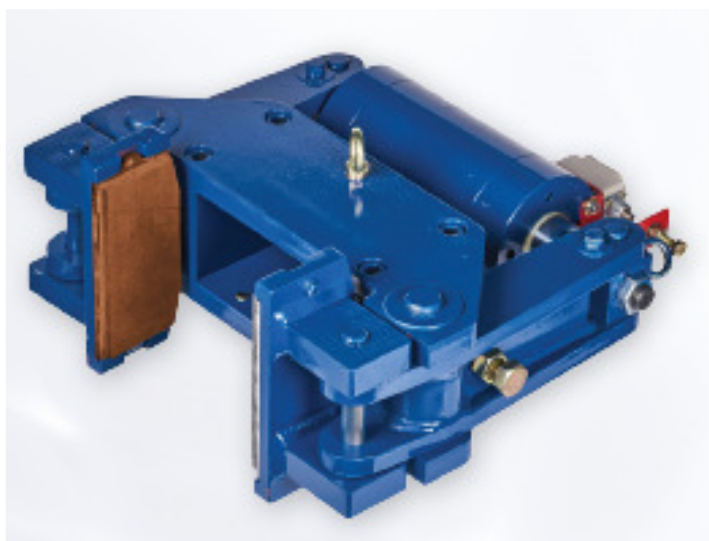


Wheel Brake
Model : TB-WB

Wheel Brake Instruction Manual

Please make sure that this instruction manual is finally reached to the hands of the person who uses this product.



HANMI TECHWIN

(FORMER : T.H. ELEMA ENG. CO., LTD.)

TEL : +82-31-498-9270

FAX : +82-31-433-5986

Wheel Brake Instruction Manual

Preface

Thank you for using wheel brake this time.

Wheel brake is an important part of the machinery.

Before use, carefully read this instruction manual and treat it properly so that the thruster functions fully.

Furthermore, please keep this instruction manual for daily maintenance and inspection as it is necessary for the treatment at the time of failure.

[Request machinery maker]

- Please ensure that this manual is certainly delivered to the final customer (End User) to use this product.

General Notes

- The illustrations in this manual may be expressed with the cover or safety shield removed to illustrate the details. When operating this product, be sure to restore the cover or blockage to its original condition and operate it according to this manual.
- The illustrations and photographs shown in this manual are typical examples and may differ from the products that have arrived.
- This manual can be changed as appropriate to improve the product, to change the specifications, and to improve the usability of the manual itself.
- When ordering the instruction manual due to damage, loss, etc., please contact the distributor of our company or the nearest sales office with the reference number of the cover on the first page.
- If the name plate affixed to the product is scratched or damaged, order a nameplate from our dealer or the nearest sales office listed on the final page.
- Modification of the product by the customer is out of the scope of our guarantee, so we are not responsible.

Wheel Brake Instruction Manual

Safety Precautions

- Before use (installation, operation, maintenance, inspection, etc.), please read this manual and all other attached documents carefully and use it correctly.
Please also learn about the knowledge of the equipment, safety information, and precautions. Once you have read it, be sure to keep it wherever you can see it.
- In this manual, safety precautions are classified into "**danger**" and "**caution**".

! Danger

: If improper handling can result in a hazardous situation and may result in death or serious injury.

! Caution

: In the event of improper handling, a dangerous situation may occur, the possibility of serious injury or minor injury, or material damage is expected.

In other words, even the matters described in the "**Caution**" may be associated with serious consequences depending on the situation.

[IMPORTANT]: The items that are not covered by "**Danger**" and "**Caution**", but which must be observed by customers, are specified in relevant places.

[General]

! Danger

- **Do not use in an explosive atmosphere (hazardous area).**
It may cause injury or fire.
- **Carrying, installation, wiring, operation, operation, maintenance and inspection work should be carried out by qualified personnel or persons with specialist knowledge.**
It may cause electric shock, injury or fire.
- **Do not modify the product.**
It may cause electric shock, injury or fire.

! Caution

- **Do not use the product outside the range described in this manual.**
It may cause electric shock, injury or fire.

! Caution

- **Life is endangered by misuse or inadequate handling or maintenance!**

※ Other uses or modifications of the wheel brake are strictly prohibited.

Ignoring the regulations, installation and maintenance instructions for a given use will shorten the life and lose the manufacturer's warranty!

Wheel Brake Instruction Manual

[Unpacking]

! Caution

- **After confirming everywhere, please disassemble the package.**
There is a risk of injury.
- **Please confirm the actual item on the name plate and order form as per the order.**
If the wrong product is installed, there is a risk of injury or damage.
- **Please check if there is any damage during transport.**
Do not use a damaged wheel brake.
There is a risk of injury or damage.

[Installation]

! Caution

- **Never allow flammable materials to surround the wheel brake.**
There is a risk of fire.
- **If it is installed in a place where people with no expertise are likely to approach it, install a safety belt.**
There is a risk of injury.
- **Do not install or use a damaged wheel brake.**
It may cause electric shock, injury or fire.

[Disassembly and assembly]

! Caution

- **Be sure to carry out disassembly and assembly at a professional factory.**
There is a risk of injury.

