HANIL LUBTEC

Advanced Technology for Centralized
Lubrication & Motion Control

www. lubtec. co.kr

PRODUCTS LINE-UP

| Lubrication Pumps | Change-over Devices
| Filling Pumps | Distributors | Control Units
| Lubricators and Spray & Mist Devices
| Auxiliary Equipment and Accessories
| Circulating Oil lubrication System
| Hydraulic Shock Absorbers

Lubrication Pumps

Manual Pumps





Model	GP	GPA	GPS	KM	HS114
Application	Dual-line system	Dual-line system	Progressive system	Progressive system	Progressive system
Lubricant Output	7.0 or 3.5cc/cycle	7.0 or 3.5cc/cycle	7.0 or 3.5cc/cycle	2.2cc/cycle	1cc/st
Output Pressure	Max. 100bar or 210bar	Max. 100bar or 210bar	Max. 100bar or 210bar	Max. 210bar	Max. 100bar
Reservoir Size	2liter or 4liter	2liter or 4liter	2liter or 4liter	1liter or 3liter	400cc
Remarks	Manual Change-over Valve installed	Automatic change-over Valve installed			

Electric Pumps





Model	PDPML	HEPB200	EGP	HEP8	HEP20
Application	Dual-line/Progressive system	Dual-line/Progressive system	Dual-line system	Dual-line/Progressive system	Dual-line/Progressive system
Lubricant Output	35cc or 70cc/min	50cc, 100cc, 200cc, 400cc/min	25cc or 50cc/min	40cc or 80cc/min	80cc or 160cc/min
Output Pressure	Max. 350bar or 210bar	Max. 350bar	Max. 250bar or 120bar	Max. 350bar or 210bar	350bar or 250bar
Reservoir Size	18liter Pail	200liter Drum	2liter or 4liter	8liter or 20liter	20liter or 35liter
Remarks	·Direct Delivery from 18liter Pail ·Motorized Litf	Direct Delivery from 200liter drum			




Model	HEP35	HEP90	HTE	EGPS
Application	Dual-line/Progressive system	Dual-line/Progressive system	Progressive system	Progressive system
Lubricant Output	200cc or 300cc/min	400cc or 600cc/min	37cc/min	25cc or 50cc/min
Output Pressure	Max. 350bar or 250bar	Max. 350bar or 250bar	Max. 210bar	Max. 250bar or 120bar
Reservoir Size	35liter or 90liter	90liter	5liter	2liter or 4liter

Lubrication Pumps

Multi Line Pumps





Model	NP	NPW	GNP Motor driven	GNP	CLPP
No. of Outlets	Max. 9 EA with 9 pump elements	Max. 18 EA with 18 pump elements	Max. 16 EA with 8 pump elements	Max. 16 EA with 8 pump elements	Max. 3 EA with 3 pump elements
Lubricant Output	0.05 – 0.35cc/stroke/element	0.05 – 0.35cc/stroke/element	0.15 – 0.45cc/stroke/element	0.15 – 0.45cc/stroke/element	2.8cc or 1.4cc/min/element
Output Pressure	Max. 300bar	Max. 300bar	Max. 100bar	Max. 100bar	Max. 300bar
Reservoir Size	10liter or 20liter	10liter or 20liter	10liter or 20liter	10liter or 20liter	2liter or 10liter
Remarks	Driving source : Motor, geared Motor, Chain, Belt		※ Driving source : Motor, geared Motor, Chain, Belt or Lever ※ A pump element has a pair of outlets.		Controller: Built-in or Exterior


Product	Pump Element	Pump Element
Model	PEA1	PE2
Pump Model	NP, NPW	CLPP
Lubricant Output	0.05 – 0.35cc/stroke	0.08cc or 0.04cc/stroke
Operating Pressure	Max. 300bar	Max. 300bar
Remark	Adjustable output	Fixed output

Pneumatic/Hydraulic Pumps




Model	HAJ	HHJ	CPG1-PK	CPG1	CPG
Driving source	Pneumatic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Lubricant Output (cc/stroke)	HAJ-03 : 0.15-0.3 HAJ-12 : 0.6-1.2 HAJ-50 : 4-8cc	HHJ-03 : 0.15-0.3 HHJ-12 : 0.6-1.2 HHJ-50 : 4-8cc	0.45cc/stroke	0.45cc/stroke	0.45cc/stroke
Output Pressure	Max. 170bar at 7bar input	Max. 350bar at 15bar input	Max. 280bar	Max. 280bar	Max. 280bar
Reservoir Size	2liter or 4liter	2liter or 4liter	25liter	–	18liter pail container
Remark			Mainly used for concrete pump car	Flange mounted type	Direct delivery from 18liter Pail

