CARRIAGE, BACKREST AND FORK



BRP9MS05

1	Backrest	4	Side roller
2	Carriage	5	Fork assy
3	Load roller	6	Extension fork

GROUP 2 OPERATIONAL CHECKS AND TROUBLESHOOTING

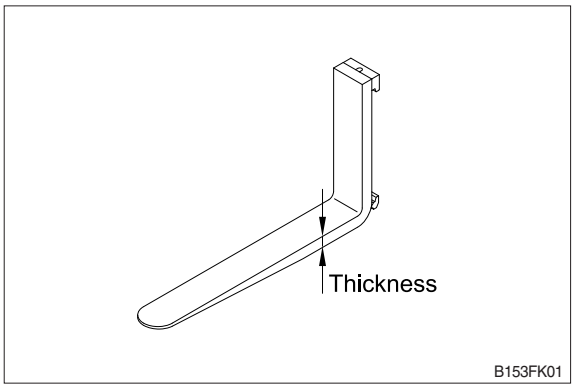
1. OPERATIONAL CHECKS

1) FORKS

(1) Measure thickness of root of forks and check that it is more than specified value.
EX : l =1050 mm (41.3 in)

mm (in)

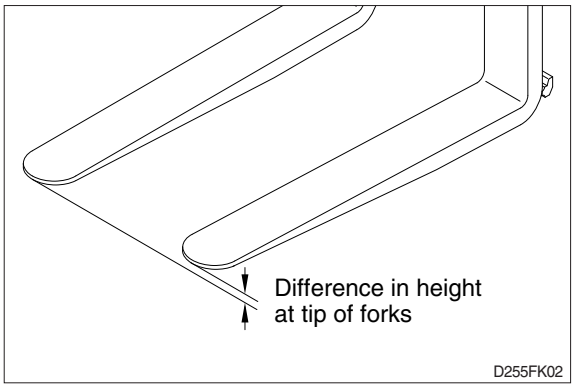
STD Fork assy	Applicable model	Standard	Limit
64HM-11060	15/18BRP-9	40 (1.6)	36 (1.4)
64HN-21040	20/23BRP-9	45 (1.8)	40 (1.6)



(2) Set forks in middle and measure difference in height at tip of forks.

mm

Model	Fork length	Height difference
15/18/20/23BRP-9	equal or below 1500	3
	above 1500	4



(3) Most force is concentrated at root of fork and at hook, so use crack detection method to check cracks.

2. MAST

1) Check for cracks at mast stay, tilt cylinder bracket, guide bar, fork carriage and roller shaft weld. Check visually or use crack detection method. Repair any abnormality.
2) Set mast vertical, raise forks about 10 cm from ground and check front-to-rear clearance and left-to-right clearance between inner mast and fork carriage, and between outer mast and inner mast. Use these figures to judge if there is any play at roller or rail.
   - Front-to-rear clearance : Within 2.0 mm (0.08 in)
   - Left-to-right clearance : Within 2.5 mm (0.10 in)
3) Check that there is an oil groove in bushing at mast support.
4) Set mast vertical, raise forks about 10 cm from ground, and push center of lift chain with finger to check for difference in tension.
   If there is any difference in tension, adjust chain stopper bolt.
5) Check visually for abnormalities at thread of chain anchor bolt, and at contact surface between chain wheel and chain.
   Rotate chain wheel by hand and check for any play of bearing.

3. TROUBLESHOOTING

1) MAST

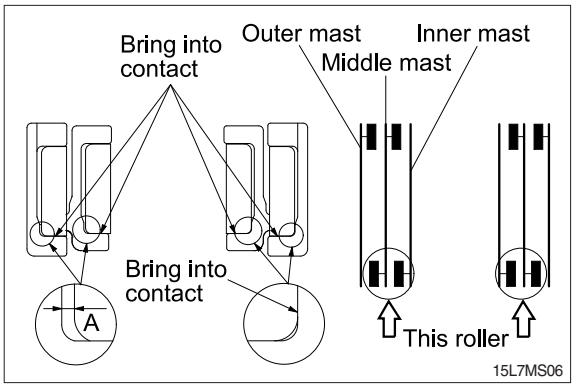
Problem	Cause	Remedy
Forks fail to lower.	· Deformed mast or carriage.	· Disassemble, repair or replace.
Fork fails to elevate	· Faulty hydraulic equipment. · Deformed mast assembly.	· See troubleshooting hydraulic pump and cylinders in section 6, hydraulic system. · Disassemble mast and replace damaged parts or replace complete mast assembly.
Slow lifting speed and insufficient handling capacity.	· Faulty hydraulic equipment. · Deformed mast assembly.	· See troubleshooting hydraulic pump and cylinders in section 6, hydraulic system. · Disassemble mast and replace damaged parts or replace complete mast assembly.
Mast fails to lift smoothly.	· Deformed masts or carriage. · Faulty hydraulic equipment. · Damaged load and side rollers. · Unequal chain tension between LH & RH sides. · LH & RH mast inclination angles are unequal. (Mast assembly is twisted when tilted)	· Disassembly, repair or replace. · See Troubleshooting Hydraulic Cylinders, pump and control valve in section 6, hydraulic system. · Replace. · Adjust chains. · Adjust tilt cylinder rods.
Abnormal noise is produced when mast is lifted and lowered.	· Broken load roller bearings. · Broken side roller bearings. · Deformed masts. · Bent lift cylinder rod. · Deformed carriage. · Broken sheave bearing.	· Replace. · Replace. · Disassemble, repair or replace. · Replace. · Replace. · Replace.
Abnormal noise is produced during tilting operation.	· Insufficient lubrication of anchor pin, or worn bushing and pin. · Bent tilt cylinder rod.	· Lubricate or replace. · Replace.

2) FORKS

<table>
<tr><th>Problem</th><th>Cause</th><th>Remedy</th></tr>
<tr><td>Abrasion</td><td>Long-time operations causes the fork to wear and reduces the thickness of the fork.
Inspection for thickness is needed.
· Wear limit : Must be 90% of fork thickness</td><td>If the measured value is below the wear limit, replace fork.</td></tr>
<tr><td>Distortion</td><td>Forks are bent out of shape by a number of reasons such as overloading, glancing blows against walls and objects, and picking up load unevenly.
· Difference in fork tip height
<table><tr><th>Fork length (mm)</th><th>Height difference (mm)</th></tr><tr><td>equal or below 1500</td><td>3</td></tr><tr><td>above 1500</td><td>4</td></tr></table></td><td>If the measured value exceeds the allowance, replace fork.</td></tr>
<tr><td>Fatigue</td><td>Fatigue failure may result from the fatigue crack even though the stress to fork is below the static strength of the fork. Therefore, a daily inspection should be done.
· Crack on the fork heel.
· Crack on the fork weldments.</td><td>Repair fork by expert.
In case of excessive distortion, replace fork.</td></tr>
</table>

1. MAST LOAD ROLLER (TF MAST)

1) INNER AND MIDDLE MAST ROLLER CLEARANCE ADJUSTMENT



(1) Measure the clearance with the mast overlap at near 480 mm.

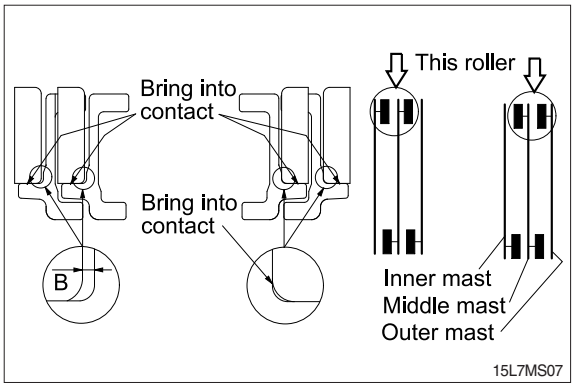
(2) Shift the inner mast to one side to bring the roller into contact with the outer mast and the middle mast, and adjust the clearance between the roller side face and mast at the closest position on the opposite side to the following value by inserting the inner and middle mast roller shim, respectively.

- Standard clearance A = 0.3~0.6 mm
- Shim thickness 0.5, 1.0 mm

(3) Distribute the shim thickness equally to the left and right roller. Refer to Mast load roller and back up liner, removal and Installation.

(4) After the adjustment, check that the inner mast moves smoothly in the middle mast, and the middle mast moves smoothly in the outer mast.

2) OUTER AND MIDDLE MAST UPPER ROLLER CLEARANCE ADJUSTMENT.



(1) Measure the clearance with the mast overlap at near 480 mm.

(2) Shift the inner mast to one side to bring the roller into contact with the middle mast and the inner mast, and adjust the clearance between the roller side face and mast at the closest position on the opposite side to the following value by inserting the outer and middle mast roller shim, respectively.

