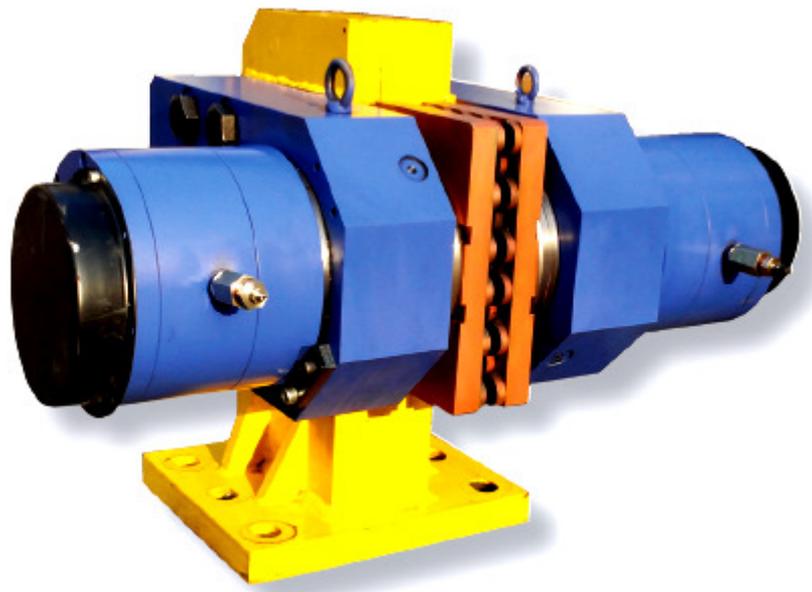


Emergency Brake

Emergency Brake Instruction Manual

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



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

TEL : +82-31-498-9270

FAX : +82-31-433-5986

Emergency Brake 취 급 설 명 서

preface

Thank you for using Emergency Brake.

Emergency Brake is an integral part of the machine.

Before use, carefully read this instruction manual and handle it properly to ensure that the functions of the Emergency Brake are

Please exercise.

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

[Ask the maker of the machine]

- This manual must be communicated to the end user (END USER) please give it to me.
- Complete the assembly test of the machine and the emergency brake, and replace the emergency brake with the assembly
When transporting to the customer, it is necessary to use the transport fixing device necessary to prevent unstable hoisting
Please install. Failure to install a locking device may result in injury.

General Precautions

- The illustrations in this manual are intended to cover or cover for safety purposes
It may be expressed with water removed. When operating this product, be sure to follow the Restore the cover or block to its original condition and operate it according to this instruction manual.
- The illustrations and photographs shown in this manual are typical examples. There is.
- This manual is intended only for the improvement of the product, You can change it appropriately to improve it.
- When ordering the instruction manual due to damage or loss, please contact our distributor or the first page
Please contact us at the nearest sales office listed on the cover page.
- If the name plate affixed to the product is scratched or damaged, please contact our distributor or the final page. Please place a nameplate at our nearest sales office.
- We do not take any responsibility for the modification of the product by the customer because it is out of our guarantee range.

Emergency Brake 취 급 설 명 서

Safety Precautions

- Before using (installation, operation, maintenance, inspection, etc.), please read this manual and all other attached documents carefully and use it correctly. We also learn about the knowledge of equipment, safety information, and precautions.

Please use it after it is cooked. Once you have read it, be sure to keep it wherever you can. Please tell us.

- This manual contains safety precautions labeled "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.

[Normal]

! danger

- Do not use in an explosive atmosphere (hazardous area).
It may cause injury or fire.
- The work of transportation, installation, wiring, operation, operation, maintenance and inspection is carried out by qualified personnel or persons with specialist knowledge.
Please. 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

- **Thrusters are part of the essential safety device.**
- **Life is endangered by misuse or inadequate handling or maintenance!**

※ Other uses or modifications of the Emergency Brake are strictly prohibited.

If you ignore the rules, installation and maintenance instructions for a given purpose

The life span is shortened and the manufacturer's warranty is lost!

Emergency Brake 취 급 설 명 서

[Unpacking]

! caution

- **After confirming everywhere, please disassemble the package.**
There is a risk of injury.
- **Please confirm the actual item on the nameplate 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 damaged wheel brakes.**
There is a risk of injury or damage.

[install]

! caution

- **Do not let any flammable material around the wheel brake Please.**
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.