Wheel Brake Instruction Manual

Contents

1. Inspection upon arrival	6
2. Handling Tips	6
3. Storage Tips	6
4. Product description	7
1) Operating Concept	7
5. Installation	8
1) Pre-Installation Checklist	8
2) Installation Procedure	8
3) Wiring	9
4) Limit Switch Adjustment	9
5) Wheel Brake Adjustment	10
6. Inspection before commissioning	10
7. Maintenance	11
1) Troubleshooting	11
2) Maintenance Schedule	12
8. Pad Replacement	12
1) Pad Replacement Procedure.....	12
9. Unit specifications and Composition	13
1) Specification	13
2) Composition	13
3) Main product composition	15
10. Ready for operation and detailed part description	15
1) Check point before driving	15
2) Feature and description for each part	15
11. Inspection and Failure	17
1) Daily Inspection Items	17
2) Monthly inspection items	17
3) Quarterly inspection items	17
4) Pump failure and check	18
5) Solenoid valve malfunction and check	19
6) Relief valve malfunction and check	19
7) Cylinder breakdown and check	20
8) Motor failure and inspection	20

Wheel Brake Instruction Manual

1. Inspection upon arrival

! Caution
<ul style="list-style-type: none">• After confirming everywhere, please disassemble the package. There is a risk of injury.• Please confirm the actual item on the name plate and order form as per the order. If the wrong product is installed, there is a risk of injury or damage.• Please check if there is any damage during transport. Do not use a damaged wheel brake. There is a risk of injury or damage.

If there is any mistake in the above matters and structure, please contact our distributor or our sales department immediately.

2. Handling Tips

! Caution
<ul style="list-style-type: none">• Please be careful when transporting with a fork lifter because there is a danger of falling or turning. There is a risk of injury• Before lifting, check the nameplate, packing list, outline dwg., catalog, etc., and check the weight of the wheel brake. Do not lift the wheel brake beyond the rated load of the hoisting machine. Hoist Point may be damaged, fallen, damaged by falling, or damaged.• Use the eye bolt for hoisting operation. There is a risk of injury or damage.• After installation on the machine, avoid hoisting the entire machine with the eyebolt of the brake. There is a risk of injury or damage.

3. Storage Tips

Do not store the wheel brake temporarily or for a long time with the package broken. Wheel brake storage location should be determined by considering the following points.

- Weather-free, damp-free place
- Oil-free place
- Where there is no harmful gas or liquid
- Place where the ambient temperature is 0 °C ~ 40 °C
- Place without vibration

Wheel Brake Instruction Manual

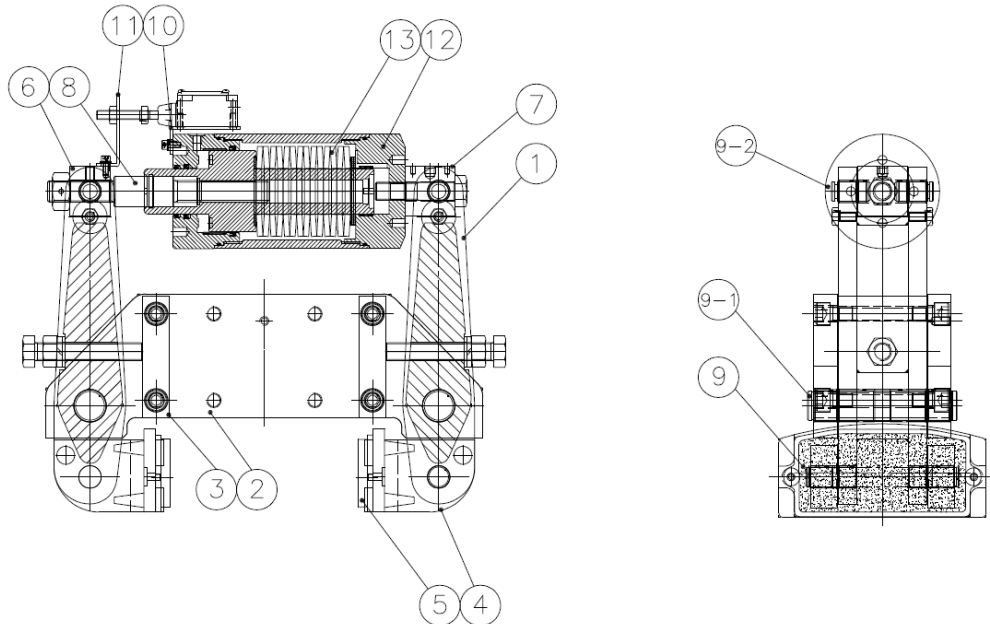
4. Product description

This manual describes the company's wheel brake.

This version of the wheel brake is not suitable for use in explosive atmospheres.

1) Operating Concept

This hydraulic push-up braking machine uses electric hydraulic unit. When power is not supplied, both posts push the shoe inward by the compressive force of the brake spring, and the pad attached to the shoe is braked with close contact with the wheel. When the power is supplied, it is a non-actuated type ("B" Type) in which the hydraulic pressure is applied to the cylinder in the unit and the brakes are released when the spring is pulled out of the compression rod to open the post and shoe outward.