Lubrication Pumps

Package Pump




Model	HAJ-50T1PK1	HEP8-HP-HHI01	NP-HP-DH01	KM-HP-HSH01
Application	Mixer of Remicon Batch Plant	Rudder Carrier, Steering Gear	Flood Gate, Rudder Carrier	Rudder Carrier, Steering Gear
Lubricant Output	4 – 8cc/stroke	40cc/min	0.05 – 0.35cc/stroke/element	2.2cc/stroke
Output Pressure	Max. 170bar at 7bar input	Max. 250bar	Max. 300bar	Max. 210bar
Reservoir Size	4liter	8liter	10liter	1liter
Remarks	Pneumatic Pump, Distributor, Flow Directional Valve	Electric Pump, Manual Pump, Filler Pack, Distributor, Control Unit	Multi0line Pump, Filler Pack, Outlet Manifold	Manual Pump, Filler Pack

Line Change-over Devices for Dual line Systems

Hydraulic Change-over Valves





System	for END-R type System	for END-R type System	for END-R type System	for LOOP type System	for LOOP type System
Model	HRVE2-RF	HRVE3	HRVE6	HRVL3	HRVL6
Input Flow Range	Max. 50cc/min	Max. 250cc/min	Max. 1000cc/min	Max. 250cc/min	Max. 1000cc/min
Press. Adjust. Range	100 – 280bar	100 – 320bar	100 – 320bar	30 – 100bar	30 – 100bar
Inlet	PT1/4	PT3/8	PT1/2	PT3/8	PT1/2
Outlet	PT1/4	PT3/8	PT3/4	PT3/8	PT3/4
Applicable Pump	EGP, HEPB18 HEP8	HEPB18, HEPB200, HEP8, HEP20, HEP35	HEPB200, HEP35, HEP90	HEPB18, HEPB200, HEP8, HEP20, HEP35	HEPB200, HEP35, HEP90

Solenoid Operated Change-over Valves and Pressure Control Unit for END type system




Product	Solenoid Operated Change-over Valve	Solenoid Operated Change-over Valve	Pressure Control Valve	Pressure Control Switch
Model	HSV-3	HSV-4	HPCV3	HPGS
Input Flow Range	Max. 400cc/min	Max. 1000cc/min	–	–
Press. Adjust. Range	Input Max. 350bar	Input Max. 350bar	30 – 100bar	Max 500bar
Inlet	PT3/8	PT1/2	PT3/8	PT3/8
Outlet	PT3/8	PT3/4	–	–
Applicable Pump	HEPB18, HEPB200, HEP8, HEP20, HEP35	HEPB200-V4, HEP90	accompanied with HSV type valve	accompanied with HSV type valve

Filling Pumps

Manual type and Motor type





Model	FP1	FP1N	FP2	HB14-D	HB14-P
Drive	Manual	Manual	Manual	Motor	Motor
Lubricant Output	30cc/min	30cc/min	15cc/min	900cc/min or 1400cc/min	900cc/min or 1400cc/min
Output Pressure	Max. 30bar	Max. 30bar	Max. 70ba	Max. 70bar or 40bar	Max. 70bar or 40bar
Container	18liter Pail	18liter Pail	18liter Pail	200liter Drum	18liter Pail
Remarks	The rubber scraper attached on the follower plate wipes out grease on the inside wall of the pail.			A winch stand, an optional item, makes drum replacement easy.	A winch stand, an optional item, makes pail replacement easy.

Pneumatic type




Model	AGP-P	AGP-D	HAP-S	HAP-D
Lubricant Output	1.8liter/min	1.8liter/min	1.8liter/min	10liter/min
Ratio	50 : 1	50 : 1	50 : 1	55 : 1
Output Pressure	Max. 280bar	Max. 280bar		
Container	18liter reservoir	200liter Drum	200liter Drum	200liter Drum
Remarks	Reservoir with caster	A winch stand, an optional item, makes pail replacement easy.	Single Ram Lift	Double Ram Lift

Accessories for Lubricant Filling



Product	Supply Valve	Filler Valve	Stop Valve
Model	HSSV	FV	SVF1
Application	Bulk Filling System	Bulk Filling System	HSSV
Remarks	Electrically opens and closes filling line to reservoir	Mechanically closes filling line to reservoir	Flange type Shut-off valve

Destributors

Dual-line Basic Models

Model	DV	DW	HVS
Outlets	1 – 4 ports	1 – 8 ports	1 – 8 ports
Output	DV-3* : 0.12 – 1.2cc/stroke/port DV-4* : 0.28 – 2.5cc/stroke/port DV-5* : 0.38 – 5.0cc/stroke/port DV-6* : 0.86 – 14.0cc/stroke/port	DW-2* : 0.15 – 0.6cc/stroke/port DW-3* : 0.16 – 1.2cc/stroke/port DW-4* : 0.23 – 2.5cc/stroke/port DW-5* : 0.38 – 5.0cc/stroke/port	HVS-2* : 0 – 0.6cc/stroke/port HVS-3* : 0 – 1.2cc/stroke/port HVS-4* : 0 – 2.5cc/stroke/port HVS-5* : 0 – 5.0cc/stroke/port
Operating Press.	20 – 350bar	20 – 350bar	20 – 400bar
Temp. Range	Standard version : -20 ~ 100℃, High Temperature : -40 ~ 200℃		