Emergency Brake 취 급 설 명 서

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Emergency Brake 취 급 설 명 서

1. Inspection upon arrival

! caution

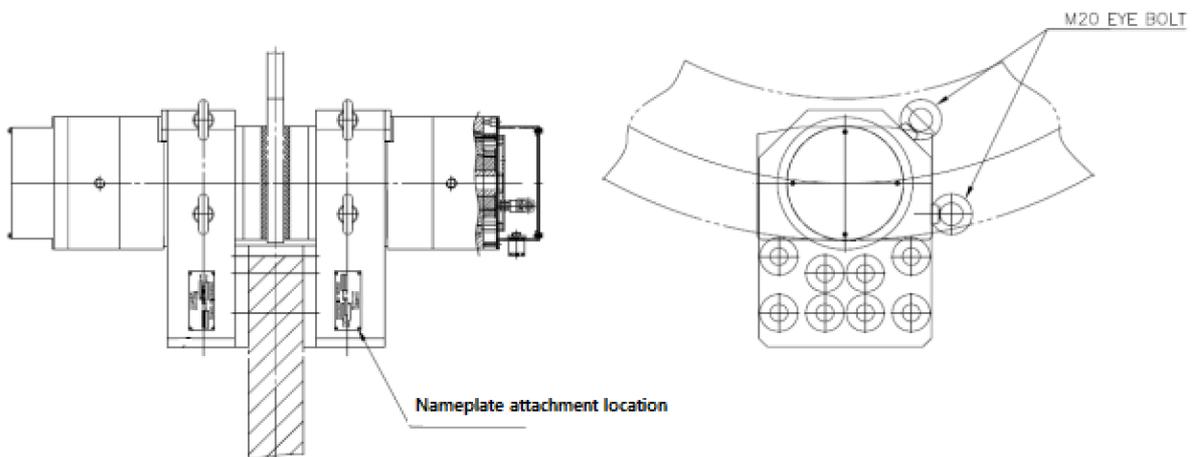
- **When disassembling the packaging, please check the sides and remove the packaging.**
There is a risk of injury.
- **Please check the nameplate and order form of the actual item as it is ordered.**
If the wrong product is installed, there is a risk of injury or damage.
- **Please check if there is any damage during transportation. Do not use damaged 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. Transport instructions

! caution

- **Please be careful when transporting with a forklift because there is a risk of falling or falling.**
There is a risk of injury.
- **Before lifting, check the nameplate, packing list, outline drawing, catalog, etc. and check the weight of the brake. Do not lift the brake beyond the rated load of the traction machine.**
Hoist Point may be damaged, fallen, damaged by conduction, 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 hoisting EYE BOLT of the brake.**
There is a risk of injury or damage.



Emergency Brake 취 급 설 명 서

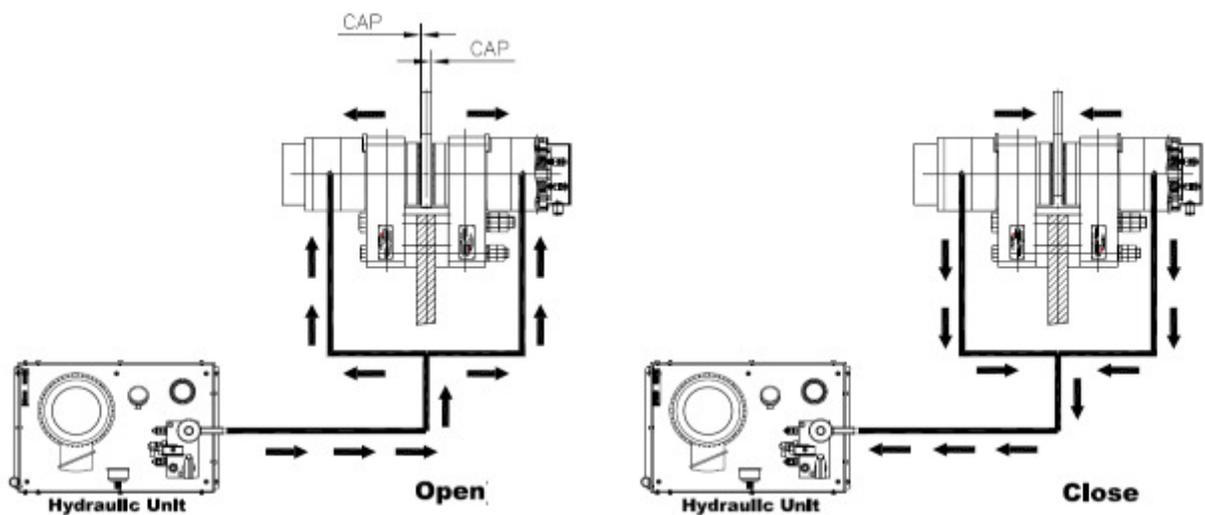
3. Storage Tips

Do not store the brake temporarily or for a long time with the package broken.
The brake storage location should be determined based on the following factors.

- Places without rain, humidity
- Greasy places
- Where there is no harmful gas or liquid
- Greasy places
- Where the ambient temperature is 0 ° C to 40 ° C
- Where there is no vibration