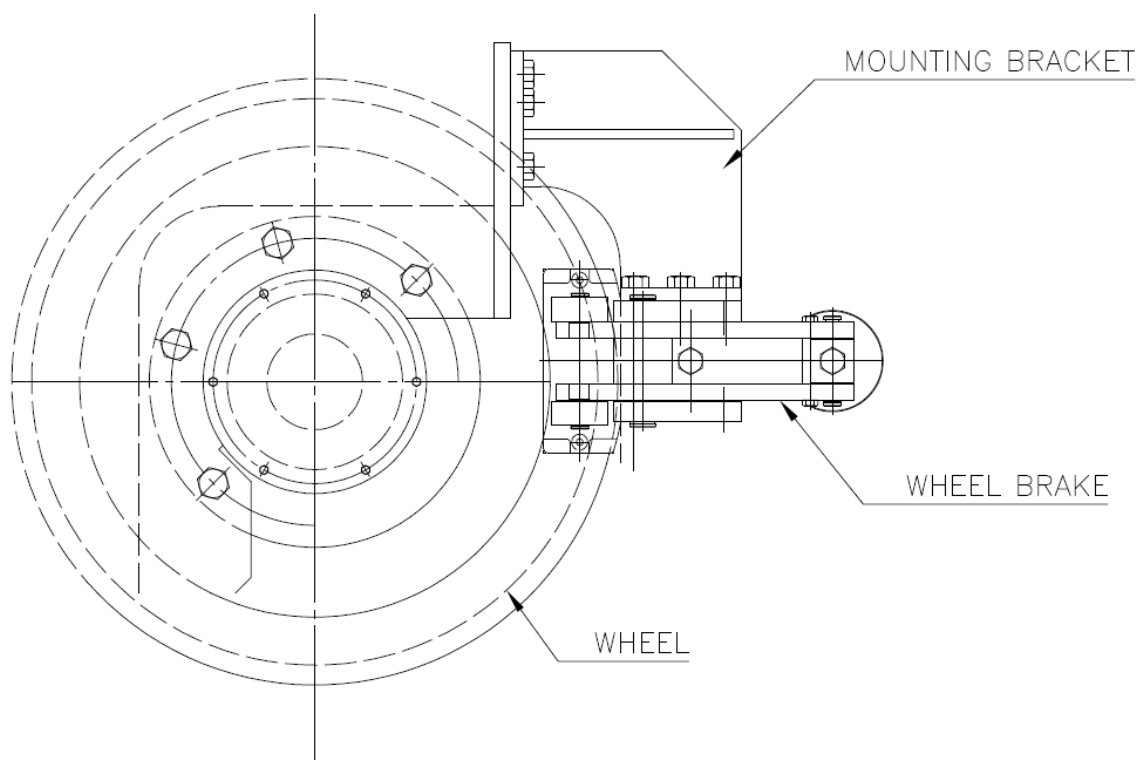
No.	Item	No.	Item	No.	Item
1	Lever	7	Lever Cross Plate-2/2	11	Limit Switch Racket-2/2
2	Hub Plate	8	Rod	12	Cylinder
3	Side Plate	9	Lever Pin-1	13	Disc Spring
4	Shoe	9-1	Lever Pin-2		
5	Pad	9-2	Lever Pin-3		
6	Lever Cross Plate-1/2	10	Limit Switch Racket-1/2		

Wheel Brake Instruction Manual

5. Installation

1) Pre-Installation Checklist

- (1) Clean the wheel with non-residue cleaner-alcohol before installation.
- (2) Remove any debris from the surface of the brake pad.
- (3) Make sure that the installation floor is flat and perpendicular to the wheel.
- (4) Install the hydraulic unit and connect the wires.



2) Installation Procedure

- (1) Operate the hydraulic unit to open the brake.
- (2) After the wheel brake is positioned between the wheels, fix the mounting bracket to the crane. If the space between the pad and the wheel is insufficient, turn the rod counterclockwise to get additional space.
- (3) Make sure that the structure rotates without interference when rotating the wheel.
- (4) Adjust left and right gaps so that both gaps are equal. (Left, right Gap each 2mm)
- (5) Install the brake so that the surface of the wheel is parallel to the pad surface.

! Caution

- Both gaps must be equal to ensure the brake contact force on the wheel.
- In case of losing the balance, the supporting structures or disc may be damaged.

Wheel Brake Instruction Manual

3) Wiring

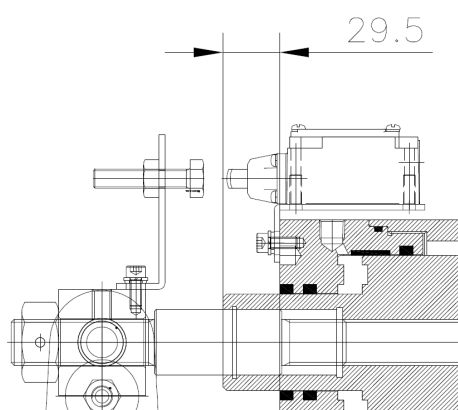
! Danger

- **Turn off the power switch, mark "No-Energization", and perform wiring work.**
It may cause electric shock
- **Wiring, maintenance and inspection work should be carried out by a person with specialist knowledge.**
It may cause electric shock or fire.
- **Be sure to connect earth terminal to ground according to electrical equipment standard and extension regulations.**
It may cause electric shock
- **Do not operate with the terminal box cover open.**
- **After the operation, install the cover of the terminal box as it is.**
It may cause electric shock