Progressive Basic Models

Model	MJ	M	MX	MZ	HVP	HED
Outlets	2 – 16 ports	2 – 16 ports	2 – 16 ports	2 – 16 ports	3 – 12 ports	2 – 12 ports
Output (cc/stroke)	0.082, 0.164, 0.246	0.164, 0.246, 0.328, 0.410, 0.492, 0.575	0.41, 0.82, 1.23, 1.64, 2.05, 2.460	2.46, 4.92, 7.38, 9.84	0.2	0.3
Operating Press.	Max. 250bar	Max. 300bar	Max. 300bar	Max. 300bar	Max. 250bar	Max. 100bar
Temp. Range	Standard version : -20 ~ 100℃, High Temperature : -40 ~ 200℃					-10 ~ 60℃

Other Products

Product	Injector for Single line system	Injector for Single line system	Distributor for Dual-line system	Distributor for Dual-line system	Distributor for Progressive system	Distributor for Progressive system
Model	HDS3	HDS5	HVSF	HVB	VDW	SDW
Outlets	1 ~ 5 ports	1 ~ 5 ports	2 ~ 8 ports	2 ~ 8 ports	6 ~ 12 ports	4 ~ 10 ports
Output (cc/stroket)	0.016 ~ 0.13	0.13 ~ 1.31	0.15 ~ 5	0.15 ~ 5	0.16	1.0
Operating Press.	Max. 150bar	Max. 350bar	Max. 400bar	Max. 350bar	Max. 250bar	Max. 210bar
Temp. Range	Standard version : -20 ~ 100℃, High Temperature : -40 ~ 200℃					

Electrical Control Units





Model	HCMP-2S	HEAB2E	HEAS	HEAB1E	HCMP-HS01
Application	Dual-line END-R System or LOOP System	Dual-line END System	Dual-line END-R System or LOOP System	Progressive System	Progressive System
Remarks	MICOM type	RELAY type	RELAY type	RELAY type	MICOM type

Oil Lubricators, Spray Valves and Mist Lubricator





Product	Wheel Flange Lubricator	Wire Rope Lubricator	Spray valve	Spray valve	Mist Lubricator
Model	FLO	WRLO-N	HS-1	HS-2	MH20
Application	Crane wheel	Wire rope drum	Girth gear, slew gear	Girth gear, slew gear	Band saw, Semi dry cutting, Chain
Output	0.0001 ~ 0.001cc/ Rev. of wheel	Dependent on oil pump	1.5cc/shot	0.35cc/shot	Max. 300cc/min
Lubricant	Oil lower than ISO VG #68 or 100,000cst	Oil lower than ISO VG #68 or 100,000cst	Grease	Grease	Oil
Reservoir size	2liter	50liter on request	-	-	3liter
Remarks	Oil smearing type	Oil dripping type	connected to dual-line distributor	connected to progressive distributor	

Auxiliary Equipment and Accessories

Pump Cabinet, Winch stand, Distributor Cover





Product	Pump Cabinet	Pump Cabinet	Winch Stand	Winch Stand	Distributor Cover
Model	PCE	PCM	HPWS-D	HPWS-P	
Application	Electric pump	Manual pump	HB14-D	HB14-P, AGP-P	Distributor
Remarks	Steel, SUS304, SUS316	Steel, SUS304, SUS316			Steel, SUS304, SUS316

Monitoring & Indicating Devices



Product	Reset Indicator	Auto Relief Indicator	Grease Signal	Test Cock	Prox. S/W Unit	Limit S/W Unit
Model	RI	AR	HGS	TC		
Application	Indication of over pressure	Indication of over pressure	Indication of grease flow	Lubrication point check	Distributor for stroke counting	Distributor for stroke counting
Remarks	Cracking Pressure : 10bar, 15bar, 20bar, 30bar, 50bar, 70bar, 100bar, 170bar, 260bar	Cracking Pressure : 50bar, 70bar, 100bar, 125bar, 150bar, 240bar	Transparent plastic tube		Max. 350bar	M series distributor

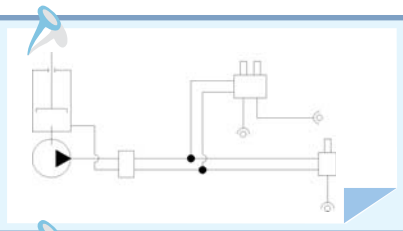
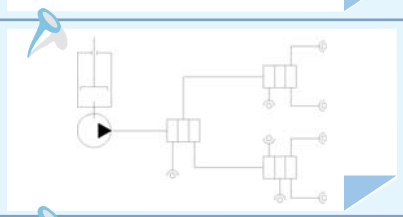
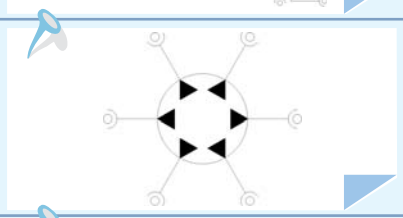
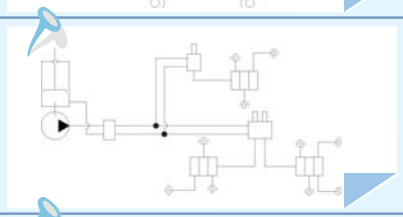
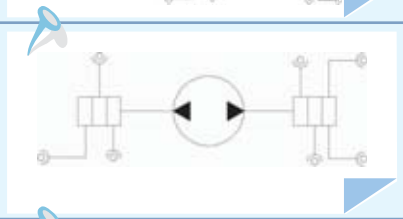
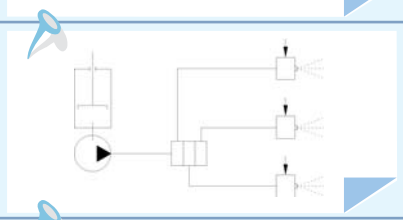
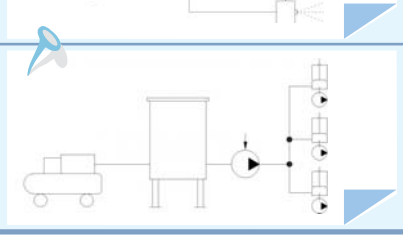
Check Valves and Fitting