4. Operation and Structure

1) Operation



(1) Braking motion

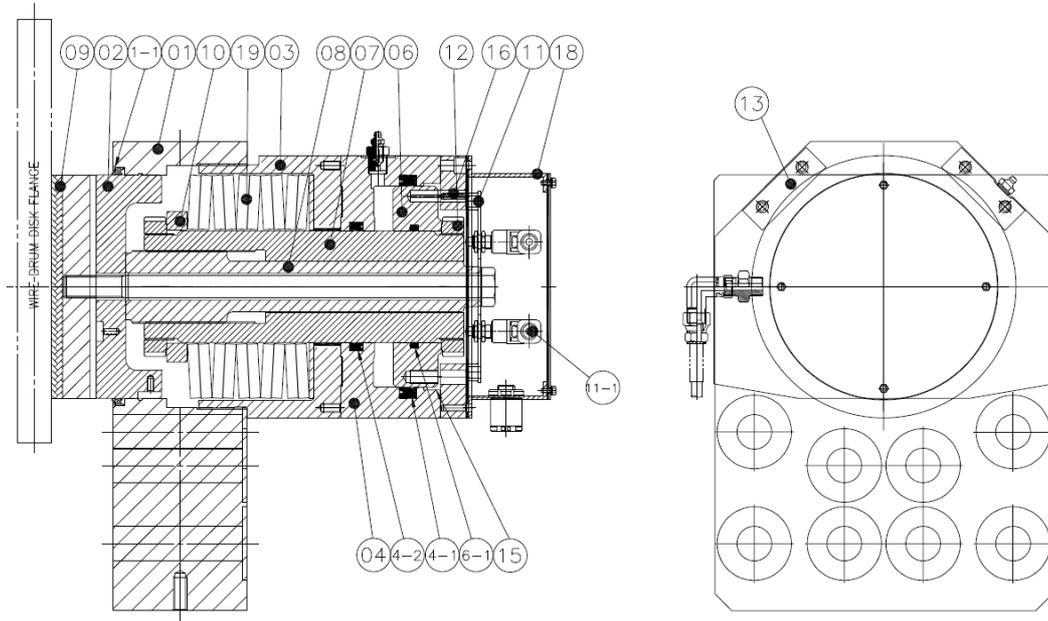
When Emergency Brake is applied to Hydraulic Unit, strong force of disc spring is transmitted in spring housing and strong braking force is generated as Disc and Lining come in close contact.

(2) Open motion

When Power On, Hydraulic Motor overcomes disc spring force by Hydraulic Motor operation and presses disc spring to open disc and lining gap.

Emergency Brake 취 급 설 명 서

2) Structure

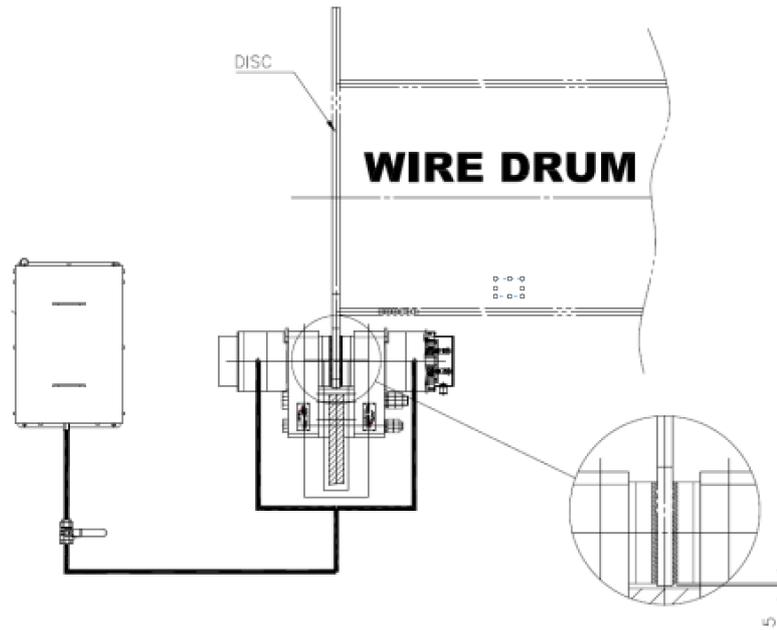


No.	Product Name	Q'ty	No.	Product Name	Q'ty
1	MAIN BODY	1	9	LINING	1
1-1	DUST SEAL	1	10	COLLER	1
2	GUIDE CYLINDER	1	11	L/S BRACKET	1
3	SPRING HOUSING	1	11-1	LIMIT S/W	1
4	OIL CHAMBER	1	12	LOUK NUT	2
4-1	OIL SEAL	1	13	STOPPER	2
4-2	OIL SEAL	1	14	SPRING COLLAR	1
5	END PLATE	1	15	WEAR RING	1
6	PISTON	1	16	GUIDE PIN	1
6-1	O RING	1	17	HOLDING SCREW	1
7	RETAINER	1	18	COVER	1
8	ADJUSTING SCREW	1	19	DISK SPRING	10

5. Installation Emergency Brake 취급설명서

1) Before Installation

- (1) Clean the brake disc prior to installation with non-residual cleaner-alcohol.
- (2) BRAKE LINING Remove foreign matter from the surface.
- (3) Make sure that the installation floor is flat and perpendicular to the DISC.
The DISC must be within geometric alignment tolerance.
- (4) Install the hydraulic unit and connect the wires.
- (5) Connect the brake to the hydraulic unit.
The maximum hydraulic pressure is 205 bar (3000 psi).



Emergency Brake 취 급 설 명 서

2) Installation procedure

~~(1) Remove End Cap and push BRAKE into place.~~

If there is insufficient space between the pad and the DISC, turn the adjusting bolt counterclockwise to obtain additional space.