- Standard clearance B = 0.3~0.6 mm
- Shim thickness 0.5, 1.0 mm

(3) Distribute the shim thickness equally to the left and right roller. Refer to Mast load roller and back up liner, removal and Installation.

(4) After the adjustment, check that the inner mast moves smoothly in the middle mast, and the middle mast moves smoothly in the outer mast.

3) CARRIAGE LOAD ROLLER

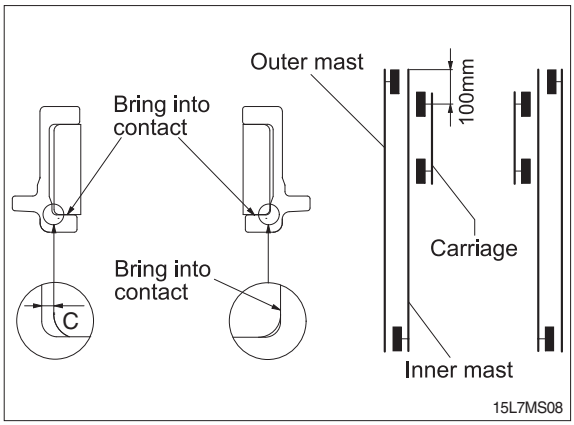
(1) Measure the clearance when the center of the carriage upper roller is 100 mm from the top of the inner mast.

(2) Measure the clearance at upper, lower rollers after loosen the adjust screws from the side rollers. Shift the carriage to one side to bring the roller into contact with the inner mast, and measure the clearance between the roller side face and mast at the closest position on the opposite side to the following value by inserting the carriage roller shim.

- Standard clearance C = 0.3~0.6 mm
- Shim thickness 0.5, 1.0 mm

(3) Distribute the shim thickness equally to the left and right roller. Refer to Carriage assembly.

(4) After the adjustment, the carriage should move smoothly along the overall mast length.



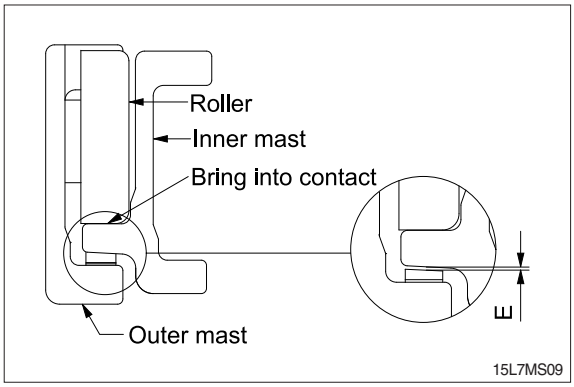
4) MAST BACK UP LINER

(1) Measure the clearance with the inner mast at the bottom position.

(2) With the inner mast in contact with the outer mast roller, adjust the clearance between the mast back up liner and inner mast to the following value by inserting the back up liner shim.

- Standard clearance E = 0.5 ~ 1.0 mm
- Shim thickness 0.5, 1.0 mm

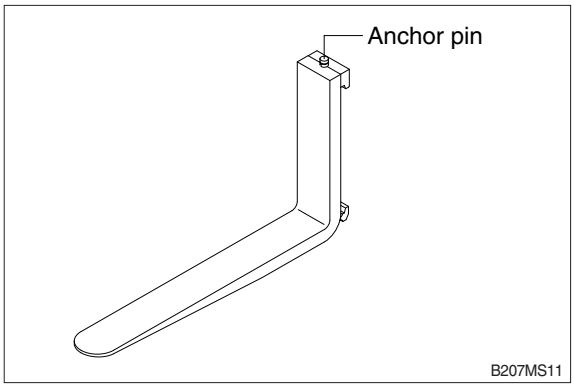
(3) After the adjustment, the mast should move smoothly.



GROUP 4 REMOVAL AND INSTALLATION

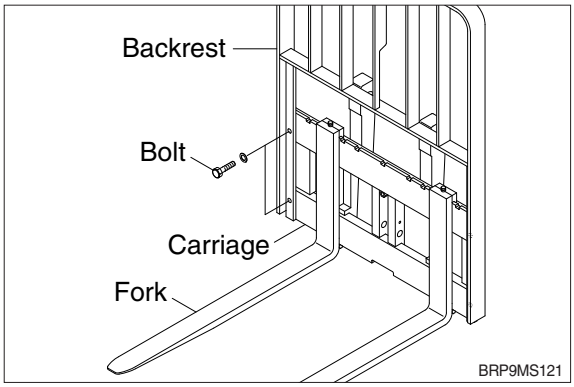
1. FORKS

1) Lower the fork carriage until the forks are approximately 25 mm (1 inch) from the floor.
2) Release fork anchor pins and slide forks, one by one, toward the center of the carriage where a notch has been cut in the bottom plate for easy fork removal.
3) Remove the fork one by one. On larger forks it may be necessary to use a block of wood.
4) Reverse the above procedure to install load forks.



2. BACKREST

1) Remove bolts securing backrest to fork carriage. Lift backrest straight up and remove from carriage.
2) Position backrest on carriage and lower in place. Install and tighten bolts.



3. CARRIAGE ASSEMBLY

1) CARRIAGE

(1) With the mast vertical, raise the carriage high enough to place blocks under the load forks. This is done to create slack in the load chains when the carriage is lowered. Lower the carriage all the way down to the floor. Make sure the carriage is level, this will prevent any binding when the mast is raised.

(2) While supporting lift chains, remove the split pin and slide out chain anchor pins from the chain anchors of stationary upright.

(3) Pull the chains out of the sheaves and drape them over the front of the carriage.

(4) Slowly raise elevating upright until mast clears top of fork carriage. Move carriage to work area and lower mast.

⚠ Make sure carriage remains on floor and does not bind while mast is being raised.

(5) Inspect all parts for wear or damage. Replace all worn or damaged pars.

(6) Reverse the above steps to reinstall.

⚠ Replace the split pin of chain anchor with new one.

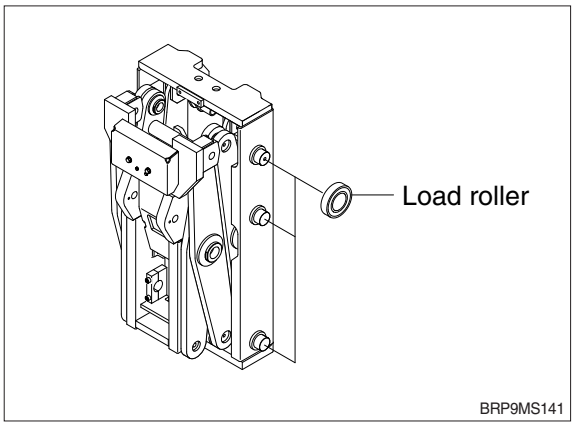
2) CARRIAGE LOAD ROLLER

(1) Remove carriage as outlined in the carriage assembly removal paragraph.

(2) Loosen and remove flat head bolts and plain washers from top load roller bracket.

(3) Using a pryer, remove load rollers from load roller bracket.

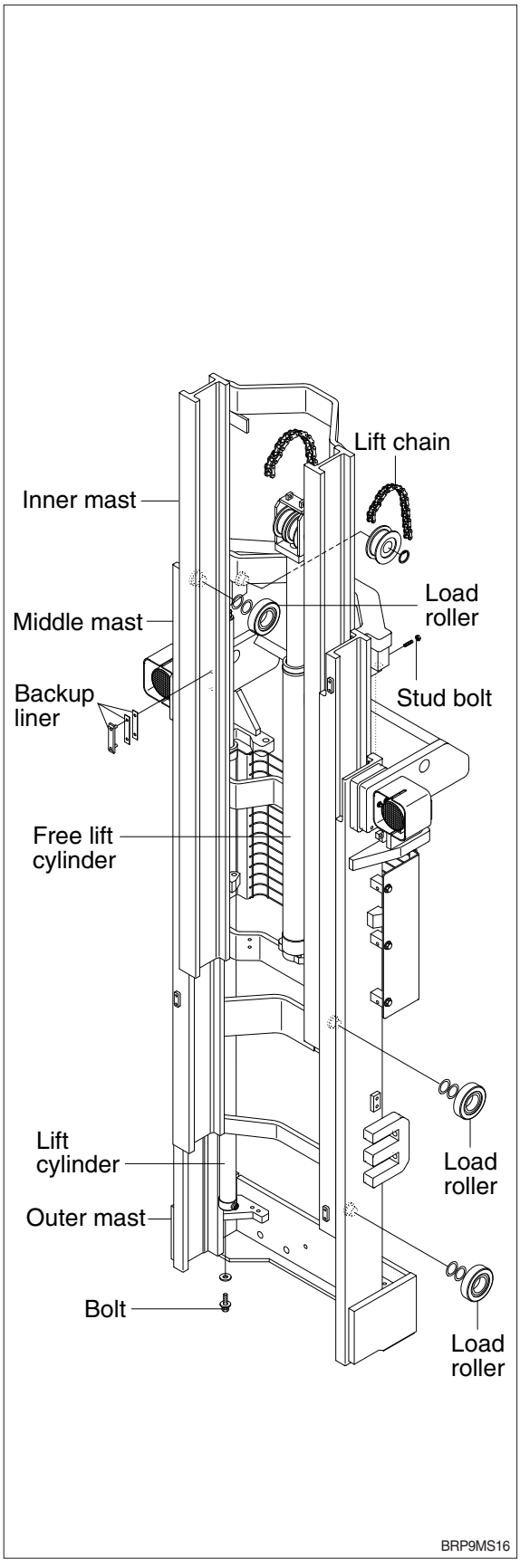
(4) Reverse the above procedure to assemble. Refer to MAST ROLLER ADJUSTMENT paragraph.