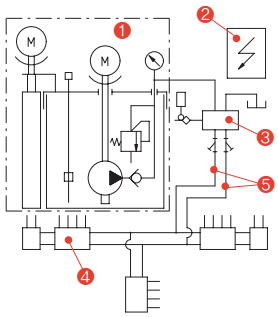



Product	2 Way Check Valve	Line Check Valve	Line Check Valve	Y Shape Strainer	Swivel Joint
Model	TPCV	BCV	TCC	STR	RU
Application	Main lines of dual-line system	Feed line	Feed line	Outlet of a pump	Rotating point
Remarks	Allows lubricant to flow at the pressure above specific one	Threaded pipe connection	Tube connection	for Screening	

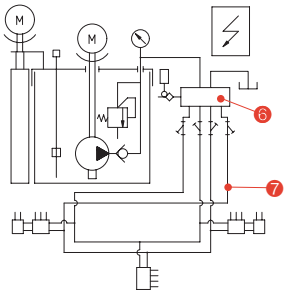
Classification of Centralized Lubrication Systems

DL		**Dual-line system** A dual-line system is composed of a lubrication pump, a reversing valve, 2 main lines and dual-line type distributors. The lubricant discharged from the pump flows through the reversing valve and one of the 2 main lines to distributors, then this lubricant works the distributors and the lubricant in the measuring chambers of the distributors is supplied to each lubrication point.	**Application** This system is suitable for the equipments which have plenty of lubrication points and need long lubrication lines · Iron/steel plant · Paper machine · Transport, loading/unloading Eqpt. · Heavy machine tool · Rolling mill
PS		**Progressive system** A progressive system is composed of a lubrication pump, a main supply line and progressive type distributors. The lubricant discharged from the pump runs through the main line to the primary distributor, and then, this lubricant operates the distributor to progressively discharge the lubricant in the distributor to each lubrication point or to the secondary distributor(s).	**Application** This system is suitable for the eqipments where relatively few lubrication points close together. · Cement/remicon plant · Printing machine · Textile machine · Construction equipment · Veicles · Machine tool · Industrial machine
ML		**Multi-line system** A multi-line system is composed of a multi-line lubrication pump and plural supply lines. In this system the lubricant discharged from each outlet of the pump is directly supplied to each lubrication point.	**Application** Equipments with few close lubrication points which need almost same quantity of lubricant respectively. · Cement/remicon plant · Compressor · Marine equipment · Water turbine · Floodgate · Incineration equipment
DP		**Mixed system(Dual+Progressive line)** In this system, progressive type distributors are connected to the outlet ports of the dual-line type distributors in dual-line system described above. Application	**Application** Equipments with large number of lubricaion points which close together in groups and need small amount of lubricant. · Container crane, Ship unloader · Iron/steel work · Rolling mill · Food machine · Production line
MP		**Mixed system(Multi+Progressive line)** In this system, progressive type distributors are connected to each outlet of the multi-line pump described above in the multi-line system.	**Application** Equipments with small number of lubricaion points which close together in groups and need small amount of lubricant. · Construction equipment · Textile machine · Ceramic equipment · Food machine · Production line
AS		**Spray system** The lubricant discharged from a pump or distributors to the spray valves is supplied to each lubrication point in the form of fog. In the process, the lubricant becomes pulverized by compressed air, as it runs through the nozzles in the spray valves.	**Application** Parts like chains, conveyors, sprockets, gears and sliding areas which are hard to be connected with lubrication lines and have large surfaces to belubricated. · Chain/conveyor · Press · Rolling/forging equipment ...
BK		**Bulk system** A bulk system is another kind of centralized system desinged to perform centralized filling up of lubrication pumps. With bulk system, individual lubrication pumps are refilled with lubricant by a heavy duty filling pump. If there are several centralized lubrication systems in a factory, this bulk system is more efficient and economical than individual filling up system.	**Application** Large lubrication system which have plenty of lubrication points and a number of lubrication pumps to be frequently replenished. · Iron /steel works · Lubricant pail filling machine

