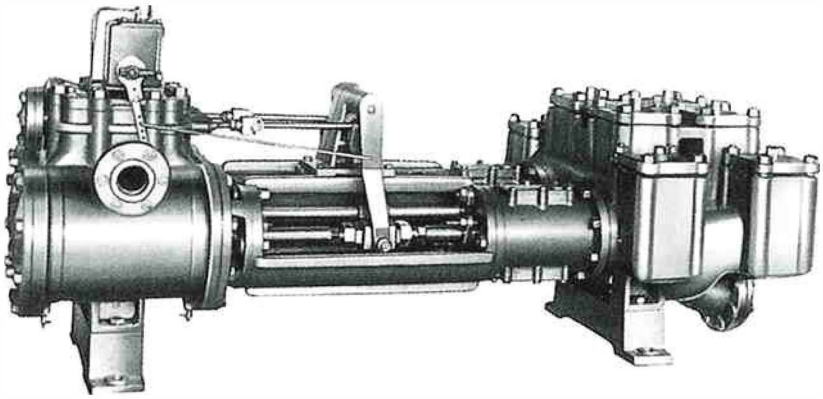
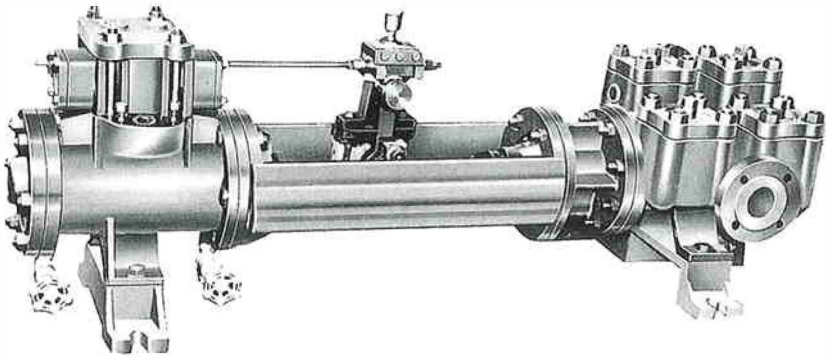
DIRECT-ACTING STEAM DRIVEN RECIPROCATING PISTON PUMPS

- For domestic and oversea.
- Long experiences.
- Sufficient references for many kinds of applications.
- High reliability.
- Refineries for Crude, Slop, Wax, Asphalt, Bottoms, Hydrocarbons.
- Chemicals for Tar, Pitch, Catalyst, Paraphine, various liquids.



TYPE DW-O
DUPLEX PUMP

TYPE SW-O
SIMPLEX PUMP



MARUSHICHI CO.,LTD.

TYPE DW-O STANDARD SPECIFICATIONS

spec \ type		$4\frac{1}{2}\times3\times4$	6×4×6	$7\frac{1}{2}\times5\times6$	8×6×10	10×6×10	10×7×10	10×8×12	12×8×12	14×10×14	16×10×14
stm piston dia／	mm	115	150	190	200	250	250	250	300	350	400
liq piston dia／	mm	75	100	125	150	150	175	200	200	250	250
stroke length／	mm	100	150	150	250	250	250	300	300	350	350
rpm ( ) standard		(37) 24−45	(32) 21−38	(30) 20−36	(25) 16−30	(22) 14−28	(22) 14−28	(20) 12−25	(20) 12−25	(16) 10−22	(16) 10−22
linear speed／	m/min	(7.4) 4.8−9.0	(9.6) 6.3−11.4	(9.0) 6.0−10.8	(12.5) 8.0−15.0	(11.0) 7.0−14.0	(11.0) 7.0−14.0	(12.0) 7.2−15.0	(12.0) 7.2−15.0	(11.2) 7.0−15.4	(11.2) 7.0−15.4
rod dia／	mm	25	30	36	38	38	45	50	50	60	65
capacity／	ℓ/min	32~64.7	77.5~151	117~223.5	231~455	202.5~424	279.5~584	381~830	381~830	588~1353	584~1345
max transmittal	eff／%	54	61	61	70.5	70.5	72	74	74	76	76
stm pressure／	kg/cm²	2−8	2−8	2.5−10	2.5−10	3.0−12	3.0−12	3.0−15	3.0−15	3.0−15	3.0−15
nozzle bore: stm inlet／	mm	20×END	25×END	50×END	50×END	50×END	50×END	50×END	65×END	80×END	80×END
nozzle bore: stm exhaust／	mm	25×TOP	40×TOP	65×SIDE	65×SIDE	65×SIDE	65×SIDE	65×SIDE	80×SIDE	100×SIDE	100×SIDE
nozzle bore: suction／	mm	50×END	80×END	100×END	125×END	125×END	122×END	125×END	150×END	150×END	150×END
nozzle bore: discharge／	mm	40×END	50×END	80×END	100×END	100×END	100×END	100×END	125×END	125×END	125×END
stuffing box: liq end OD×ID×Depth/	mm	45×25×85	50×30×85	62×36×115	64×38×140	64×38×140	71×45×140	82×50×170	82×50×170	86×60×150	92×65×150
stuffing box: stm end OD×ID×Depth/	mm	45×25×55	50×30×55	62×36×80	64×38×90	64×38×90	71×45×90	82×50×110	82×50×110	86×60×100	92×65×120
stuffing box: stm chest OD×ID×Depth/	mm	20×10×25	22×12×22	32×16×48	30×16×50	32×20×50	32×20×50	32×20×50	32×20×50	38×22×55	42×22×65