3) MAST LOAD ROLLER AND BACK UP LINER

(1) 3 stage mast (TF mast)

① Remove the carriage assembly and move to one side.
② Loosen and remove hexagon bolt securing bottom cylinder from outer mast.
③ Loosen and remove bolts and special washers securing lift cylinders to middle mast.
④ Attach chains or sling to the inner and middle mast section at top crossmember. Using an overhead hoist, slowly raise the uprights high enough to clear lift cylinder.
⑤ After lowering the lift cylinder rods, and disconnecting lift cylinder hose, tilt the lift cylinders LH and RH and tie them with ropes to the outer mast.
⑥ Using the overhead hoist raise inner and middle masts. Place 4 inch block of wood under the free lift cylinder bracket of the inner mast then lower mast sections (this will create slack in the chains).
⑦ Remove retaining rings securing chain sheaves to sheave support brackets. While support chains, remove chain sheaves and let chains hang free. The upper outer and lower middle mast rollers and back up liners are now exposed.
⑧ Using a pryer, remove load rollers from load bracket. Remove back up liners and shims.
⑨ Attach chains or sling to the middle mast section at top crossmember. Using an overhead hoist, slowly raise the middle mast until top and bottom rollers are exposed.
⑩ Using a player, remove load rollers from load roller bracket.
⑪ Thoroughly clean, inspect and replace all worn or damaged parts.
⑫ Reverse the above procedure to assemble. Refer to MAST LOAD ROLLER ADJUSTMENT paragraph.



4) ELEVATING MAST

(1) Inner and middle mast (TF mast)

① After completing all necessary steps for load rollers and back up liner removal. Remove rear chains and sheave support if not already done.

② Disconnect free lift cylinder hose. Drain hose into a suitable pan or container and cap hose.

③ While supporting free lift cylinder assembly, remove bolts and washers securing cylinder to mast crossmember.

④ Place a sling around free lift cylinder and attach to an overhead hoist. Slowly raise and move cylinder to one side.

⑤ Attach chains or sling to the inner mast section at top crossmember. Using an overhead hoist slowly raise the upright straight up and out of middle mast section.

⑥ Attach chains or sling to the middle mast section at top crossmember. Using an overhead hoist slowly raise the upright straight up and out of outer mast section.

⑦ Replace upright and reverse above procedure to install. Make all necessary measurements and adjustments.

5) CHAIN

(1) Rear chain sheave (TF mast)

① Raise and securely block carriage and inner mast section.

② Remove the split pin securing the chain anchor pins and discard. While supporting the chains, remove the chain anchor pins from outer mast section.

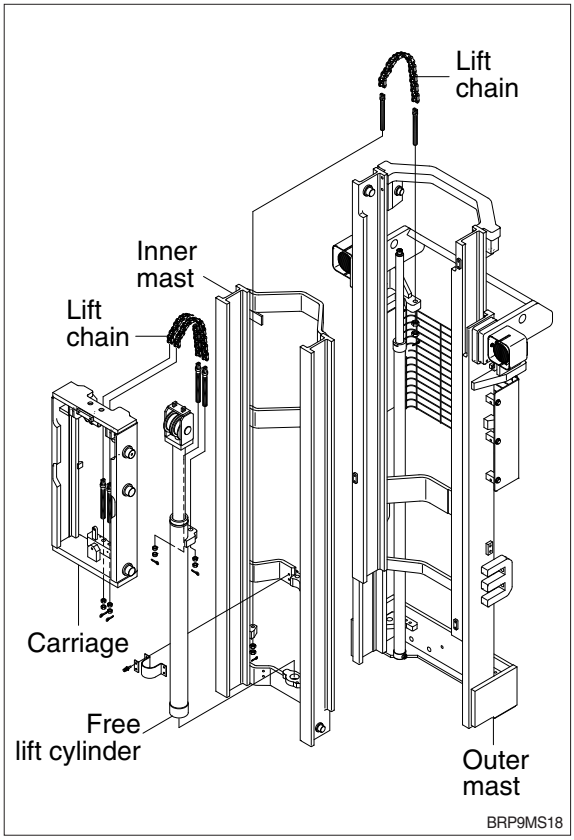
③ Remove chains.

④ Remove retaining ring securing chain sheaves to sheave support. Pry off sheaves with bearings.

⑤ Remove bearing retaining ring from sheave and press bearings from sheaves.

⑥ Thoroughly clean, inspect and replace all worn or damaged parts.

⑦ Reverse the above procedure to assemble and install. Use new split pins in chain anchor pins.



(2) Chain wheel bearing support (TF mast)

① Remove the carriage assembly and move to one side.
② After removing bolt to securing chain wheel bearing support assembly to free lift cylinder.
After a sling to the chain wheel bearing support assembly. Using an overhead hoist, lift support assembly straight up and off of free lift cylinder. Move assembly to work area.
③ Remove retaining ring securing chain wheel bearing to chain wheel bearing support.
④ Remove bearing retaining ring from chain wheel bearing and press bearings from chain wheel bearings.
⑤ Thoroughly clean, inspect and replace all worn or damaged parts.
⑥ Reverse the above procedure to install.

(3) Rear chain (TF mast)

① Remove the carriage assembly and move to one side. Refer to carriage removal and installation.
② Raise and securely block truck approximately 6 inches from the floor.
③ Using a sling or chain around inner mast section attached to an overhead hoist, slowly raise inner mast until there is enough slack in the chains to remove them. Block inner mast section.
④ Remove split pins and chain anchor pins securing chains to chain anchor(part of inner mast).
⑤ While supporting the chains, remove split and chain anchor pins securing chains to chain anchors attached to outer mast section.
⑥ Remove chains.
⑦ Reverse the above to assemble and install. Use new split pins in chain anchor pins. Refer to this section for Load chain lubrication and adjustment.

(4) Carriage chain

① Place a sling around carriage front plate and attach to an overhead hoist. Lift and secure carriage high enough so that split and chain anchor pins on carriage can be easily be removed. Remove chain anchor pins from carriage and drape chains out over carriage.
② Place a wooden block under the carriage and lower the carriage on the block.
③ While supporting the chains, remove split pins and chain anchor pins from chain anchors.
④ Remove chains and wash them with solvent. Refer to this section for Load chain inspection and maintenance.
⑤ Reverse the above procedure to assemble and install. Use new split pins in chain anchor pins. Refer to this section for Load chain lubrication and adjustment.

(5) Load chain inspection and maintenance

After every 200 hours of truck operation, lift chains should be inspected and lubricated inspect for the following chain conditions :

① Wear

As the chain flexes on and off the chain wheel bearings, the joints very gradually wear. The stretch a chain developes in service is due to material being worn off pin outer diameter and pitch hole inner diameter on the inside plate.

Chain wear can be measured using a wear scale or steel tape. When chains have elongated 2%, they should be discarded. When checking chain wear, be sure to measure a segment of chain that operates over a sheave. Do not repair chains by cutting our the worn section and splicing in a new piece. If part of the chain is worn, replace all the chains on the truck.

② Rust and corrosion

Chains used on lift trucks are highly stressed precision components. It is very important that the "as-manufactured" ultimate strength and fatigue strength be maintained throughout the chain service life. Corrosion will cause a major reduction in the load-carrying capacity of lift chain or roller chain because corrosion causes side plate cracking.

③ Cracked plate

The most common cause of plate cracking is fatigue failure. Fatigue is a penomenon that affects most metals and many plastics. After many repeated heavy loads, the plates may crack and the chains will eventually break. Fatigue cracks are almost always found through the pitch holes perpendicular to the pitch line. Contrast this failure mode to the random failures caused by stress-corrosion cracking. If cracks are present, replace all the chain on the truck. Noise in the chain indicates that the plate is on the verge of cracking and will be failed before long.