- (2) Place the brake on the DISC and make sure that the end of the DISC is 5 mm beyond the end of the lining.
- (3) Make sure that the structure rotates without interference during rotation of the DISC.
- (4) Operate the hydraulic to open the brake.
- (5) Steer the Adjusting Screw so that both gaps are equal. (Left and Right Gap Angle 2mm)

! caution

- Both gaps must be the same to ensure BRAKE contact force on the DISC.
- Failure to do so may cause damage to the support structure or the disk..

- (6) Install the brake so that the DISC surface is parallel to the lining surface.
If the lining does not reach the DISC, turn the Rotating Adjusting Nut clockwise
Please readjust.
- (7) Measure the distance between the side plate and the DISC surface so that the disc is centered on the brake
Please check both sides. The difference between the measured values must be less than 1 mm.
- (8) Ensure that the support frame base is in contact with the mounting pad.
- (9) Open the brake by operating the hydraulic pressure, and turn the DISC to check the steady state between DISC, Frame and Lining.
- (10) Or fasten the bolts to the mounting pads on the mounting frame using the fasteners.

Brake Type	Bolt Size	Torque (Nm)
TEM-100	M24	1050
TEM-150	M24	1050
TEM-240	M30	2100
TEM-300	M26	3700
TEM-400	M48	6400

<Table 1. Fastener Torques>

- (11) Adjusting Air gap Adjust the brake clearance according to the instructions.

Emergency Brake 취 급 설 명 서

6. Maintenance

1) Troubleshooting

Problem	Prescription
Brake not open	<ul style="list-style-type: none"> • Make sure that the direction of pump motor rotation is correct. • Make sure that the relief valve is adjusted too low. • Check the solenoid valve for debris. • Check that the needle valve on the manifold is in the correct position. • Check that the solenoid valve coil is working. • Check tank for oil. • Check hydraulic piping for damage or bent parts. • Check the seals in the brakes are damaged.
The brake slowly opens.	<ul style="list-style-type: none"> • Ensure that all air has been removed from the system. • Check that the needle valve on the manifold is in the correct position. • Identify any abnormal bottlenecks in the hydraulic piping. Please clean. • Make sure the gap is adjusted correctly. • Ensure that the hydraulic fluid used is suitable for the temperature environment. • Check the seals in the brake for damage. • Make sure there is no excessive leakage in the pump unit
Brake does not close	<ul style="list-style-type: none"> • Check that the needle valve on the manifold is in the correct position. • Check that the solenoid valve and coil are working properly. • Ensure that all air has been removed from the system. • Make sure the gap is adjusted correctly. • Identify any abnormal bottlenecks in the hydraulic piping. Please clean.
Insufficient brake torque	<ul style="list-style-type: none"> • Check that the load and speed are within the operating capacity. • Make sure the gap is adjusted correctly. • Make sure the disc is clean. • Make sure that the lining is not dirty. • Clean or replace lining if necessary.
Abnormal wear of lining	<ul style="list-style-type: none"> • The brake body is well aligned with the disc, Make sure that it is securely fastened to the crane body. • Whether the brake is in use during (disk) operation Please check. • Whether the hydraulic pressure is adequate to release the brake Please check. • Ensure that the lining retaining bolts are of the correct length. • The brake discs are properly aligned and rotated Please check. • Make sure that there is no bearing error or bending of the shaft.
Abnormal wear of disk	<ul style="list-style-type: none"> • If the lining is over- Check for contamination.
Abnormal over wear of lining	<ul style="list-style-type: none"> • Whether the braking action and speed monitor are working properly Please check. • Whether the load, speed, and number of runs are in the design criteria Please check. • Make sure the gap is adjusted correctly. • Make sure that the brake is fully open.

Emergency Brake 취급 설명서

2) Maintenance schedule

! caution
<ul style="list-style-type: none"> • The brakes are generated by the spring force generated by the spring catch method. • If the lining wears down, the spring force is reduced and the brake capacity of the equipment is reduced.

DESCRIPTION	Cycles	MAINTENANCE TIME INTERVALS(MONTHS)													
		1	2	3	4	5	6	7	8	9	10	11	12	24	36
Check gap, adjust if necessary, disk Cleanliness Check	500			x											
All oil pressure Confirm connection	500			x											
Hydraulic level check	500			x											
Ensure that the lining is well worn	500			x											
Check hydraulic	500			x											
Ensure that all lining thicknesses are at least 6 mm	1000												x		
Check or replace disk springs															
Check brake capacity	2000												x		
Brake during high-speed rotation Replace lining when caught															
Lubricate springs (10,000 CYCLES or 3 years First)	10000														x

Note
<ul style="list-style-type: none"> • Recommended air gap: TEM- / 100/150/240/300/400 -> 2.0mm • It is not recommended to widen the gap to lower the brake torque.

3) Disk spring maintenance

(1) Brake disassembly

- (a) Do not remove the brake from the frame.
- (b) Loosen and remove the cap screws on the end cam using Allen socket.
- (c) Remove the cap and gasket.
- (d) Remove the limit switch by loosening the cap screw.
- (e) Tap the spring pin of the adapter rod and remove the nut from the rod.
- (f) Unscrew and remove the socket head cap screws of the chamber cap.
- (g) Remove the chamber cap.
- (h) Remove the cylinder barrel.
- (i) Remove the top thrust washer.