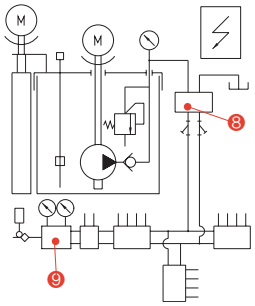
Types of Dual-line Systems



Dual Line System END-R type



Dual Line System LOOP type



Dual Line System END type

① Grease Pump
② Electric Control Unit
③ END-R type Change-over Valve
④ Dual-line Distributors
⑤ Main Lines
⑥ LOOP type change-over Valve
⑦ Return Lines
⑧ END type Solenoid Operated Change-over Valve
⑨ Pressure Control Valve

Circulating Oil Lubrication System

Oil Unit

Base Plate Type	Flow Rate	8 – 100 liter/min
	Reservoir Size	None Reservoir
	Lubricant	ISO VG10 – 320
	Components	Oil Pump, Filter, Oil cooler
	Application	Small-size reducer, Machine tools, Compressor

Unit Type	Flow Rate	8 – 2000 liter/min
	Reservoir Size	100 – 5,000 liter
	Lubricant	ISO VG10 – 320
	Components	Oil pump, Duplex filter, Oil cooler, Heater, Control Unit
	Application	Steam turbine for power plant, Dryer cylinders of paper mill, I/D fan, Boiler feed-water pump

Cellar Type	Flow Rate	8 – 2000 liter/min
	Reservoir Size	6,000 – 60,000 liter
	Lubricant	ISO VG10 – 320
	Components	Oil pump, Duplex filter, Oil cooler, Heater, Control Unit, Centrifuge Purifier
	Application	Steam turbine for power plant, Dryer cylinders of paper mill, I/D fan, Boiler feed-water pump

Circulating Oil Lubrication System

Main Components

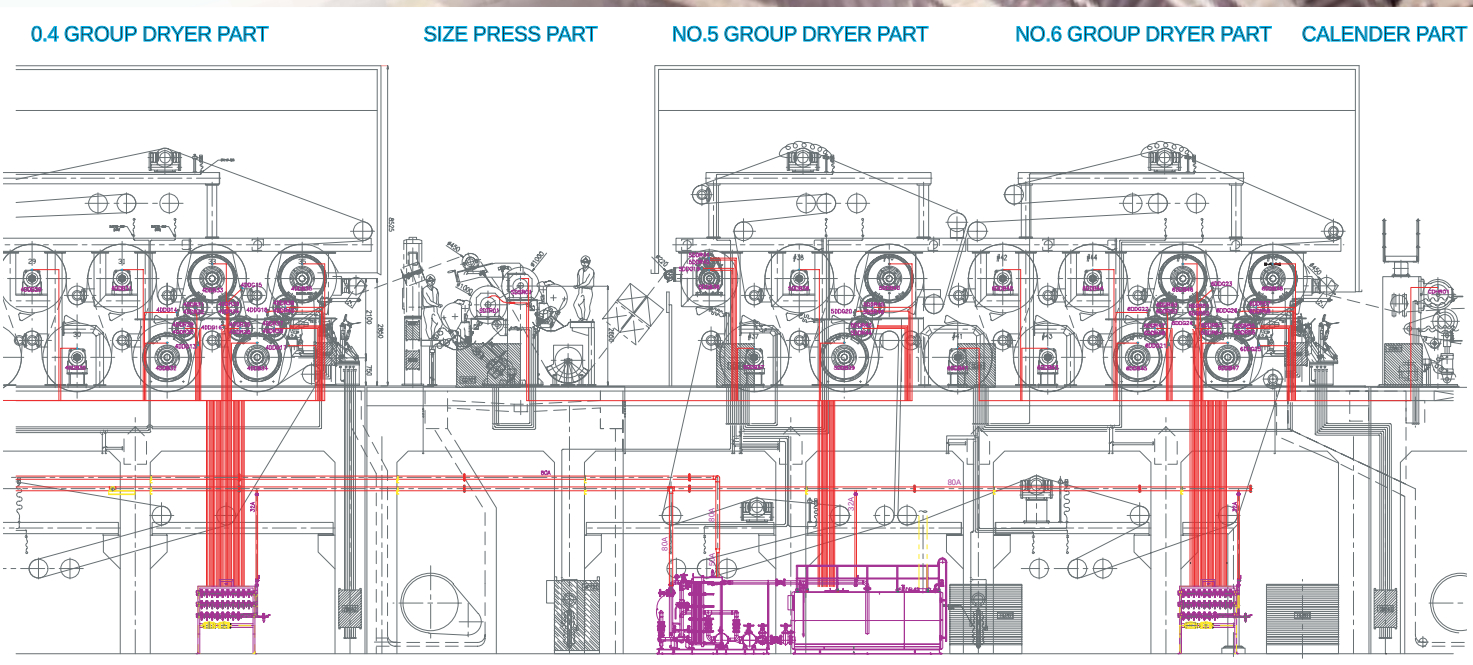




Component	Oil Pump	Duplex Filter	Oil Cooler	Multi Flow	SightSight Glass
Model	–	–	–	MFS	HOSA
Remarks	Gear pump, Centrifugal pump	2 filter elements, One of 2 can be replaced during the other is in service	Shell & Tube type, Plate type, Air cooled fin-tube type	Ball Float type	Back pressure in the line can be removed with compressed air