④ Tight joints

All joints in lift chain should flex freely. Tight joints resist flexure, increase internal friction, thus increasing chain tension required to lift a given load. Increased tension accelerates wear and fatigue problems.

Tight joints in lift chains can be caused by :

- Bent pins or plates.
- Rusty joints.
- Peened plate edges.

Oil rusty chains and replace chains with bent or peened components.

⑤ Protruding or turned pins

Heavily loaded chains operating with lube generate tremendous friction between pins and plates. In extreme cases, the frictional torque in the joint can actually turn pins in the press-fit outside plates. If chain is allowed to operate in this condition, the pins slowly work out of the chain causing chain failure. Turned pins can be quickly spotted because the flats on the V heads are no longer in line. Chains with turned or protruding pins should be replaced immediately. Do not attempt to repair the chain by driving pins back into the chain.

⑥ Chain side wear

A wear pattern on pin heads and outside plates indicates misalignment. This condition damages chain and sheaves as well as increasing internal friction in the chain system.

⑦ Chain anchors and chain wheel bearings

An inspection of the chain system includes a close examination of chain anchors and chain wheel bearings. Check chain anchors for wear, breakage and misalignment.

Anchors with worn or broken fingers should be replaced. Anchors should be adjusted to eliminate twisting or other misalignment in the chain. When chain is misaligned, load is not distributed uniformly between the plates. Prolonged operation will result in premature fatigue failure. Chain wheel bearings with badly worn flanges and outside diameter should be replaced. Heavy flange wear indicates chain misalignment.

⑧ Chain wear scale

The chain can be checked for wear or stretching with the use of a chain wear scale. Stretching of a chain is due to the elongation of the pitch holes and wearing of the pin O.D. The greatest amount of stretching occurs at the areas of the chain that flex over the sheaves most frequently. Check the chain at this point with a scale. The wear scale has instructions printed on the sides for use in determining chain stretch and are as follows :

- Determine pitch length of chain using 6 inch scale on one side of wear scale.
- If pitch is 1/2 (12.7 ㎜), 3/4 (19.05 ㎜), 1 (25.4 ㎜), 1-1/2 (38.1 ㎜), 2 (50.8 ㎜), use side A of scale.
- If pitch is 5/8 (15.875 ㎜), 1-1/4 (31.75 ㎜) or 2 (50.8 ㎜), use side B.
- Align point A or B to center of a pin and note position of the opposite A or B point.
- If other point also lines up with a pin, the chain is worn and should be replaced.

If any of the above conditions exists(cracked plates, turned pins, stretching etc), the chains should be replaced in pairs as a complete assembly. Order chains by part number to insure the correct chain length, pitch and material specifications.

(6) Load chain lubrication and adjustment

① Lubrication

The most important consideration in field maintenance of lift chains is lubrication. Hard working, heavily loaded chains cannot be expected to give satisfactory wear life without scheduled periodic re-lubrication. Like all bearing surfaces, the precision manufactured, hardened steel, joint-wearing surfaces require a film of oil between mating parts to prevent rapid wear. Oil must penetrate the chain joint to prevent wear. Applying oil to external surfaces will prevent rust, but oil must flow into the live bearing surfaces for maximum wear life. Frequency of re-lube will vary with operating conditions and environment, the best estimate of lube period is 200 hours. Trucks parked outdoors or trucks in extremely severe service, may require more frequent re-lube to maintain an oil film on all chain surface.

- Wipe off the old oil with a clean cloth and blow out the remaining dirt with compressed air.

⚠ Wear eye protection.

- With a clean brush, apply EP-140 extreme pressure lubricant or heavy motor oil(40W).

② Replacement

Replace chains as a pair. It will be virtually impossible to maintain uniform loading between the strands if a new chain is put into service opposite an old chain. The jonts in the old chain will be greater than that on the new chain, greatly complicating the problem of maintaining equal chain tension. The new chain will wear more slowly causing it to bear the major portion of the load resulting in premature wear and fatigue failure. Don't steam clean or decrease new chains.

The manufacturer's grease is effective in reducing wear and corrosion. If the original factory lube is dried out or wiped off, soak the new chain in heavy engine oil for at 1/2 hour prior to installing on truck. After the old chains have been stripped from the mast, very carefully inspect chain anchors and chain wheel bearing. Broken, cracked or worn anchor must be replaced using the new anchor pin and split pin. Do not paint newly replaced chain after it has been installed.

③ Adjustment

Chain adjustments are important for the following reasons :

- Equal loading of chain.
- Proper sequencing of mast.
- Prevent over-stretching of chains.
- Prevent chains from jumping off sheaves if they are too loose.

④ Adjustment procedure

- With mast in its fully collapsed and vertical position, lower the fork to the floor.
- Adjust the chain length by loosening or tightening nut on the chain anchor.
  After making adjustment on the mast, be sure to tighten the nut.

APPENDIX : 15/18/20/23BRP-9 SETTING PROCEDURE

1. PURPOSE

This appendix is to set the reach type forklift 15/18/20/23BRP-9 after repair or change of the controllers if needed.

2. DESCRIPTION

1) BRP-9 setting procedure : Appendix #1
2) Display and access of the user/truck menu : Appendix #2
3) Description and setting for the Australia option : Appendix #3, #8
4) Load weight setting : Appendix #4, #7
5) Height indicator operation : Appendix #5, #6

3. APPENDIX

1) Appendix #1 : BRP-9 setting procedure
2) Appendix #2 : Display and access of the user/truck menu
3) Appendix #3 : Description and setting for the Australia option
4) Appendix #4 : Load weight setting
5) Appendix #5 : Height indicator operation
6) Appendix #6 : Height offset for each mast
7) Appendix #7 : Overload weight tables for each mast and frame
8) Appendix #8 : Speed limit group drawing
9) Appendix #9 : Alarm history deleting

APPENDIX #1 : BRP-9 SETTING PROCEDURE

BRP-9 setting procedures are as follows.

※ Refer to the appendix #2 for the setting of the display and access the USER/TRUCK menu.

1. BRP-9 ON PARAMETER SETTING

1) The controller can be used for the BRP-9 truck with changing the parameter as below.
   Truck Menu -> Settings -> Traction -> Set Options -> BRP-9 : OFF -> ON
   Truck Menu -> Settings -> Pump -> Set Options -> BRP-9 : OFF -> ON

※ The parameter in pump controller is supposed to be synchronized according to same parameter in traction controller.
   Synchronizing function is not performed when error happened, so confirm the parameter of the pump controller.

2) Turn the start switch OFF/ON.

2. CHECK THE PROGRAM VERSION OF EACH CONTROLLER

Check the program version of each controller as follows.

1) Traction controller : Truck Menu -> Monitoring -> Traction -> S/W Ver
2) Pump controller : Truck Menu -> Monitoring -> Pump -> S/W Ver
3) Fingertip controller : Truck Menu -> Monitoring -> MHYRIO -> S/W Ver
4) EPS master controller : Truck Menu -> Monitoring -> EPS -> S/W Ver
5) Display : User Menu -> S/W Ver

Item	Discription	Required version	Remark
Traction controller	All except Australia option	1.11 over	
	Australia option only	1.13 over	
Pump controller	All except Australia option	1.09 over	
	Australia option only	1.10 over	
Fingertip controller	-	1.14 over	
Display	Standard (6 key type)	1.16 over	
	Option (12 key type, height indicator)	0.36 over	
EPS master	Standard	1.86 over	
EPS slave	Standard	-	No needed
CAN tiller	Standard	-	No needed
CAN encoder	Height indicator option	-	No needed

※ If the controller program version is not satisfied, please consult the Hyundai or your Hyundai distributor.

3. TRUCK TYPE SETTING

1) Change the parameter of the model section as follows.
   Truck Menu -> Settings -> Traction -> Set Options -> Model Selection
   Truck Menu -> Settings -> Pump -> Set Options -> Model Selection
   15BRP-9 : 15, 18/20BRP-9 : 20, 23BRP-9 : 23

※ The parameter in pump controller is supposed to be synchronized according to same parameter in traction controller.
   Synchronizing function is not performed when error happened, so confirm the parameter of the pump controller.

2) Turn the start switch OFF/ON.

4. EPS SETTING

1) Set the parameter of the truck type as follows.
   Truck Menu -> Settings -> EPS -> Set Options -> Truck Type : 5

2) Turn the start switch OFF/ON.

3) Set the parameter of the auto teaching as follows.
   Truck Menu -> Settings -> EPS -> Adjustments -> AutoTeaching : ON

4) Turn the start switch OFF/ON.

5) The truck set the range with operating EPS steering wheel automatically when the start switch is turned ON.
   Turn the start switch OFF/ON after the operating is finished.