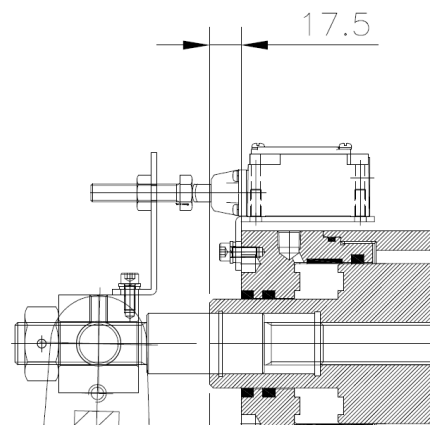
! Caution

- **Wiring should be done according to the electrical equipment standard and extension regulations.**
It may cause electric shock, fire or injury.
- **The voltage fluctuation should be within 110% to 85% of the rated voltage.**
The burnout may cause ignition, abnormal operation, electric shock, injury or fire.
- **Protective devices (such as Circuit breaker) should not be installed on the brake.**
Remove the installed parts.
The burnout may cause electric shock or fire.

4) Limit Switch Adjustment



(Brake Close)

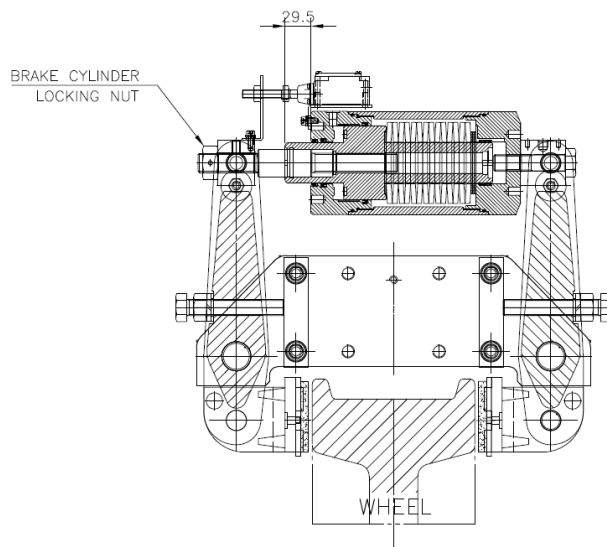


(Brake Open)

- (1) Adjust the distance using the limit switch bracket and adjustment bolt.
- (2) After setting is completed, fix bracket and adjusting bolt so that it does not move.
- (3) After completing all the settings, operate the brake and check that the limit switch contacts before going to the open position.

Wheel Brake Instruction Manual

5) Wheel Brake Adjustments



- (1) Piston rod setting adjusted to 29.5mm. (Max. piston rod dimension 32.5mm)
- (2) Shoe gap
Normal Brake gap = 1 mm per side
Maximum Brake gap = 2 mm per side
(Recalibration is required if you miss a normal gap.)
- (3) Replace if pad thickness is less than 5.5mm.
- (4) Lateral Movement up to ± 6 mm

6. Inspection before commissioning

! Danger

- **Be sure to check whether there is any paint or foreign substance on the wheel and lining contact surface.**

Abnormal operation and injury may be caused.

Before commissioning, confirm the following.

- Is the power supply voltage adequate?
- Wiring not changed?
- Is the brake wheel and pad clearance appropriate?
- Is the braking spring length set to the setting length?
- Was the wheel and pad cleaned?
If there is paint or foreign matter, wipe it with thinner.
- Is there any damage to the wheel and pad surface?
- Are the screws and nuts on each part fastened?

After commissioning, please confirm the followings.

- Wheel brake does exert sufficient function?
- Is operation of each part normal during operation?

Wheel Brake Instruction Manual

7. Maintenance

1) Troubleshooting

Trouble	Troubleshooting
Brake does not open	<ul style="list-style-type: none"> • Make sure that the direction of pump motor rotation is correct. • Make sure the relief valve is adjusted too low. • Check the solenoid valve for debris. • Make sure the needle valve on the manifold is in the correct position. • Check that the solenoid valve coil is working. • Make sure the oil tank. • Check hydraulic piping for damage or bent parts. • Check the seals inside the cylinder for damage.
Brake opens slowly	<ul style="list-style-type: none"> • Ensure that all air is exhausted from the system. • Check for any abnormal bottlenecks in the hydraulic piping. Please clean. • Make sure the gap is adjusted correctly. • Make sure that the hydraulic oil is suitable for the on-site temperature environment. • Check the seals inside the cylinder for damage. • Check that there is no excessive leakage in the pump unit.
Brake does not close	<ul style="list-style-type: none"> • Make sure the needle valve is in the correct position. • Check that the solenoid valve and coil are working properly. • Ensure that all air is exhausted from the system. • Make sure the gap is adjusted correctly. • Check for any abnormal bottlenecks in the hydraulic piping. Please clean.
Not enough brake torque	<ul style="list-style-type: none"> • Make sure that the load and speed are within the operating capacity. • Make sure the gap is adjusted correctly. • Make sure the wheel is clean. • Make sure the pad is not dirty. • Clean or replace Pad if necessary.
Abnormal Pad wear	<ul style="list-style-type: none"> • Brake body is well aligned on disk, make sure that it is securely fastened to the crane body. • Whether the brake is being used during (Wheel) operation. Please check. • Whether the hydraulic pressure is sufficient to release the brake sufficiently. Please check. • Make sure that the pad fixing bolt is of the proper length. • Make sure your Brake disk is well aligned, While rotating please check. • Make sure that there is no bearing error and no bending of the shaft.
Abnormal wear of disk	<ul style="list-style-type: none"> • Make sure that the pad is excessively worn or contaminated by foreign matter.
Abnormal over wear of pad	<ul style="list-style-type: none"> • Check that the braking action and speed monitor are working properly. • Make sure that the load, speed, driving times, etc. are in the design specification. • Make sure the gap is adjusted correctly. • Make sure the brake is fully open.