Instrument Console Box

Oil Sight Station

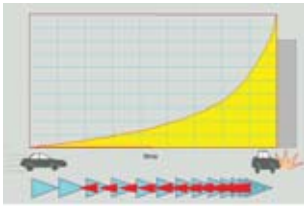


Hydraulic Shock Absorbers

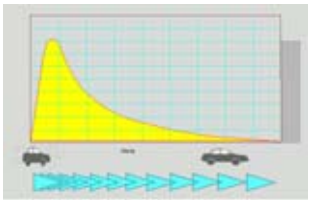
Introduction to Hydraulic Shock Absorber

All moving objects possess kinetic energy and the amount of energy is dependent upon weight and velocity. Collision between the moving object and the opposite object results in physical damage to either or both of them. So it is required the moving object be stopped to avoid the collision. A device that produces resistance diametrically opposite to the direction of motion must be used to bring the moving object to rest.
Various devices are commonly used to bring moving objects to rest. They vary greatly in effectiveness and mechanism Energy absorption products which have been typically used include springs, rubber bumpers, cylinder cushions and snubbers but they absorb impact energy just in low efficiency. They do not break up the kinetic energy at even deceleration rate producing a destructive resistance force at the moment of impact or at the end of stroke. On the contrary, a hydraulic shock absorber stops the moving object with no damage due to constant deceleration. The following graphs illustrate how each product performs when kinetic energy is identical.

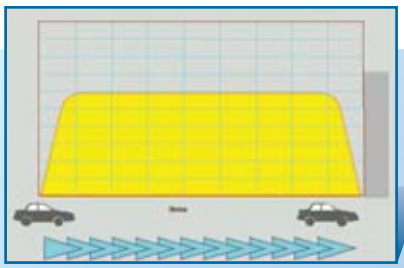
Suppose a car is approaching a wall and the driver applies the brakes to stop the car before the wall



Spring/Rubber bumper
- Too light braking
- Resistance force goes stronger
- Strong reaction to the object

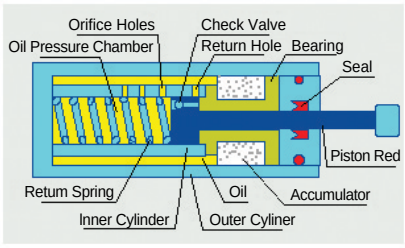


Cylinder cushion/Dashpot
- Too strong braking
- Too strong resistance force at the moment of impact



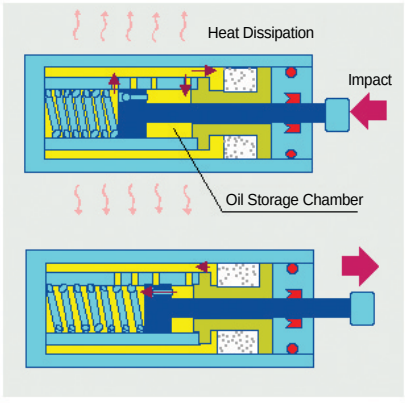
Hydraulic shock absorber
- Stable braking
- Uniform resistance along the stroke
- Linear deceleration

The driver applies the brakes with adequate load considering the distance between the car and the wall and the driving speed.
The car will stops smoothly and firmly without producing bad feel to the passengers and harmful affect to the car.
Hydraulic shock absorbers provide a linear deceleration by converting almost of the kinetic energy into heat through a series of orifice holes. Thus using a hydraulic shock absorber means like appling a car's brakes smoothly and firmly.



Structure

Basically a hydraulic shock absorber has the composition as left figure. Inner cylinder lies in outer cylinder has a series of orifice holes. The pistion moves forward along the inner cylinder and then it pressurizes the fluid within the device and forces it to flow through fixed orifice. The accumulator has a function to store temporarily oil volume as the same as stroked piston rod has in the Inner cylinder.



How to Work

A. COMPRESSION

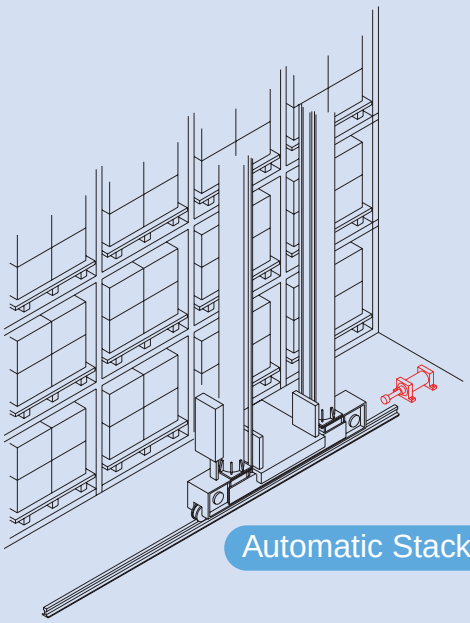
Upon being impacted, a moving object drives the piston assembly into the shock tube filled with oil. Return flow hole in the piston are closed by the check valve. High pressure oil is forced through the orifice holes located along the axial direction of the inner cylinder. The heat is transferred from the oil to the inner cylinder and outer cylinder and then dissipated to the atmosphere. A precharged foaming bladder accumulator is contained within the shock absorber to accommodate the oil displaced by the stroked piston assembly.