Emergency Brake 취 급 설 명 서

(2) Spring lubrication

Note

- More than 10,000 cycles or three years first
- 1 cycle = brake set-release-set Grab hold and hold for 1 cycle.

- Disassemble the brake following the above instructions.
- Remove the springs one by one, and arrange them for later re-installation.
- Clean each spring thoroughly and check carefully for gold, corrosion and grooves
If these parts are present, all springs must be replaced.
- Evenly apply grease to the surface of the spring, and apply the edge of the spring to the spring with high quality rubber or hand pressure.
- Apply grease to the upper (push) plate as well.
- Re-insert the springs in the correct order.
Reassemble the brake in reverse order of a.
- M16, grade 10.9. Tighten the chamber cap fasteners to 196 lb-ft, (266 N-m) torque.
- Check the brake setting.

(3) Replacing Spring

- Disassemble the brake according to the above instructions.
- Remove the springs one by one and arrange them for later reinstallation.
- Assemble the springs one by one and check for fine scratches or rusty spots.
Do not use damaged springs.
- Apply grease evenly to the surface of the spring and apply a high quality rubber or leather pressure to the edge of the spring.
- Apply grease to the upper (push) plate as well.
- Re-insert the springs in the correct order.
Reassemble the brake in reverse order of a.
- Check the brake setting.

! caution

- Do not wipe the spring with acid or chlorine-based cleaners.

7. Lining Replacement

Emergency Brake 취급 설명서

! warning

- Make sure that the operating unit is locked so that no external loads will cause the system to rotate.

The brake lining should be replaced when the thickness T is less than 6 mm (see figure 8) or when it is worn out unevenly. The lining should always be replaced with a pair (both left and right).

1) Lining replacement order

- (1) Check that the operating unit is locked to prevent the system from rotating by any external load.
- (2) Hydraulic operation to fully open the brake.
- (3) Open cap on both ends and loosen lock nut.
- (4) Rotate the adjustment nut counterclockwise to remove the shoe.
- (5) Releasing the lining fixing bolt.
- (6) Remove the lining from the shoe. Check if the key is coming out of the key slot.
- (7) Install a new lining on the shoe and check that it is clean and not contaminated. The curved portion of the lining The disc should face outward.
- (8) Make sure that it is fully inserted into the key slot on the brake shoe. The lining should be attached flat to the shoe.
- (9) Remove the lining fixing bolt. Tightening Torque 85Nm
- (10) The brake must be readjusted before use.

8. Inspection and driving tips before commissioning

1) Inspection before commissioning

! danger

- be sure to check whether there is any paint or foreign substance on the contact surfaces of Brake Lining and Disc.
Failure to do so may result in injury.
- Please proceed to burning new Lining.
Failure to do so may result in injury.

Before commissioning, confirm the following.

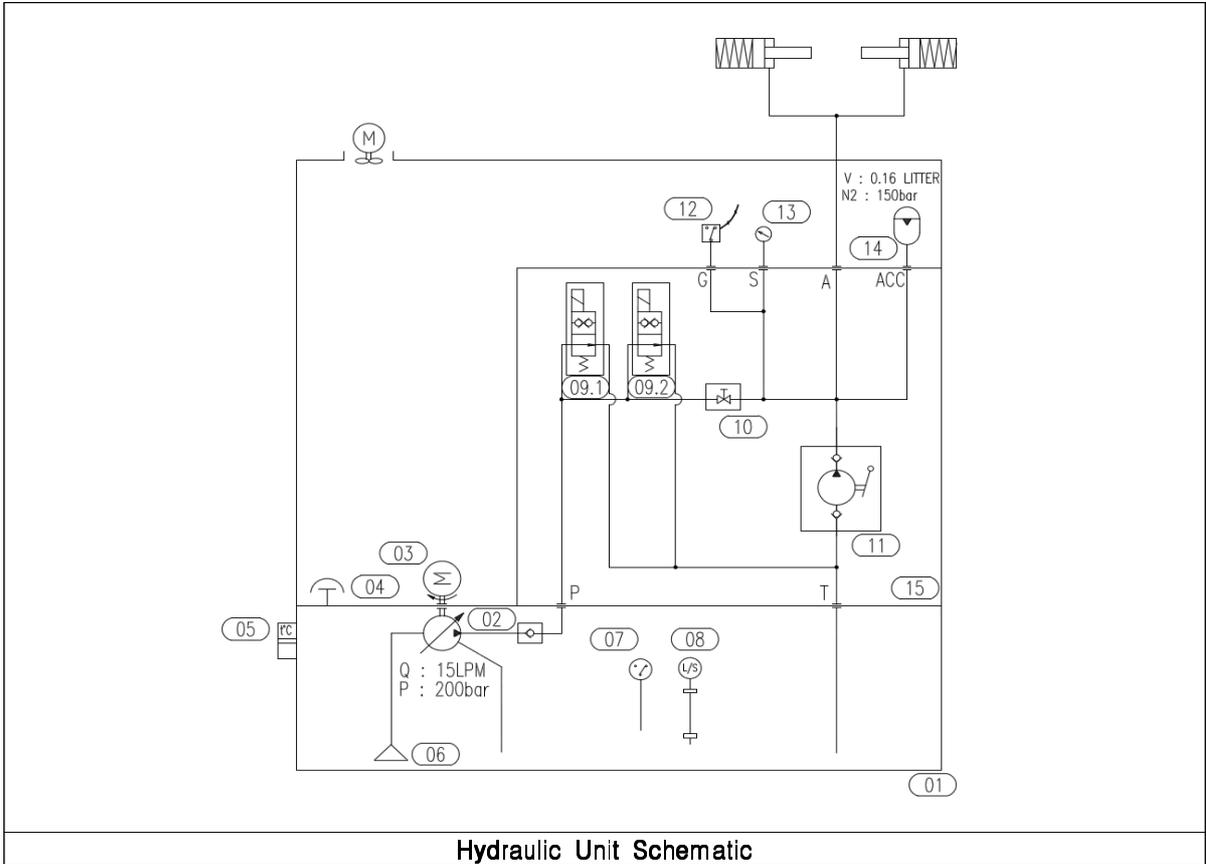
- Is the power supply voltage adequate?
- Has the wiring been changed?
- Is the gap between the brake lining and disc proper?
- Is the installation of the lining appropriate?
- Have you cleaned the Brake Lining and Disc side?
- Is there any damage to the Brake Lining and Disc surface?
- Are the screws and nuts of each part fastened?
- Is Brake fully functional?
- Is the operation of each part normal during operation?