Wheel Brake Instruction Manual

2) Maintenance Schedule

! Caution																
<ul style="list-style-type: none">• The braking is generated by the spring force produced by the spring catch method.• If the pad wears down, the spring force is reduced and the equipment exhibits a reduced brake capacity.																
Description	Cycl.	Maintenance Time Intervals (Month)														
		1	2	3	4	5	6	7	8	9	10	11	12	24	36	
Check gap, adjust if necessary, Disk cleanliness check	500			x												
Check all hydraulic connections for leaks	500			x												
Hydraulic level check	500			x												
Make sure the pad is well worn	500			x												
Check hydraulic power	500			x												
Confirm that all pad thick. is 6mm or more	1000													x		
Check or replace disk springs																
Check brake capacity	2000													x		
Replace pad when brake is caught during high speed rot.																
Lubricate the springs (10,000 Cycles or 3 years first)	10000															x

8. Pad Replacement

! Warning																
<ul style="list-style-type: none"> Make sure that the operating unit is locked before any external loads to prevent the system from rotating. 																

Brake pads should be replaced when the thickness T is less than 6 mm or when the pad is worn out unevenly. Pad should always be replaced with a pair (both left and right).

1) Pad Replacement Procedure

- (1) Make sure that the operating unit is locked before any external loads,
- (2) Hydraulic to be operated so that the wheel brake is fully open.
- (3) Loosen the pad fixing bolt.
- (4) Remove the pad from the shoe.
- (5) Install the new pad on the shoe and make sure it is clean and free from contamination. The curved part of the pad should face the outside of the wheel.
- (6) Tighten the pad fixing bolt.
- (7) Wheel brake should be readjusted before use.