5. FINGER TIP MODEL SETTING

1) Truck Menu -> Settings -> MHYRIO -> Set Options -> Model Truck : Option #3

2) Turn the start switch OFF/ON.

6. FINGERTIP VOLTAGE AND PARAMETER SETTING

※ This doesn't need if the fingertip program version is over 1.18.

1) Truck Menu -> Settings -> MHYRIO -> Set Options
   Set Battery Type : 48V -> 36V, Valves Supply : 48V -> 36V

※ Do not change the voltage (24V) of the valves coil parameter.

2) Truck Menu -> Settings -> MHYRIO -> Parameter Change
   Max EVP 1 : 70.2% -> 60%, EVP 1,2 CLOSE DELAY : 0.1 -> 0.4,
   EVP 3,4 OPEN DELAY : 0.2 -> 2.5

7. BACK BUZZER OUTPUT PARAMETER CHANGING

1) Change the PWM output for the horn relay and back buzzer from 12V to 24V as follows.
Truck Menu -> Settings -> Pump -> Adjustments -> MC/AUX PWM : 33% -> 66%

8. OPTION SETTING

1) HEIGHT INDICATOR

(1) Set the height indicator parameter ON.
Truck Menu -> Settings -> Pump -> Set Options -> Height Indicat.
(2) Set the operating height for the free lift cylinder.
Truck Menu -> Settings -> Pump -> Adjustments -> OFFSET HEIGHT
※ Refer to the Appendix #6 for the HEIGHT OFFSET of the BRP-9 masts.

2) LOAD WEIGHT

Refer to the Appendix #4 for the load weight setting of the BRP-9 truck.

3) AUSTRALIA OPTION

Refer to the Appendix #3 for the setting and description of the Australia option for the BRP-9 truck.

9. LANGUAGE, UNITS AND CURRENT TIME SETTING

1) LANGUAGE SETTING

User Menu -> Language
Korea only : Korean
Except Korea : English

2) UNITS SETTING

User Menu -> UNIT
Inch (North America) : Speed - mile/h, height - Ft, Weight - Lb
Metric (except North America) : Speed - km/h, height - m, Weight - kg

3) CURRENT TIME : User Menu -> Set Time

10. ALARM CODE DELETING

Refer to the Appendix #9 for the alarm history deleting.

11. COOLING FAN CHECK

Check the operation of the cooling fan as follows.

1) Operate the cooling fan intentionally with changing the parameter for the check.
   Truck Menu -> Settings -> Pump -> Set Options -> FAN Control : Option #1

※ FAN Control parameter : Define of the fan operation
   Option #1 : The fan is always operating.
   Option #2 : The fan is operating when the temperature of the controller and motor is high more than the define temperature of the FAN CNT. TEMP parameter.

※ FAN CTL.TEMP : Truck menu -> Settings -> Pump -> Adjustment
   Option #3 : The fan is always operating when the controller and motor are operating.

2) Check the operation of the cooling fan.

3) Reset the fan control parameter to OPTION #2 (default).

12. OTHERS CHECK

Perform the check as follows.

1) Check the operation of the back buzzer normally when travelling backward.

2) Check the operation of the horn when operating the horn.

13. CHECK OPTION FUNCTION

Check the option function as follows.

1) HEIGHT INDICATOR

Check the mast stop at the preset height by referring the Appendix #5 for the operating description of the height indicator.

2) LOAD WEIGHT

Check that the load weight is displayed correctly.

3) AUSTRALIA OPTION

Check that the travel speed is limited to 3 km/h when the mast is risen above the operation range of the free cylinder.

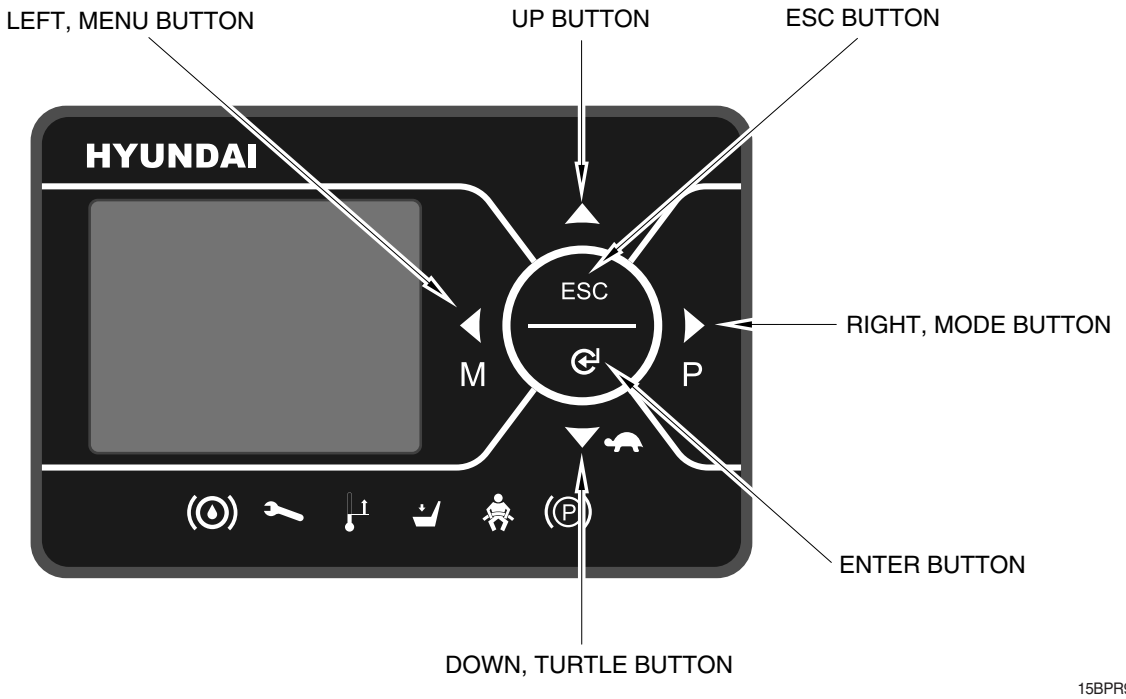
14. HOUR COUNTER CHECK

Check that the HK, HT and HP time is displayed correctly when the start switch is turn ON and clear the time to zero (0).

APPENDIX #2 : DISPLAY AND ACCESS OF THE USER/TRUCK MENU

There are two menu which are the USER MENU for the operator and TRUCK MENU for the maintenance in the display and you can access the MENU as follows.

1. DISPLAY BUTTON



2. ACCESS USER MENU

Step	Display	Description
1		1. Initial screen is displayed as left when the start switch is turned ON. 2. Press the MENU button more than 1 second in the initial screen.
2		1. The display will show the UESR MENU as left.

3. ACCESS TRUCK MENU

Step	Display	Description
1		1. Initial screen is displayed as left when the start switch is turned ON. 2. Press the ESC button more than 1 second in the initial screen.
2		1. The display will show the password input screen. 2. Enter the password using the buttons (LEFT, UP, DOWN, RIGHT) and then press the ENTER button.
3		1. The display will show the initial screen as left after entering password. 2. Press the MENU button more than 1 second.
4		1. The display will show the TRUCK MENU as left. 2. Select the MENU using the UP and DOWN buttons and press ENTER to go into the selected menu. 3. Press the ESC button to go into the previous menu.

APPENDIX #3 : DESCRITION AND SETTING FOR THE AUSTRALIA OPTION

1. DESCRITION

This option limits the travel speed to 3 km/h when the mast is risen above the operation range of the free cylinder.

2. COMPONENTS INSTALLATION

Refer to the page A-25 for the components installation.

3. PARAMETER SETTING

1) Display the lift limit parameter of the traction controller as below.
   Truck Menu -> Settings -> Traction -> Set Options -> Lift Limit : Off -> ON
2) Adjust the speed to the lift limit CTB (default 33 Hz) if the speed reduction is above or below 3 km/h.
   Truck Menu -> Settings -> Traction -> Parameter Change -> Lift Limit CTB
3) If this function is not operated normally, check the limit switch operation by below parameter.
   Truck Menu -> Monitoring -> Pump -> Cutback Switch (reduction : ON)

APPENDIX #4 : LOAD WEIGHT SETTING

1. Display load weight menu by activating the load sensor parameter as below.
   Truck Menu -> Settings -> Pump -> Set Options -> Load Sensor : Option #1

2. Set the standard weight (reference weight) to lift weight for the setting.
   Truck Menu -> Settings -> Pump -> Adjustments -> Reference Weight

3. Set the warning weight (overload weight) to warn alarm when the lifting weight is over warning weight.
   Truck Menu -> Settings -> Pump -> Adjustments -> OverLoad Weight

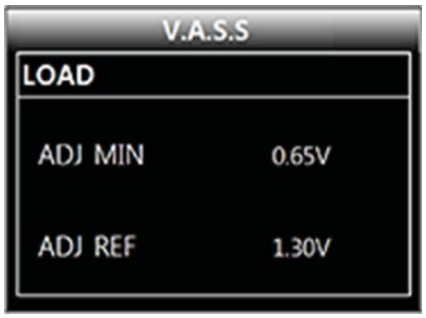
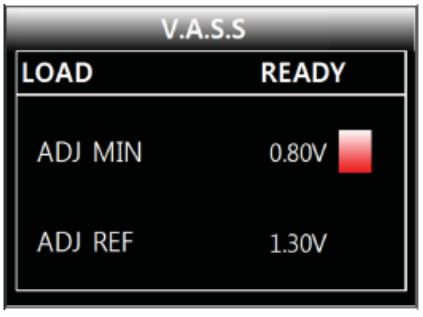
※ Please refer to the Appendix #7 for the overload weight of each mast and frame.