Please perform commissioning and confirm the followings.

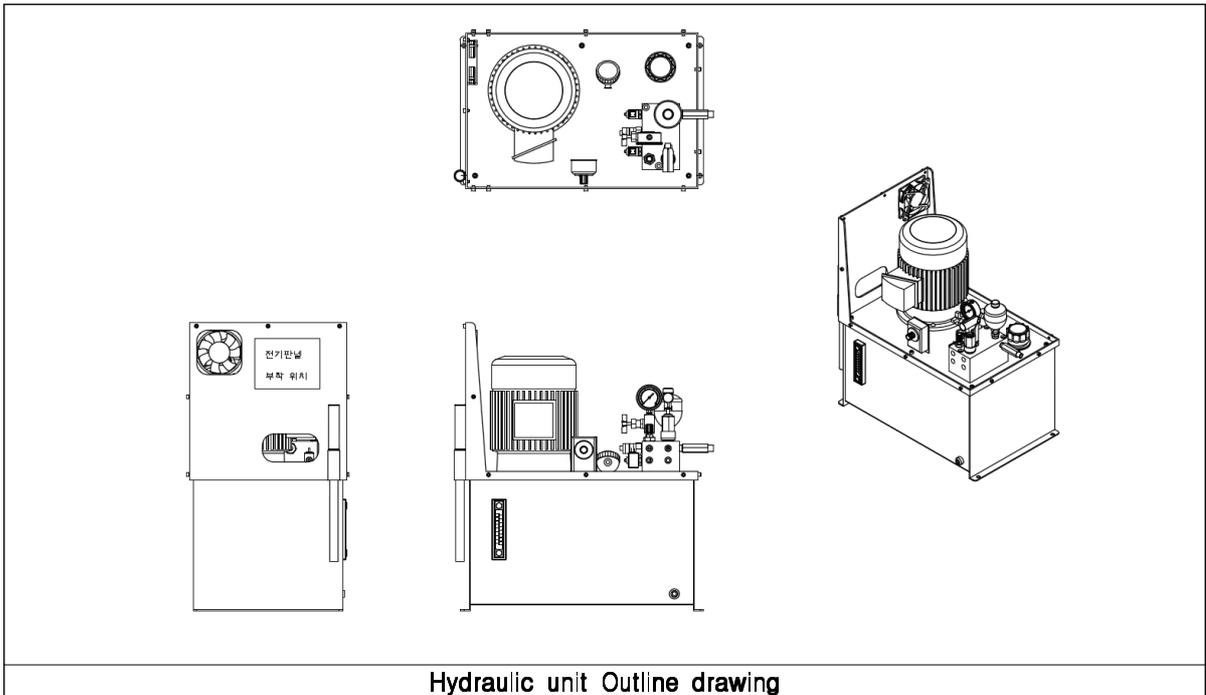
Emergency Brake 취급 설명서

8. Hydraulic unit

1) Configuration



Hydraulic Unit Schematic



Hydraulic unit Outline drawing

Emergency Brake 취급 설명서

2) Main product composition

Item	Product Name	Specifications
1	OIL TANK	30L
2	PISTON PUMP	PVS-OB-8N3
3	E, MOTOR	5HP-4P-220/380V-50HZ(High efficiency)
4	AIR BREATHER	DFB-1210
5	LEVEL GAUGE	DOG-127
6	SUCTION FILTER	DOF-06
7	THERMOSTAT	EGO 0 ~ 110°C
8	LEVEL S/W	2접점 HIGH / LOW
9	SOL VALVE	SV10-21P-O-N-230AG
10	MIDDLE VALVE	NV10-20B-O-N
11	HAND PUMP	KP
12	PRESSURE S/W	DE16
13	PRESSURE GAUGE	A63-250K
14	ACCUMULATOR	ELM 0.16 (N2:150K)
15	MANIFOLD BLOCK	Circuit specification