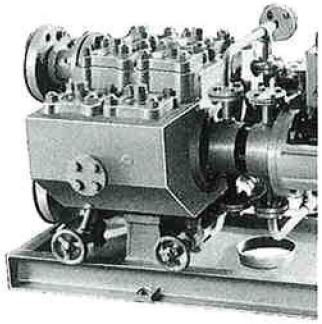
TYPE SW-O STANDARD SPECIFICATIONS

spec \ type		5×3×6	6×4×8	6×4×12	8×6×10	8×6×12	10×6×10	10×8×14	14×10×18	16×12×18
stm piston dia／	mm	125	150	150	200	200	250	250	350	400
liq piston dia／	mm	75	100	100	150	150	150	200	250	300
stroke length／	mm	150	200	300	250	300	250	350	450	450
rpm ( ) standard		(26) 16−32	(22) 14−28	(18) 10−22	(20) 12−24	(18) 10−22	(18) 10−22	(16) 8−20	(12) 7−16	(12) 7−16
linear speed／	m/min	(2.8) 5.1−9.6	(8.8) 5.6−11.2	(10.8) 6.0−13.2	(10.0) 6.0−12.0	(10.8) 6.0−13.2	(9.0) 5.0−11.0	(11.2) 5.6−14.0	(10.8) 6.3−14.4	(10.8) 6.3−14.4
rod dia／	mm	25	35	35	38	38	38	40	50	65
capacity／	ℓ/min	16.4~34.4	34.7~72.2	37.2~87	88~184.5	88~205	73.5~168.5	151~395	272~660	391~943
max transmittal	eff／%	57	64	68	70	70	72	74	78	78
stm pressure／	kg/cm²	2−8	2−10	2−10	2.5−12	2.5−12	3.0−15	3.0−15	3.5−15	3.5−15
nozzle bore: stm inlet／	mm	20×TOP	20×TOP	25×SIDE	40×SIDE	40×SIDE	50×SIDE	50×SIDE	50×SIDE	80×SIDE
nozzle bore: stm exhaust／	mm	25×TOP	25×TOP	40×SIDE	50×SIDE	50×SIDE	65×SIDE	65×SIDE	80×SIDE	100×SIDE
nozzle bore: suction／	mm	50×SIDE	50×SIDE	50×SIDE	80×SIDE	100×SIDE	80×SIDE	100×SIDE	150×SIDE	150×SIDE
nozzle bore: discharge／	mm	40×SIDE	40×SIDE	40×SIDE	50×SIDE	80×SIDE	50×SIDE	80×SIDE	100×SIDE	100×SIDE
stuffing box: liq end OD×ID×Depth/	mm	45×25×80	61×35×115	61×35×115	64×38×140	64×38×140	64×38×140	66×40×140	82×50×170	97×65×190
stuffing box: stm end OD×ID×Depth/	mm	45×25×55	61×35×80	61×35×80	64×38×90	64×38×90	64×38×90	66×40×90	82×50×110	97×65×130
stuffing box: stm chest OD×ID×Depth/	mm	20×12×25	20×12×25	20×12×25	30×20×36	30×20×36	30×20×36	30×20×36	40×22×45	40×22×45

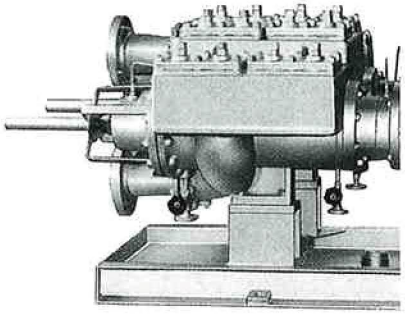
SOME TECHNICAL LIMITATIONS

- Max design temperature — DW-O 400℃ — SW-O 300℃
- Max working pressure — DW-O 35kg/cm²G — SW-O 40kg/cm²G
- Max hydrostatic test pressure — DW-O — SW-O
  - liq end 55kg/cm²G — liq end 60kg/cm²G
  - stm end 35kg/cm²G — stm end 35kg/cm²G
- For steam cylinder, not piston construction but sliding-valve construction can be applied.
- Rated shaft power cannot be applied.