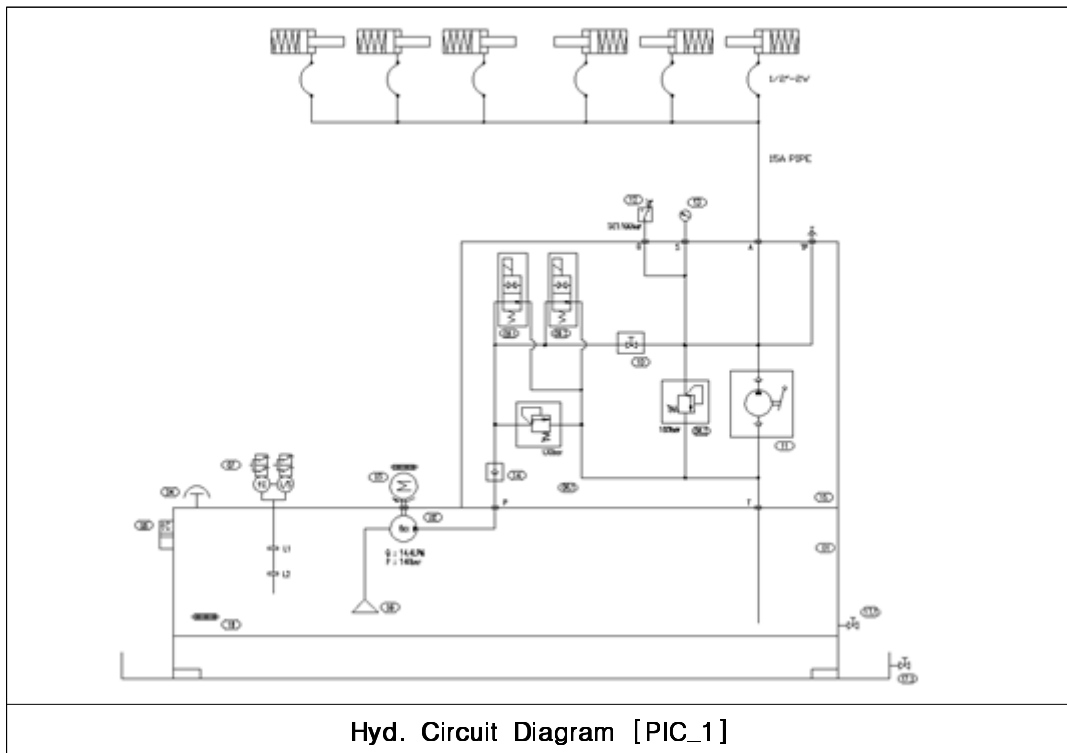
Wheel Brake Instruction Manual

9. Unit specifications and Composition

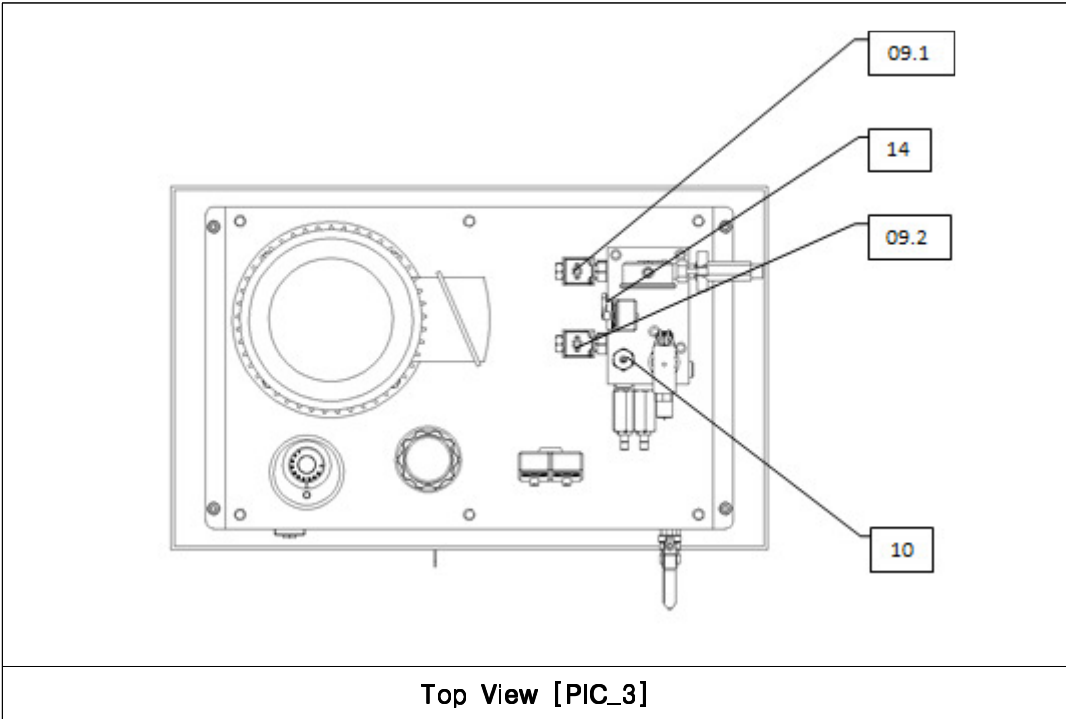
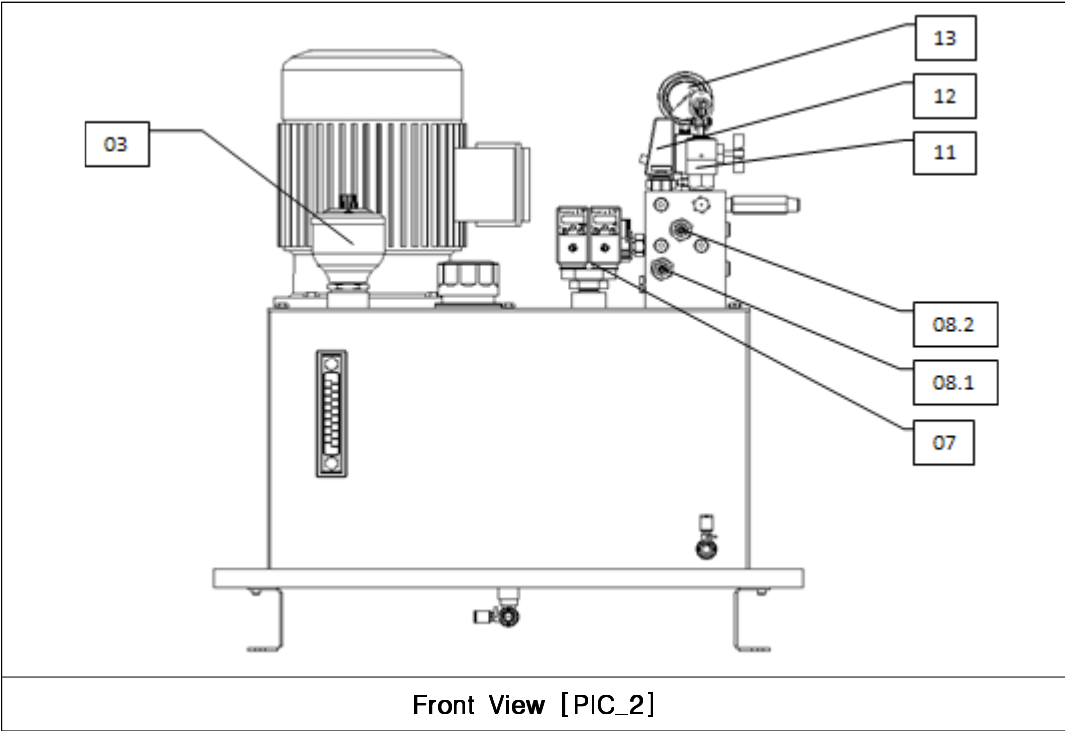
1) Specifications

Item	Specification
Power	3.7KW
Discharge	14.4 LPM
Tank Capacity	50ℓ
Pump Type	Gear
Max. Working Pressure	130bar
Hydraulic Oil	VG32
Accumulator Capacity	Not Applicable
Operating Means	Motor / Hand Pump
Hydraulic Cylinder	Φ105-Φ50-20st
Tank Material	SUS316
Solenoid	AC220V
Filter	100Mesh