B. RETURN

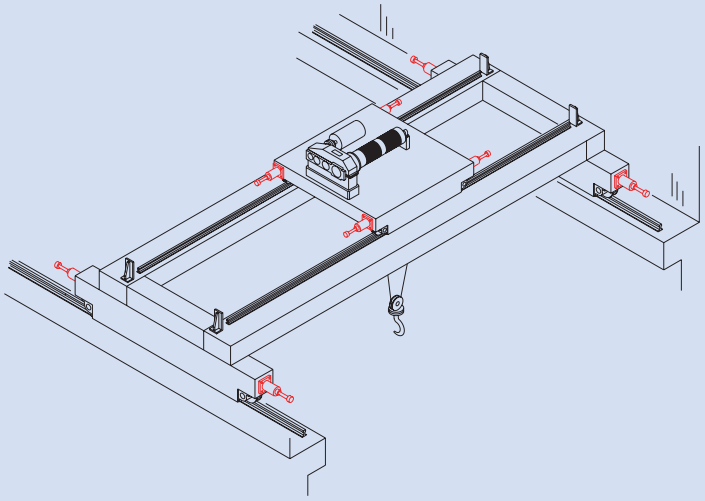
The compressed accumulator expands and forces the piston assembly to return to its original position. The check valve in the piston head will open return flow hole for the oil to ensure rapid recovery.

Hydraulic Shock Absorbers

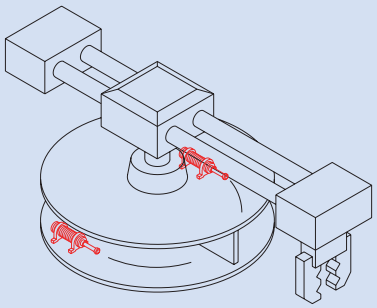
Application of Hydraulic Shock Absorbers