3) Preparation of operation and detailed parts setting

* Things to check before driving

- Check the amount of oil in the oil tank. Red ball at the highest point on the level gauge before installation It must be full to be located. When the clamp release is activated, the oil will flow through the hydraulic cylinder It is supplemented to the accumulator and the water level reaches to the lowest point.
- Check the direction of motor rotation after electric connection. As indicated by the arrow on the motor, All operations must be performed.
- Hose connection between block assembly and motor assembly, between hydraulic cylinder and block assembly Check the hose fastening condition. Suction part -3/8 "Discharge part -1/4" Be careful not to change.
- Ensure that the scale of the pressure gauge indicates "0 bar".

4) Functions and settings per part

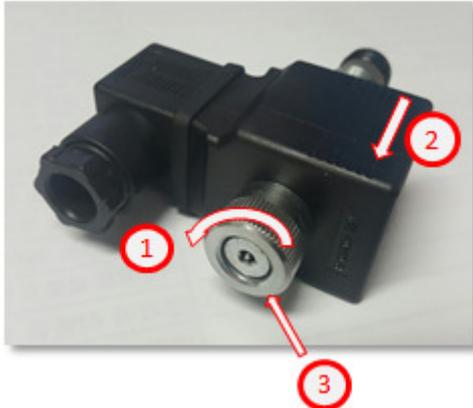
[08. RELIEF VALVE]

- Pressure adjustment screw Clockwise rotation - Pressure rise
Pressure adjustment screw Counterclockwise rotation - Pressure drop
Factory setting: 200bar
- Limit the maximum value of the hydraulic pressure discharged by the hydraulic pump so that the pressure in the hydraulic circuit It plays a role of coordination. By limiting the pressure rise above the safety limit,

[09. SOL VALVE]

- 220V single phase - SOLENOID ON
OFF-SOLENOID OFF
- Performs the pressure LOAD / UNLOAD in the hydraulic circuit as an electrical signal.

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Coil disassembly method.

- Loosen the fixing bolts.
- Pull the coil and disassemble it.
- Coil assembly method - Reverse order of disassembly
 - Forced loading by pressing the plunger part with a tool is possible.

[11. NIDDLE VALVE]

- NIDDLE VALVE Clockwise rotation to the end - Closed

NIDDLE VALVE Counterclockwise rotation - open

Factory setting: Hydraulic pump operation.

- Hydraulic pump / manual hand pump operation can be selected by manual operation.

11.1 Closed / 11.2 Operated by manual hand pump in open setting.

11.1 Open / 11.2 Operated by hydraulic pump when closed.

[12. HAND PUMP]

- Repeated operation with up / down operation after connecting pump operation knob.

A flow rate of 8 cc is discharged per stroke. (FULL STROKE)

- Hydraulic pressure can be supplied by manual operation in emergency. (About 100 pumping is required.)

[13. ACCUMULATOR]

- Nitrogen filling amount in ACCUMULATOR: 80 bar

- It acts to increase the time that the hydraulic cylinder can maintain the pressure when the clamp is released.

[14. PRESSURE S / W]

- Factory setting pressure: PH: 160bar PB: 142bar

- The on / off contact signal is sent by the pressure value acting on the hydraulic cylinder.

A signal to restart the pump by sensing the pressure drop threshold during clamp release.

So that the required pressure can be maintained at all times.

Emergency Brake 취급 설명서

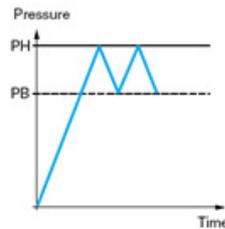
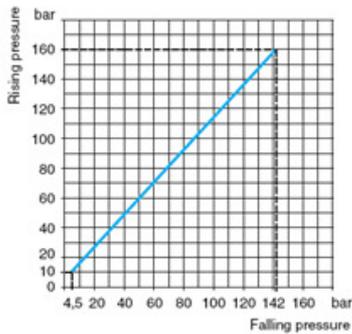
Pressure setting method

~~Clockwise rotation pressure rise~~

Counterclockwise rotation pressure drop

- The pressure setting is the moment when the pressure gradually rises and the "falling" sound is heard.

You can set it by referring to the PH-PB pressure setting graph below.



Connector model
Pressure switch connector pin view



1 → 11 and 13
2 → 12
3 → 14

[17. THROTTLE CHECK VALVE]

- Knob clockwise rotation: Cylinder reverse speed deceleration

Knob counterclockwise rotation: Increase cylinder propulsion speed

- Since cylinder descent is operated by spring force, there is a device that can control its speed.

And a common throttle valve controls the flow rate through the valve to regulate the cylinder speed.

