



Vertical Power Unit

NACHI Standard Vertical Hydraulic Power Units offer standard systems complete with:

- Reservoir, Pump, Pump Motor Adaptor, Electric Motor, Flexible Coupling, Pressure Control Relief Valve for Gear Pumps.
- Remote Compensator for Pressure

Features

Noise Levels:

Noise levels are well below the 90db (a) specified under the WALSH-HEALY ACT.

Standard Units:

Standard units can be ordered using the simple model codes. Optional selections can be obtained with the same codes. Custom units can be manufactured using standard unit components.

Capacities:

Reservoir capacities available from 5 gallon to 30 gallons (specials upon request). Reservoir capacities vs. pump

Compensated Piston or Vane pumps.

- Pressure Gauge w/Shut Off, Air Breather/Filter Combination, Sight Gauge w/Thermometer, Drain Plug, Pressure and Return Connections, Suction Strainer w/3PSI By-Pass (except on 5 gallon) and check valve.

flow can vary depending on specific applications. Generally a 2:1 reservoir to pump ratio is acceptable. Pressures at specific pump flow will determine the hydraulic horsepower required. Refer to "TABLE A", below.

Quality:

Quality components and high manufacturing standards make these factory assembled units fit virtually any application. The wide variety of pumps, motors, reservoirs, manifolds and choice of options enable you to match

your application requirements for optimum productivity and Cost-Effective operation.

Reliability:

Strict control of accepted hydraulic assembly practices, testing procedures, plus high quality components assure successful operation in a variety of industrial applications.

Low Cost:

Production line assembling, combined with minimal piping offers compact systems at low cost.

Operating Instructions

Fill reservoir with new premium grade hydraulic fluid (Mobil DTE26 or equal). It is highly recommended to filter all hydraulic fluid before filling the reservoir. Fluid level gauge will indicate proper level. Electric motor wiring must conform to the motor wiring nameplate. Jog motor to check proper rotation, indicated by the rotation arrow on the unit. Incorrect rotation can be reversed by interchanging any two lines on a three phase motor.

Relief or compensator control valve should be set at lowest pressure setting for startup. Decrease pressure by turning the adjusting screw counterclockwise. If pump does not prime, vent pump pressure line to atmosphere and into an open container to establish flow. After pump has primed, reconnect pressure line and run at lowest pressure setting to purge air from the system piping. Recheck the fluid level in the reservoir, as some fluid could be lost in the filling of piping and components. Most foreign material and contaminants will be trapped by the return line filter after a few hours of operation. The return line filter element should be replaced when gauge indicates. Most industrial applications should operate at a temperature below 140 degrees fahrenheit. At higher temperatures, problems are often experienced in maintaining reliable and consistent hydraulic control. Component service life is also reduced and hydraulic oil deteriorates. If the system tends to operate at an elevated temperature level, steps must be taken to reduce this elevated operating temperature.

Once a year or every 4000 hours of operation, the reservoir's air breather filter and the suction strainer should be replaced. The reservoir oil should be drained, and the reservoir cleaned. Dusty or contaminated environments may require more frequent cleaning and maintenance.

Pressures shown will load AC electric motors to their nameplate horsepower rating. Pressures shown should not be exceeded when system must be started at full pressure. Momentary pressures higher than those listed can be applied if sufficient operating time at lower pump

pressure or lower motor load during the cycle will provide for motor cooling. Dead head pressure loading would require full motor HP using a constant displacement gear pump. Dead head pressure with a pressure compensated Piston or Vane pump would require a small percentage of the full flow loading, consequently generating less heat. Actual HP requirements depend on the duty cycle and operating conditions. This is many times best determined by actual testing by the customer.

The components and piping are designed for the use of petroleum base fluids.

THEORETICAL PRESSURE TABLE (PSI)

Table "A"

GPM	HORSEPOWER REQUIREMENTS ▲								
	1	1.5	2	3	5	7.5	10	15	20
GEAR PUMPS									
1.6	1071	1607	2143	*					
2.4	714	1071	1428	2143	*				
3.0	571	857	1143	1714	2857	*			
5.2		494	659	989	1648	2472	*		
7.0		367	490	735	1224	1836	2449	*	
9.0			381	571	952	1428	1904	2857	*
10.4				494	824	1236	1648	2472	*
12.3				418	697	1045	1393	2090	*
PISTON PUMPS									
3.8	451	677	902	1353	2255	*			
7.8	220	330	439	659	1099	1648	2197	*	
10.5	163	245	326	490	816	1224	1632	*	
VANE PUMPS									
7.9		325	434	651	1085	1627	*		
10.5		245	325	490	816	*			
14.2			241	362	604	905	1207	1811	*

▲ 5 Horsepower and larger can only be used on 10 gallon and larger reservoirs.