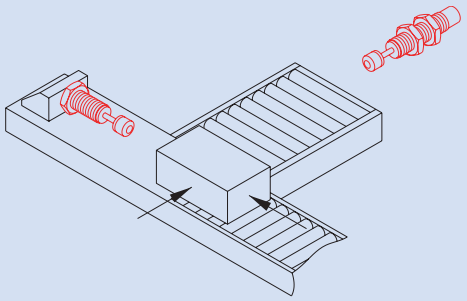
Automatic Stacker System



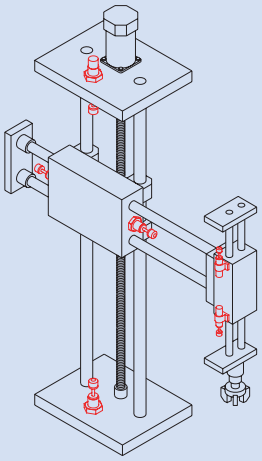
Crane



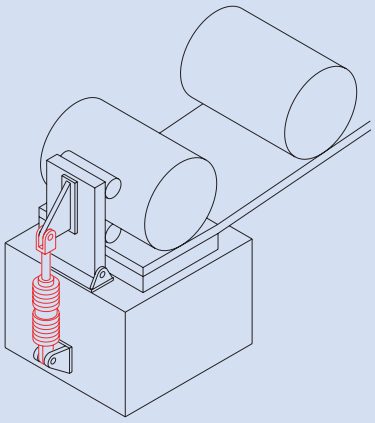
Turn Table



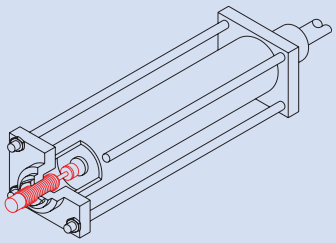
Conveyor System



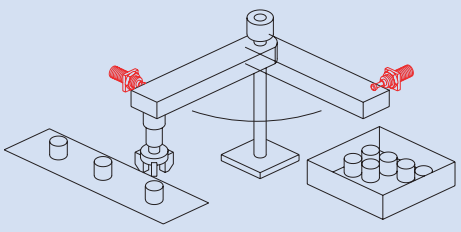
Robot



Drum Transportation



Cylinder Cushion



Pick-up and transfer

Hydraulic Shock Absorbers

Heavy Duty Hydraulic Shock Absorbers

Type	Single Rod					Double Rod				
Standard Spec.	Series	Stroke (mm)	Energy Absorption (kg-m/stroke)	Effective Weight (ton)	Effective Velocity (m/sec)	Series	Stroke (mm)	Energy Absorption (kg-m/stroke)	Effective Weight (ton)	Effective Velocity (m/sec)
	HSAS-30	50 - 200	140 - 560	2.4 - 122	0.3 - 2.0	HSAD-30	50, 100	140, 280	2.4 - 30.5	0.3 - 1.5
	HSAS-50	50 - 250	390 - 1,960	6.8 - 427	0.3 - 2.0	HSAD-50	50, 100	390, 780	6.8 - 85	0.3 - 1.5
	HSAS-70	100 - 300	1,650 - 4,950	14.4 - 1,709	0.3 - 2.0	HSAD-70	100, 150	1,650, 2,470	21.5 - 359	0.3 - 1.5
	HSAS-100	100 - 300	3,140 - 9,420	27.4 - 2,053	0.3 - 2.0	HSAD-100	100, 150	3,140 - 4,710	41.1 - 684	0.3 - 1.5
	HSAS-120	100 - 500	4,710 - 23,560	41.1 - 5,136	0.3 - 2.0					
	HSAS-140	200 - 600	10,990 - 32,990	53.9 - 7,191	0.3 - 2.0					

Industrial Shock Absorbers

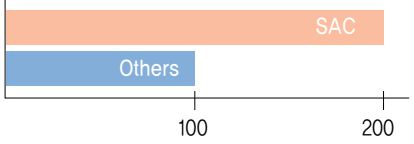
Type	None Adjustable : Small sized, Medium & low speed					None Adjustable : Small sized, High speed				
Standard Spec.	Series	Stroke (mm)	Energy Absorption (kg-m/stroke)	Effective Weight (kg)	Effective Velocity (m/sec)	Series	Stroke (mm)	Energy Absorption (kg-m/stroke)	Effective Weight (kg)	Effective Velocity (m/sec)
	SAM-7	7, 10	0.34, 0.48	14 - 105	0.3 - 0.7					
	SAM-10	10, 15, 20	1.5, 2.3, 3.1	60 - 380	0.3 - 0.9	SAP-10	10, 15, 20	1.5, 2.3, 3.1	13 - 56	0.7 - 1.8
	SAM-15	10, 15, 20, 30	2.3, 3.5, 4.7, 7.0	76 - 501	0.4 - 1.2	SAP-15	10, 15, 20, 30	2.3, 3.5, 4.7, 7.0	18 - 95	0.7 - 2.2
	SAM-20	15, 20, 25, 40, 50	4.7, 6.2, 7.8, 12.5, 15.7	101 -856	0.4 - 1.2	SAP-20	15, 20, 25, 40, 50	4.7, 6.2, 7.8, 12.5, 15.7	28 - 214	0.9 - 2.2

Type	None Adjustable : Medium sized					Adjustable				
Standard Spec.	Series	stroke (mm)	Energy Absorption (kg-m/stroke)	Effective Weight (ton)	Effective Velocity (m/sec)	Series	stroke (mm)	Energy Absorption (kg-m/stroke)	Effective Weight (ton)	Effective Velocity (m/sec)
	SAG-20	25, 50, 75	20, 40, 60	480 - 2,400	0.4 - 1.2	SAV-13	25	11.7	5 - 450	0.6 - 4.5
	SAG-30	50, 75, 100, 125	110, 165, 220, 280	1,780 - 6,780	0.6 - 1.5	SAV-13	50	23	10 - 810	0.6 - 4.5
	SAG-40	50, 80, 120, 160	235, 380, 560, 750	3,200 - 14,710	0.7 - 1.7	SAV-19	50	53	43 - 6,300	0.3 - 4.5
	SAG-50	50, 100, 150, 200	380, 770, 1,150, 1,530	3,800 - 22,560	0.8 - 1.9	SAV-19	75	79	54 - 9,500	0.3 - 4.5

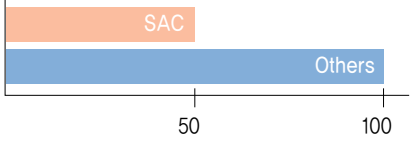
Hydraulic Shock Absorbers

Turbo Shock

➔ Absorbing Energy : Enhanced by more than 100% in case of same size



➔ Size : Reduced by more than 50% in same absorbing energy



None Adjustable : Small & medium sized				
Series	Stroke (mm)	Energy Absorption (kg-m/stroke)	Effective Weight (ton)	Effective Velocity (m/sec)
SAC-12-10	10	1.63	1.3 - 360	0.3 - 5
SAC-14-12	12	3.16	2.5 - 690	0.3 - 5
SAC-20-15	15	7.14	6.9 - 1,560	0.3 - 4.5
SAC-25-25	25	20.4	25 - 4,450	0.3 - 4
SAC-33-30	30	32.6	71 - 7,100	0.3 - 3

Speed Controller/Dampe

Type	One-way(Compression or Tension)	Double Acting(Both Compression and Tension)
Model	HADA	HADB
Stroke(mm)	100 - 1200	100 - 1200

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Tel. +82-31-491-8251 Fax. +82-31-491-8226

Changwon Office
6-9, Palryong-Dong, Changwon-City, Kyungnam, Korea
Tel. +82-55-265-6930 Fax. +82-55-65-6932

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