2) Composition



Wheel Brake Instruction Manual



Wheel Brake Instruction Manual

3) Main product composition

Item	Name	Model
02	GEAR PUMP	AZPF-10-008RCB20MB
03	E. MOTOR(Direct connection)	5HP-4P-220/380V
07	TEMP/LEVEL S/W	SCLTSD-250-00-07
08	RELIEF VALVE	AZ04B2HZM
09	SOL VALVE	DSH101NRT
10	NIDDLE VALVE	NHV101-K
11	HAND PUMP	HP10-21
12	PRESSURE S/W	SCPSD-250-04-17
13	PRESSURE GAUGE	A63-250K
14	CHECK VALVE	D02B2-0.2N
16	HEATER	PT1"-220V-500W-60Hz

10. Ready for operation and detailed part description

1) Check point before driving

- (1) Check the amount of oil in the oil tank. The level must be filled to the highest point on the level gauge before installation. If the wheel brake release is activated, the oil is replenished to the hydraulic cylinder and the oil level is lowered.
- (2) Check the rotation direction of the motor after the electrical connection.
After confirming that the motor is rotated as indicated by the arrow on the motor, all operations must be performed.
- (3) Confirm that there is no deviation between the connection between the hydraulic unit and the outer case. Confirm the connection between the six hydraulic cylinders from the outlet of the outer case, and then operate when there is no abnormality. Make sure that there is no leakage in the connecting piping between the hydraulic unit and the hydraulic cylinder during the initial operation, and stop the start immediately if oil is found.
- (4) Check that the scale of the pressure gauge indicates "0 bar".

2) Feature and description for each part

[07. TEMP/LEVEL S/W]

[12. PRESSURE S/W]

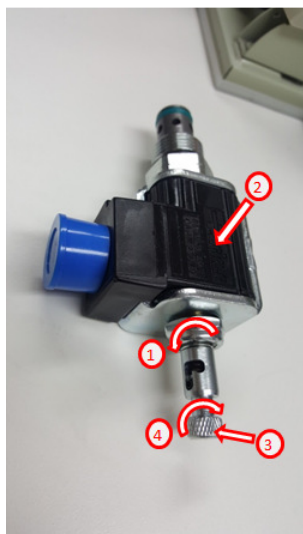
- It is a device that outputs a contact type signal for controlling the operating oil temperature, the operating oil level, the pressure supplemented to the cylinder, and so on. Factory setting Input value: 100bar

Wheel Brake Instruction Manual

[08. RELIEF VALVE]

- Pressure adjustment screw Clockwise rotation - Pressure rise
- Pressure adjustment screw Counterclockwise rotation - Pressure drop
- Factory setting: 130 bar
- Serves to adjust the pressure in the hydraulic circuit by limiting the maximum value of the hydraulic pressure discharged by the hydraulic pump.

Limit pressure rise above safety limits to prevent motor overload and damage to components in the circuit.



- Coil disassembly method.
 - ① Loosen the fixing bolt.
 - ② Remove the coil.
- Coil assembly method - reverse order of disassembly
 - ③ After pressing the plunger part
 - ④ By rotating and fixing it, manual loading operation is possible.

[10. NIDDLE VALVE]

- NIDDLE VALVE Clockwise rotation to the end - Closed
- NIDDLE VALVE Counterclockwise rotation - open
- Factory setting: Hydraulic pump operation.
- You can manually select the operation of the hydraulic pump / manual hand pump.
 - Operated by manual hand pump when closing.
 - Operated by hydraulic pump when open setting.

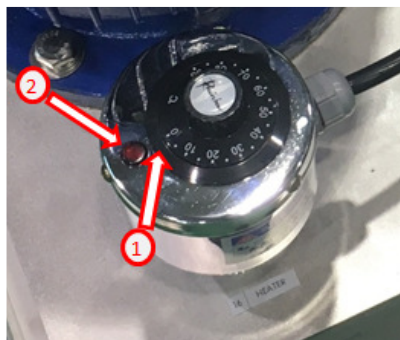
[11. HAND PUMP]

- Repeated operation with up / down operation after connecting pump operation knob.
 - A flow rate of 10.6cc is discharged per stroke. (Full Stroke)
- Hydraulic pressure can be supplied manually by emergency operation.
 - The required flow rate when moving 20 mm inner diameter 105mm cylinder 6
 - $86.5 \text{ cm} \times 2 \times 2 \text{ cm} \times 6 \text{ea} = 1038 \text{ cc}$
 - About 98 pumping is required.

[16. HEATER]

- Thermostatic Heater
- To prevent deterioration of performance of hydraulic device due to increase of viscosity at low temperature in winter.
- If the temperature is set on the scale, the heater will operate and the oil temperature will rise if it is below the indicated temperature.
- Factory setting value: 10 °C

Wheel Brake Instruction Manual



- ① Scale location
- ② Lighting lamp
(lights up when the heater is turned on)

11. Inspection and Failure

1) Daily Inspection Items

- (1). Hydraulic oil level of tank is proper? : See the oil gauge
- (2). The discharge pressure of hydraulic pump
 - ① Is the operating pressure normal? : setting pressure
 - ② Is the pressure gauge's instructions unusually shaken?
- (3). Is there abnormal noise in the hydraulic pressure tank?
- (4). Is there leakage in equipment, piping, etc.?
- (5). Actuator Operation
 - ① Is it operating at the specified speed?
 - ② Is it working smoothly?