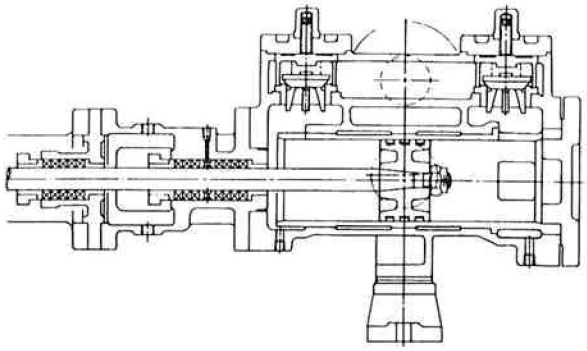
SOME OPTIONAL REALIZATIONS



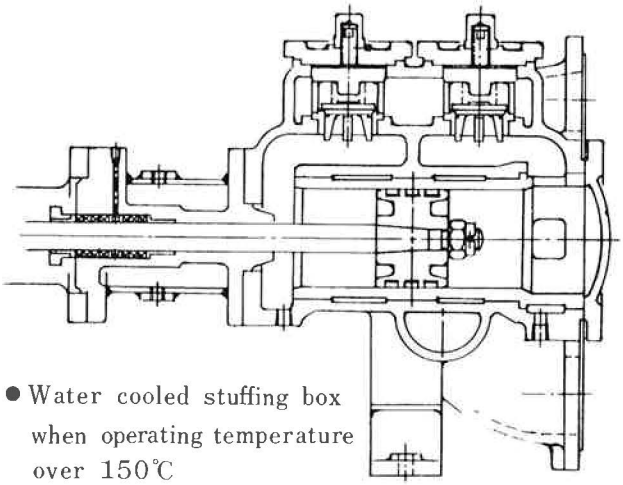
- Type DW-OJ/SW-OJ with welded jacket on cylinder and stuffingbox.
- For liquid solidify in ambient temperature.



- With auxiliary rod for big pump.
- Avoid easy abrasion of piston-rings.



- Double stuffing box when required no leakage.



- Water cooled stuffing box when operating temperature over 150℃

VALVES

- Standard type is Conical valves.
- When pumped liquid has high viscosity or some sludges, Ball type valve is provided.

LUBRICATIONS FOR STUFFING BOX AND STEAM CYLINDER

- Forced lubrication by lubricator.
- Standard type : SHIMAZU type NEO would be provided, with lubrication pipings.

BASE PLATE AND RELIEF-VALVE CAN BE PROVIDED OPTIONALLY

STANDARD MATERIALS

	Liquid end			Steam end	
Cylinder and Stuffing box	FC 250 (A 48cl. 35)	SC480 (A216 Gr WCB)	SCS 13 (A296 Gr. CF-8)	FC 250 * (A 48cl. 35)	FCD 450 (A216 Gr. 65-45-12)
Cylider liner	Special Cast-Iron. with chromium	→		**	
Piston	FC 250 (A 48cl. 35)	SUS 420 J2 (A276 type 420)	SUS 329 J1	FC 250 (A 48cl. 35)	FCD 450 (A216 Gr. 65-45-12)
Valve	SUS 420 J2 treated (A 276 type 420)	→	SUS304 stellited	***	
Rod	SUS 420 J2 chromium plated (A 276 type 420)	→		S 45C chromium plated (A 576 Gr. 1045)	

- For other materials not listed in the table, please consult with us.
- For very high or low temperature services. SCPH21(A426Gr. CP12)or SCPL21 (A352GrLC2)is applicable.
- For piston-rings and packings, the most suitable materials are recommended.
- Asterisks

  * Cast steel cannot be applied for steam cylinder, because of extremely complicated steam passages.

  ** Cylinder liner cannot be applied for steamend.

  *** Sliding valves.

Pressure	Saturated temp	Volume
kg/cm²	℃	m³/kg
P	t_2	t''
1.5	110.8	1.181
2	119.6	0.9019
3	132.9	0.6166
4	142.9	0.4705
5	151.1	0.3813
6	158.1	0.3210
7	164.2	0.2775
8	169.2	0.2445
9	174.5	0.2186
10	179.0	0.1977
12	187.1	0.1661
14	194.1	0.1432
16	200.4	0.1259
18	206.1	0.1123
20	211.4	0.1014
25	222.9	0 .08144
30	232.8	0.06795

STEAM CONSUMPTION CALCULATION

$$C=\frac{\pi}{4}D^2\times L\times N\times 60n\times\frac{1}{t''}\times\frac{100}{Et}$$

where
- C : kg/Hr, consumption
- D : m , steam piston diameter
- L : m , stroke length
- N : number of piston face
  DW-O=4 SW-O=2
- n : stroke numbers/min
- t″ : m³/kg (figure shown in the table)
- Et : %, transmittal efficiency

- In case of air-driven or electromotive, please consult with us.