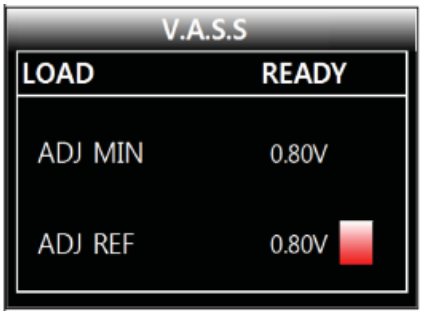
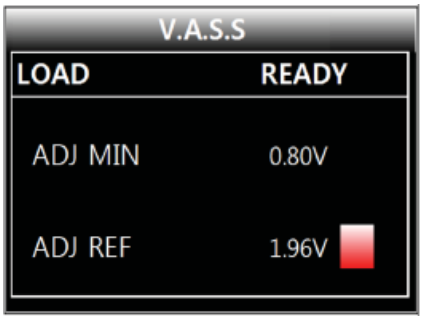
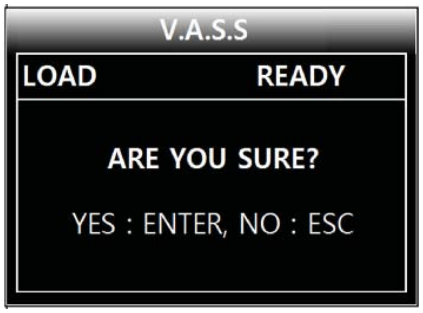
4. Set the overload type to None to stop the warning while setting.
   Truck Menu -> Settings -> Pump -> Set Options -> OverLoad Type

※ Overload type parameter : Define the truck operation when the lifting load weight is over the set weight.
   None : Do not warn when the lifting load weight is over the set weight.
   Option #1 : Do warn alarm and limit the operation of the truck when the lifting load weight is over the set weight.
   Option #2 : Do warn alarm only when the lifting load weight is over the set weight.

※ Do warn alarm and stop the operation of the truck regardless of the overload type when the sensor is accrued error or the lifting load weight is over the maximum weight. (Truck can be lift down only)

5. SET THE VALUE OF THE LOAD SENSOR AS FOLLOWS.

Step	Display	Description
1		1. Display the setting screen as follows. This setting can be made when the load sensor is set OPTION #1. 2. Make sure that the direction lever is in the neutral and the traction and pump motors are not running and the load is none and then start the setting by pressing ENTER button.
2		1. The "READY" appears at upper right and the "ADJ MIN" turn ON in red, start the "ADJ MIN LOAD" setting. If the value of the "ADJ MIN" is non load, display will show the load sensor input value and start the "ADJ MIN LOAD" setting. 2. Press ENTER button and go into the "ADJ REF".

Step	Display	Description
3		1. The "ADJ REF" will turn ON in red and, start the "ADJ REF" setting. 2. To set the load sensor input value of the lifting load for the "ADJ REF", shift the direction lever to forward and lift the load to about 50 cm from the working place. 3. You can see that the voltage value of the"ADJ REF" is changed as lifting the load.
4		1. Lift the load to set and wait about 5~10 seconds and then press the ENTER button after the "ADJ REF" value keeps constant value.
5		1. The display will ask "ARE YOU SURE?" 2. Press the ENTER button and escape the screen. 3. Keep the overload type is NONE as clause 4. ※ The accuracy of the load sensor is best when the lift load is heavier within the overload weight.

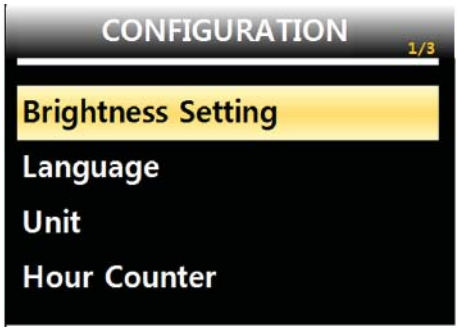
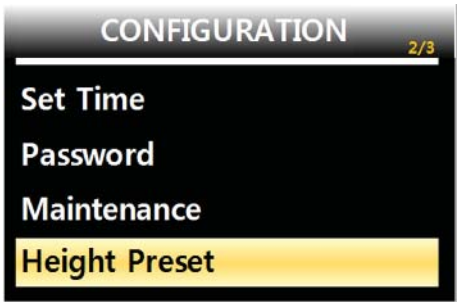
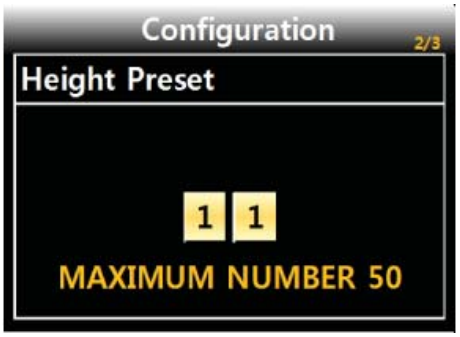
APPENDIX #5 : HEIGHT INDICATOR OPERATION

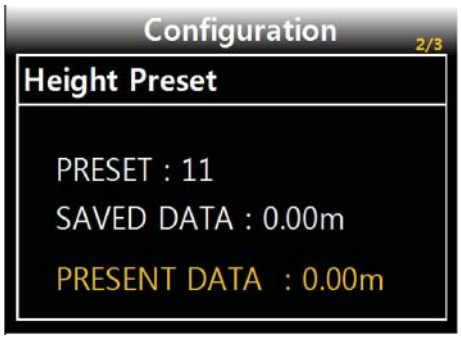
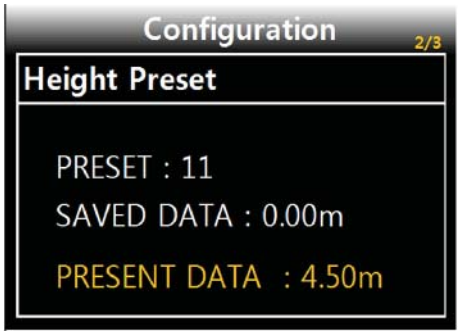
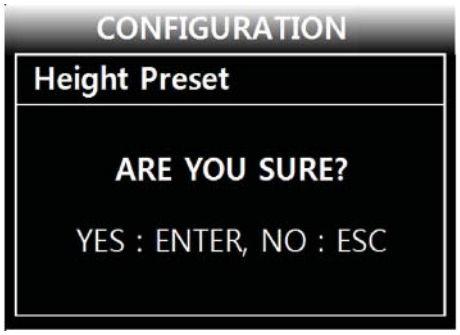
1. HEIGHT INDICATOR FUNCTION

1) This function displays the fork height when the fork is lifted above the free cylinder range.
2) You can set the "Height Preset" maximum 50 kinds and call the set height using the display. In fork up and down operation, the fork will stop when the fork reaches the set height.

2. HEIGHT PRESET SETTING

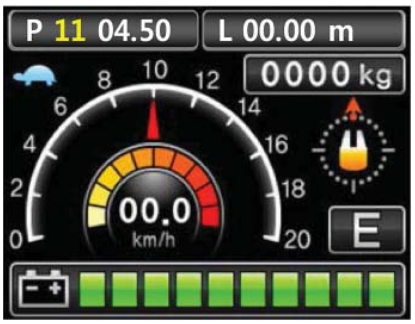
Set the height that you want as follows.