2) Monthly Inspection Items

- (1) Analysis of Daily Inspection Records
- (2) Inspection of oil pressure tank level
- (3) Sampling test of operating oil (moisture, viscosity etc.)
- (4) Check operation of actuator (operating speed, working pressure)
- (5) Leakage check on equipment, piping, and coefficient
- (6) Confirm operation of equipment that is not normally used,
such as emergency equipment

3) Quarterly Inspection Items

- (1) Analysis of monthly inspection records
- (2) Inspection and cleanliness of air breather
- (3) Remove dirt and debris from the top of the unit
- (4) Check the electrical connection status and operation status of relay, solenoid, etc.
- (5) Precision checking and checking the operation of instruments such as pressure gauge and pressure switch
- (6) Check of flexible hose

Wheel Brake Instruction Manual

4) Pump failure and check

Failure	Cause	Measure
Discharge does not occur.	Reverse direction of rotation.	Turn in the direction of rotation as specified.
	Clogging of suction pipe or filter for tank.	Clean the clog.
	Poor airtightness of suction pipe.	Inspect the connection of the pipe, fasten the screw, repair defective packing and etc.
	The viscosity of oil is too high.	Repair defective packing and etc.
	Worn or damage of parts.	Replace or repair parts.
No pressure is produced.	Relief valve adjustment is incorrect	Relief valve adjustment
	Hydraulic oil is being bypassed to tank.	Sequential verification of circuit pressure
	Pressure gauge abnormal	Replace pressure gauge
There is a lot of noise. Pressure vibration is large.	Clogging of suction pipe or tank filter.	Clean the clog
	Clogging the air breather of the oil tank.	Cleaning the air breather
	The air in the casing is not completely exhausted.	No-load operation until the air is completely exhausted
	The pressure is exceeding the specified value.	Operating below regulated pressure
	Damage or wear of pump parts	Parts replacement or repair
The heat is heavy.	It is operated at a pressure higher than the specified pressure.	Adjust to regulated pressure
	Excessive leakage through the relief valve	Relief valve adjustment
	Part wear	Check and replace
	Hydraulic oil shortage	Replenish hydraulic oil

Wheel Brake Instruction Manual

5) Solenoid valve malfunction and check

Failure	Cause	Measure
Malfunction	Spool contamination of foreign matter in sliding part	disassemble, washing
	Contact failure or disconnection	Coil contact and current resistance check
	Damage of spring	Spring replacement
Abnormal noise	Solenoid core damage	Solenoid replacement
	there is not enough air subtract in the circuit.	Subtract air fully
External leak	O-RING damaged or eliminated	New product exchange
	Poor mounting face	Pitch surface roughness of mounting surface check
Sol. valve burnout	Is the voltage wrong or is the voltage fluctuation within the specification?	
	Is there any connection miss?	
	Is solenoid fully functional?	
	Is there a problem with the solenoid operating frequency?	
	Electronic operation valve spool is not stuck?	
	Is ambient temperature, oil temperature too high?	

6) Relief valve malfunction and check

Failure	Cause	Measure
Pressure does not rise enough	Pressure setting is not suitable.	Inspect pressure gauge, set pressure correctly
	Poppet does not touch seat correctly	Replace after check wear of poppet or seat
		After check deformation damage of spring for poppet, exchange
	There is a lot of leakage of other hydraulic equipment in the circuit.	Poppet decomposite and clean dust
Pressure fluctuates unstably	Valve wear occurs, or contact between the seat and the poppet is unstable.	Inspect each device in the circuit and repair or replace
	Defective pressure gauge	Replace the valve when the same phenomenon occurs after removing the dust in piston hole Pressure gauge exchange

Wheel Brake Instruction Manual

7) Cylinder breakdown and check

Failure	Cause	Measure
Jumping phenomenon occurs and the non-smooth operation	Air flow rate in the hyd. oil and malfunction of control valve	Performing air pulling, adjusting, or exchanging
	Piston rod packing is not centered	Operating cylinder only without load
	Piston rod packing is tight.	Apply MOS2 grease
	Lack of hydraulic oil	Check oil level, replenish
Output drop (force, speed)	Drop of set pressure of relief	Check, fix or replace relief valve
	Excessive operating resistance	Check the defective such as packing, rod-head and etc.
	Internal and external leakage over	Check and exchange piston and rod packing
	Poor pump	Exchange
Damage of piston packing, rod packing, etc.	Hydraulic oil contamination	Refer cause and countermeasure of hydraulic fluid contamination
	Damage to dust wiper	Check and exchange
	Damage of the rod surface	Repair or exchange

8) Motor failure and inspection

Failure	Cause	Measure
Jumping phenomenon occurs and the non-smooth operation	Relief valve set pressure drop	Adjustment or exchange
	Lack of hydraulic oil	Check and replenish
	Excessive internal leakage or sliding parts seized	After disassembly, check whether each part is abnormal.
	Overload action	Check system or connected devices
Output drop (force, speed)	Hydraulic oil contamination	Causes and measures for operating oil contamination
	Seal breakage and bearing wear around the shaft	Check and exchange
	Abnormal wear or damage of internal sliding parts	Check and exchange