* Using this horsepower could cause pump to exceed maximum rated pressure

THEORETICAL PRESSURE TABLE (PSI)

Table "B"

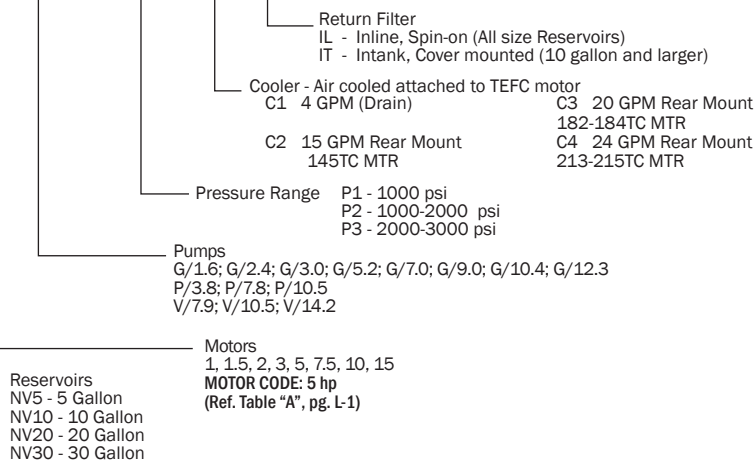
ORDERING CODE	THEORETICAL FLOW (GPM)	DISPLACEMENT CU IN/REV
GEAR PUMPS		
G/1.6	1.63	0.21
G/2.4	2.41	0.31
G/3.0	3.03	0.39
G/5.2	5.22	0.67
G/7.0	7.09	0.91
G/9.0	9.03	1.16
G/10.4	10.44	1.34
G/12.3	12.38	1.59

ORDERING CODE	THEORETICAL FLOW (GPM)	DISPLACEMENT CU IN/REV
PISTON PUMPS		
P/3.8	3.80	0.49
P/7.8	7.80	1.01
P/10.5	10.50	1.34
VANE PUMPS		
V/7.9	7.90	1.02
V/10.5	10.50	1.34
V/14.2	14.20	1.83

Reservoir Code

NV20 - 5 - G/5.2 - P1~3 - N - IL

How to Order



NOTE: Piston and Vane Pumps must use 10 gallon or larger reservoir

Replacement Items:

FILTER ELEMENT (INLINE)	#72-001
FILTER ELEMENT (INTANK)	#72-015
AIR BREATHER FILTER	#42-001
SUCTION STRAINER (5GPM)	#70-001
SUCTION STRAINER (8GPM)	#70-002
SUCTION STRAINER (10GPM)	#70-003
SUCTION STRAINER (20GPM)	#70-004

Motor Enclosure

Totally enclosed motors (TEFC) are intended for use where moisture, dirt, and/or corrosive materials are present in indoor or outdoor locations.

Motor Voltage

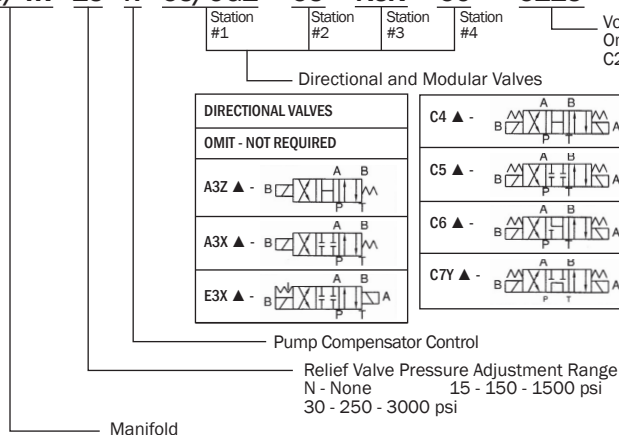
3 PHASE - 208-230/460V, 60HZ
(Special voltages upon request)

*Combination of reservoir and pumps are generally a 2:1 reservoir to pump flow ratio. Smaller pump and motor combinations may be mounted on larger reservoirs.