Step	Display	Description
1		1. Press the MENU button using the key pad in the Main Menu and go into the User Menu.
2		1. Seek the "Height Preset" menu using the UP and DOWN button in the USER MENU.
3		1. Press the ENTER button to go into the "Height Setting" menu.
4		1. If you go into the "Height Preset" menu, the display will ask you the number for the "Height Preset" setting. 2. The "Height Preset" can be set maximum 50 kinds. Select the number that you want and press the ENTER button using the key pad. (For example, select the 11)

Step	Display	Description
5		1. Now, display will show the number of the preset and the height value of stored in white and display the fork height at present in orange at below. Be note that the fork height display zero (0) in the free cylinder range because the height indicator function is not operated in the free cylinder range.
6		1. Lift up the fork to the height that you want to set the height setting using the lift lever. (For example, the height is 4.5 m) 2. Press the ENTER button when the height is 4.5 m.
7		1. The display will ask "ARE YOU SURE?", press the ENTER button and finish the setting.

3. HEIGHT PRESET OPERATION

Preset operation is done as follows.

Step	Display	Description
1		1. Press the H button using the key pad in the main display.
2		1. The current time display is changed to the preset call display and the number 00 blinks in yellow. 2. Input the the height preset number using the key pad and press the ENTER button. (For example, call the number 11, 4.50 m)
3		1. The preset call display stop blinking and the preset height (4.5 m) lights ON in yellow. 2. Raise the fork to the set height using the lift lever or joystick. ※ The fork will move up or down to the set height direction only when the preset set status. (For example, if the present height is 3.5 m and the preset height is 4.5 m, the fork will lift up only.) The fork can move reverse direction when preset status is released by pressing the ESC button.
4		1. The lever or joystick is pulled continuingly, the fork get out of the free cylinder range and the height will be measured.
5		1. The lever or joystick is pulled continuingly, the fork stops at the preset height and the preset function is cancelled.

APPENDIX #6 : HEIGHT OFFSET FOR EACH MAST

Model	Mast	Free lift stroke	Fork thickness	Offset height
15BRP-9	TF500	808	40	1656
	TF530	885	40	1810
	TF610	1037	40	2114
	TF685	1190	40	2420
	TF760	1340	40	2720
	TF815	1455	40	2950
	TF865	1570	40	3180
	TF930	1710	40	3460
	TF1010	1862	40	3764
18BRP-9	TF500	808	40	1656
	TF530	885	40	1810
	TF610	1037	40	2114
	TF685	1190	40	2420
	TF760	1340	40	2720
	TF815	1455	45	2950
20BRP-9	TF500	808	45	1661
	TF530	885	45	1815
	TF610	1037	45	2119
	TF685	1190	45	2425
	TF760	1340	45	2725
	TF815	1455	45	2955
23BRP-9	TF500	808	45	1661
	TF530	885	45	1815
	TF610	1037	45	2119
	TF685	1190	45	2425
	TF760	1340	45	2725
	TF815	1455	45	2955
	TF865	1570	45	3185
	TF930	1710	45	3465
	TF1010	1862	45	3769

APPENDIX #7 : OVERLOAD WEIGHT TABLE FOR EACH MAST AND FRAME

1. 15BRP-9 A TYPE BATTERY

· 34 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1315	1447
TF530	1293	1422
TF610	1270	1397

· 44 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1338	1472
TF530	1315	1447
TF610	1270	1397

· 36 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1315	1447
TF530	1293	1422
TF610	1270	1397

· 46 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1338	1472
TF530	1315	1447
TF610	1270	1397

· 38 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1315	1447
TF530	1293	1422
TF610	1270	1397

· 48 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1338	1472
TF530	1315	1447
TF610	1270	1397

· 40 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1315	1447
TF530	1293	1422
TF610	1270	1397

· 50 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1315	1447
TF530	1315	1447
TF610	1293	1422

· 42 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1315	1447
TF530	1315	1477
TF610	1270	1397

2. 15BRP-9 B TYPE BATTERY

· 34 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1315	1477
TF760	839	923
TF815	386	425

· 36 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1315	1477
TF760	1043	1147
TF815	522	574

· 38 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1315	1477
TF760	1270	1397
TF815	658	724

· 40 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1315	1477
TF760	1270	1397
TF815	816	898

· 42 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1338	1472
TF760	1270	1397
TF815	975	1073

· 44 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1338	1472
TF760	1270	1397
TF815	1179	1297

· 46 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1338	1472
TF760	1270	1397
TF815	1179	1297

· 48 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1338	1472
TF760	1270	1397
TF815	1179	1297

· 50 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1338	1472
TF760	1270	1397
TF815	1179	1297

3. 15BRP-9 C TYPE BATTERY

· 34 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	953	1048
TF815	499	549

· 36 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1202	1322
TF815	658	724

· 38 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1361	1497
TF815	816	898

· 40 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1361	1497
TF815	975	1073
TF865	726	799

· 42 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1361	1497
TF815	1179	1297
TF865	885	974

· 44 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1361	1497
TF815	1293	1422
TF865	1066	1173

· 46 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1361	1497
TF815	1293	1422
TF865	1247	1372

· 48 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1361	1497
TF815	1315	1447
TF865	1270	1397

· 42 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1361	1497
TF815	1315	1447
TF865	1270	1397

4. 15BRP-9 D TYPE BATTERY

· 34 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1111	1222
TF815	612	673

· 36 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1315	1447
TF815	748	823

· 38 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1361	1497
TF815	907	998

· 40 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1361	1497
TF815	1111	1222
TF865	839	923

· 42 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1361	1497
TF815	1315	1447
TF865	998	1098
TF930	590	649

· 44 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1361	1497
TF815	1361	1497
TF865	1202	1322
TF930	748	823
TF1010	340	374

· 46 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1361	1497
TF815	1361	1497
TF865	1361	1497
TF930	907	998
TF1010	476	524

· 48 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1361	1497
TF815	1361	1497
TF865	1361	1497
TF930	1066	1173
TF1010	590	649

· 50 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1361	1497
TF530	1361	1497
TF610	1361	1497
TF685	1361	1497
TF760	1361	1497
TF815	1361	1497
TF865	1361	1497
TF930	1293	1422
TF1010	726	799

5. 18BRP-9 A TYPE BATTERY

· 34 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747

· 36 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747

· 38 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747

· 40 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747

· 42 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747

· 44 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747

· 46 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747

· 48 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747

· 50 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747

6. 18BRP-9 B TYPE BATTERY

· 34 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747
TF685	1429	1572

· 36 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747
TF685	1588	1747

· 38 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747
TF685	1588	1747

· 40 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747
TF685	1588	1747

· 42 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747
TF685	1588	1747

· 44 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747
TF685	1588	1747

· 46 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747
TF685	1588	1747

· 48 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747
TF685	1588	1747

· 50 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1588	1747
TF530	1588	1747
TF610	1588	1747
TF685	1588	1747

7. 20BRP-9 B TYPE BATTERY

· 34 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1746	1921
TF685	1429	1572

· 36 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1746	1921
TF685	1656	1822

· 38 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1746	1921
TF685	1656	1822

· 40 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1746	1921
TF685	1656	1822

· 42 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1746	1921
TF685	1656	1822

· 44 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1769	1946
TF685	1656	1822

· 46 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1769	1946
TF685	1656	1822

· 48 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1769	1946
TF685	1656	1822

· 50 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1769	1946
TF685	1656	1822

8. 20BRP-9 C TYPE BATTERY

· 34 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1814	1995
TF685	1588	1747
TF760	1043	1147
TF815	590	649

· 36 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1814	1995
TF685	1814	1995
TF760	1247	1372
TF815	703	773

· 38 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1814	1995
TF685	1814	1995
TF760	1474	1621
TF815	862	948

· 40 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1814	1995
TF685	1814	1995
TF760	1724	1896
TF815	1021	1123

· 42 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1814	1995
TF685	1814	1995
TF760	1724	1896
TF815	1225	1348

· 44 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1814	1995
TF685	1814	1995
TF760	1724	1896
TF815	1429	1572

· 46 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1814	1995
TF685	1814	1995
TF760	1724	1896
TF815	1565	1722

· 48 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1814	1995
TF685	1814	1995
TF760	1724	1896
TF815	1565	1722

· 50 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	1814	1995
TF530	1814	1995
TF610	1814	1995
TF685	1814	1995
TF760	1724	1896
TF815	1588	1747

9. 23BRP-9 B TYPE BATTERY

· 34 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	1996	2196
TF685	1406	1547
TF760	907	998
TF815	454	499

· 36 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	1996	2196
TF685	1678	1846
TF760	1089	1198
TF815	590	649

· 38 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2018	2220
TF685	1905	2096
TF760	1293	1422
TF815	720	799

· 40 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2018	2220
TF685	1905	2096
TF760	1520	1672
TF815	885	974

· 42 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2018	2220
TF685	1905	2096
TF760	1792	1971
TF815	1043	1147

· 44 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2018	2220
TF685	1905	2096
TF760	1792	1971
TF815	1247	1372

· 46 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2018	2220
TF685	1905	2096
TF760	1792	1971
TF815	1451	1596