5) Inspection and trouble

A. Daily Inspection Items

- Is the oil level of the hydraulic tank appropriate? : I see the oil level system

- Discharge pressure of hydraulic PUMP

Is the operating pressure normal? : SETTING pressure

Is the pressure gauge's instructions unusually shaken?

- Is there abnormal noise in the hydraulic tank?

- Is there leakage in equipment, piping, etc.?

- Operation of ACTUATOR

Is it operating at the specified speed?

B. Monthly Inspection Items

- Analysis of daily check records

- Inspection of oil tank surface

- SAMPLING inspection of operating oil (moisture, viscosity etc.)

- Check operation of ACTUATOR (operating speed, working pressure)

- Checking leakage in equipment, piping, and coefficient

- Verification of operation of equipment which is rarely used, such as emergency equipment

C. Branch Inspection Items

Emergency Brake 취 급 설 명 서

- Analysis of monthly inspection records

~~Inspection and cleanliness of AIR BREATHER~~

- Remove dirt and debris from the top of the machine
- Check the operation status of electrical connection and relay, solenoid, etc.
- Check the operation and check the accuracy of meter such as pressure gauge and pressure switch
- Check of FLEXIBLE HOSE

6) PUMP failure and check

broken	cause	Measures
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, fastening the screw Repair defective packing and bad.
	The viscosity of oil is too high.	Repair defective packing and bad.
	Worn or damaged parts.	Replace or repair parts.
No pressure is formed.	RELIEF VALVE adjustment is incorrect	RELIEF VALVE adjustment
	Hydraulic oil is being bypassed with TANK.	Sequential verification of circuit pressure
	At least pressure GAUGE	Replace pressure GAUGE
There is a lot of noise. Pressure vibration is large.	Clogging of suction pipe or tank filter.	Clean the clog
	Blockage of the air tunnel 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.	Driving below regulated pressure
	Damage or wear of PUMP parts	Parts replacement or repair
It feels so hot.	It is operated at a pressure higher than the specified pressure.	adjust to regulated pressure
	RELIEF V / V to overflow	RELIEF V / V adjustment confirmation
	Part wear	OK Replace
	Hydraulic oil shortage	

Emergency Brake 취 급 설 명 서

7) Solenoid valve malfunction and check

broken	cause	Measures
error.	SPOOL Contamination of foreign matter in sliding part	Decomposition, washing
	Contact failure or disconnection	COIL contact and current resistance CHECK
	Damage of SPRING	SPRING exchange
Abnormal noise	SOLENOID core breakage	SOLENOID exchange
	Circuit subtraction is not enough.	Completely remove AIR
External LEAK	O-RING damaged or eliminated	New product exchange
	Poor mounting face	ounting surface PITCH Surface roughness CHECK
Sol valve burnout	Is the voltage wrong or is the voltage fluctuation within the specification?	
	Is there a final MISS?	
	Is SOLENOID fully functional?	
	Is there a problem with the SOLENOID operating frequency?	
	Electronic operation V / V SPOOL is not stuck?	
	Is ambient temperature, oil temperature too high?	

8) Relief valve malfunction and check

broken	cause	Measures
ressure does not rise enough	Pressure setting is not suitable.	Inspect pressure gauge, set pressure correctly
	Poppet does not touch sheet correctly	Replace after confirming wear of poppet or seat After confirming deformation damage of SPRING for poppet, exchange Poppet decomposition dust cleaning
	There is a lot of leakage of other hydraulic equipment in the circuit	Inspect each device in the circuit for repair or replacement
Fluctuations in pressure instability	Valve wear or seat part It is not stable.	PISTON Replace the valve when the same phenomenon occurs after removing the hole dust
	Poor pressure gauge	Pressure gauge exchange

Emergency Brake 취 급 설 명 서

9) Cylinder failure and check

broken	cause	Measures
Non-smoothness of jumping phenomenon occurrence and operation	Air flow rate in the working fluid and malfunction of control valve	에어 Adjusting or replacing the air pullout run
	Piston, rod packing do not center	Cylinder only without load
	Piston rod packing is tight.	Apply MOS2 grease
	Lack of hydraulic oil	Check oil level, replenish
Output (force, speed) drop	Relief set pressure drop	Check, fix or replace relief valve
	Excessive operating resistance	Packing, load-head defective inspection
	Internal and external leakage	Piston and rod packing inspection, exchange
	Poor pump	exchange
Damage to piston packing, rod packing, etc.	Operational oil contamination	Causes and measures for operating oil contamination
	Damage of DUST WAIPER	Check exchange
	Damage to the rod surface	Repair or exchange

10) Motor trouble and check

broken	cause	Measures
Non-smoothness of jumping phenomenon occurrence and operation	Relief valve set pressure drop	Adjustment or exchange
	Lack of hydraulic oil	Replenishment
	Overheating of internal leakage or sliding parts	After disassembly, check whether each part is abnormal.
	Overload action	Check SYSTEM or connected devices
Output (force, speed) drop	Operational oil contamination	Causes and measures for operating oil contamination
	Seal breakage and bearing wear around the shaft	Check exchange
	Abnormal wear or damage to internal sliding parts	Check exchange