· 48 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2018	2220
TF685	1905	2096
TF760	1792	1971
TF815	1633	1796

· 50 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2018	2220
TF685	1905	2096
TF760	1792	1971
TF815	1656	1822

10. 23BRP-9 C TYPE BATTERY

· 34 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	1565	1722
TF760	1043	1147
TF815	590	649

· 36 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	1860	2046
TF760	1225	1348
TF815	703	773

· 38 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	2041	2245
TF760	1451	1596
TF815	862	948

· 40 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	2041	2245
TF760	1724	1896
TF815	1021	1123
TF865	771	848

· 42 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	2041	2245
TF760	1973	2170
TF815	1202	1322
TF865	930	1023

· 44 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	2041	2245
TF760	1973	2170
TF815	1429	1572
TF865	1111	1222

· 46 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	2041	2245
TF760	1973	2170
TF815	1656	1822
TF865	1293	1422

· 48 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	2041	2245
TF760	1973	2170
TF815	1814	1995
TF865	1497	1647

· 42 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	2041	2245
TF760	1973	2170
TF815	1814	1995
TF865	1724	1896

11. 23BRP-9 D TYPE BATTERY

· 34 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	1701	1871
TF760	1157	1273
TF815	680	748

· 36 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	1996	2196
TF760	1361	1497
TF815	816	898

· 38 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	2041	2245
TF760	1588	1747
TF815	975	1073

· 40 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	2041	2245
TF760	1860	2046
TF815	1157	1273
TF865	907	998

· 42 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	2041	2245
TF760	2041	2245
TF815	1338	1472
TF865	1043	1147
TF930	658	724

· 44 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	2041	2245
TF760	2041	2245
TF815	1588	1747
TF865	1247	1372
TF930	816	898
TF1010	431	474

· 46 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	2041	2245
TF760	2041	2245
TF815	1837	2021
TF865	1451	1596
TF930	953	1048
TF1010	544	598

· 48 inch outrigger

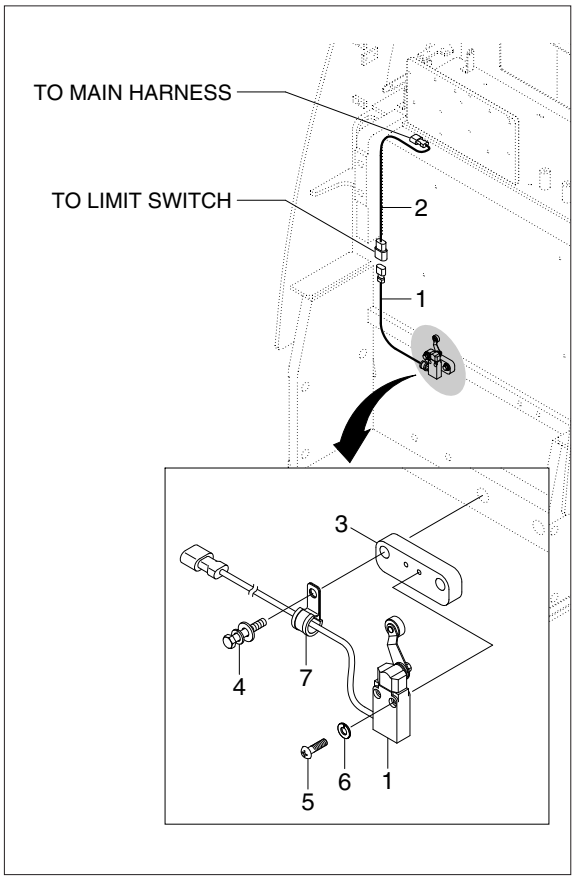
Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	2041	2245
TF760	2041	2245
TF815	1973	2170
TF865	1656	1822
TF930	1111	1222
TF1010	658	724

· 50 inch outrigger

Mast	Load capacity (kg)	Warning weight (kg, 110%)
TF500	2041	2245
TF530	2041	2245
TF610	2041	2245
TF685	2041	2245
TF760	2041	2245
TF815	1973	2170
TF865	1905	2096
TF930	1315	1447
TF1010	794	873

APPENDIX #8 : SPEED LIMIT GROUP DRAWING

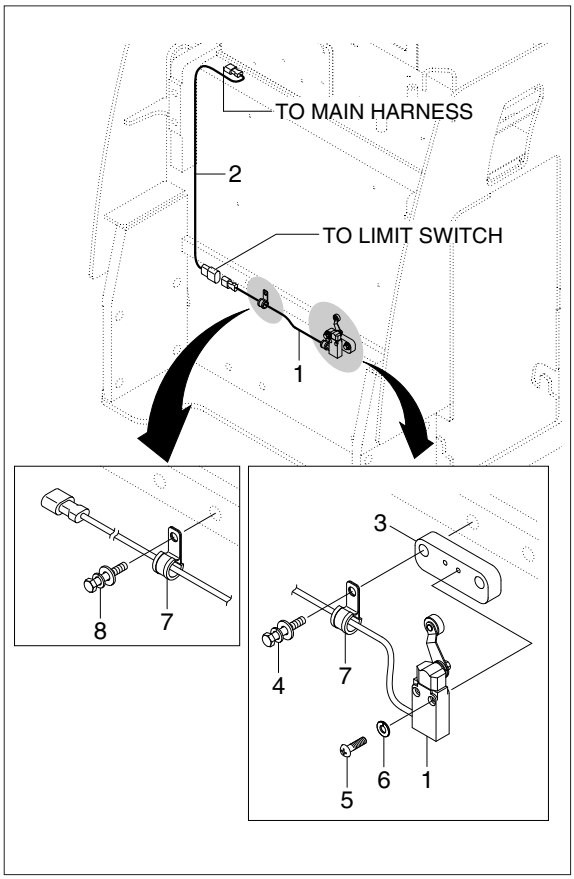
· 15/23BRP-9



15BRP9024

1 Speed limit 6 switch assy
2 Limit switch (650) harness
3 Switch bracket
4 Bolt
5 Screw
6 Spring washer
7 Tube clamp

· 18/20BRP-9

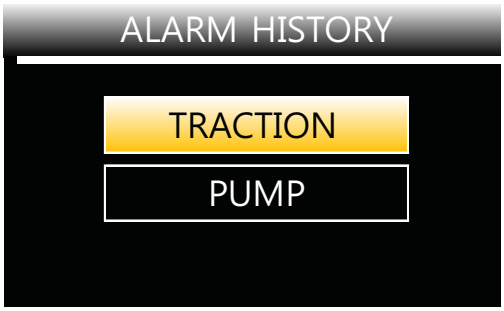
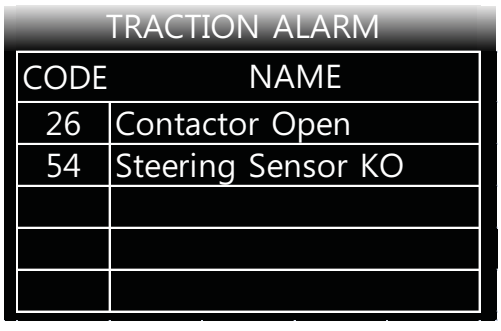


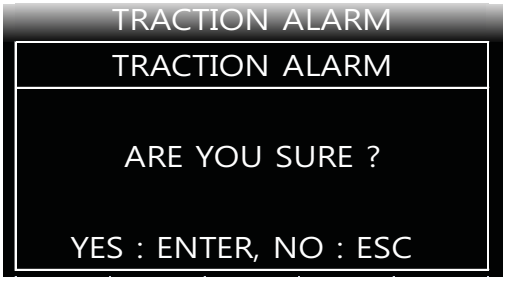
15BRP9025

1 Speed limit 6 switch assy
2 Limit switch (650) harness
3 Switch bracket
4 Bolt
5 Screw
6 Spring washer
7 Tube clamp
8 Bolt

APPENDIX # 9 : ALARM HISTORY DELETING

Delete the alarm history that occured during the setting procedure using the display TRUCK MENU as follows.

Step	Display	Description
1		1. Select the ALARM HISTORY MENU in the TRUCK MENU using the UP and DOWN button and press the ENTER button.
2		1. Display reads the alarm history from all the controllers for 5~10 seconds.
3		1. The display will show as left figure when finished the alarm history reading. 2. Select the TRUCTION and press the ENTER button and check the alarm history of the traction controller.
4		1. The alarm lists that are stored in the traction controller are displayed as left. 2. Press the ESC button in order to delete.

Step	Display	Description
5		1. The display will ask "ARE YOU SURE?". 2. Delete the alarm history by pressing the ENTER button.
6		1. Delete the alarm history of the pump controller through the above steps 3~5. 2. Confirm the deletion of the alarm history correctly through above steps 1 and 2.