Manifold Code

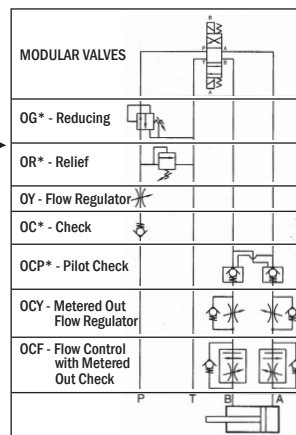
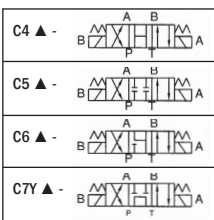
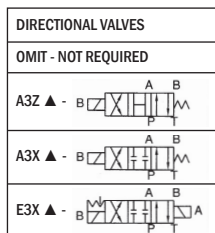
D05/4R - 15 - N - C5/OG1 - C5 - A3X - C6 - C115

How to Order



Voltage - Solenoid Valve Voltage
Omit - Not Required; C115 - AC 115V 60HZ
C230 - AC 230V 60HZ; D1 - DC 12V; D2 - DC 24V

EASY WIRING: Directional control valves come standard with a large waterproof wiring box with terminal screws, solenoid indicator light(s) and (2) PF 1/2 conduit connections.



Pressure Adjusting Range
C: 21 - 500 PSI (D03 & D05 ONLY)
1: 114 - 1000 PSI
2: 500 - 2286 PSI

Pressure Adjusting Range
1: 0 - 1000 PSI
3: 500 - 3000 PSI

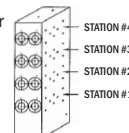
Cracking Pressure
1: 5.7 PSI
2: 50 PSI
3: 71 PSI

Cracking Pressure
1: 29 PSI
2: 71 PSI

Station #1 is closest to reservoir on a multiple station manifold

▲ ADD "F" FOR OPTIONAL HYDRAULIC SHOCKLESS SOLENOID

■ "D03" SIZE ONLY



ALUMINUM MANIFOLD BLOCKS

D03/*R - D03 Directional valve manifold with relief valve.
(*Number of valve stations required, 4 maximum. Consult factory if more stations are required.)



PB3R - Pressure block (#8SAE pressure connection) with relief valve for gear pumps.



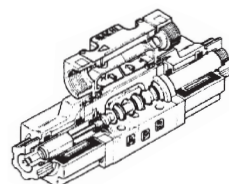
D05/*R - D05/(D02) Directional valve manifold with relief valve.
(*Number of valve stations required, 4 maximum. Consult factory if more stations are required. 8 gallon and larger reservoir only)



PB5R - Pressure block (#12SAE pressure connection) with relief valve for gear pumps. (8 gallons and larger reservoir only)



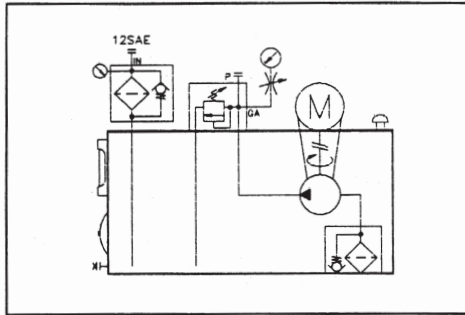
PB5C - Pressure block (#12SAE pressure connection) with compensator control for piston and vane pumps. (8 gallons and larger reservoir only)



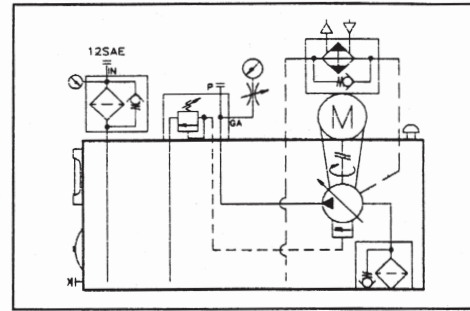
Note: "A" and "B" port connections on "D03" and "D05" manifolds are #8SAE (3/4 - 16 UNF).

Consult factory for additional configurations.

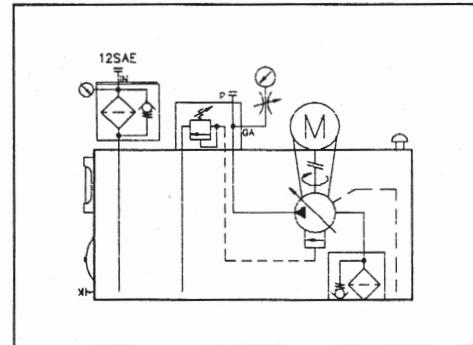
Schematics



Gear Pump Unit
with Manifold Option "PB3R" (8SAE)
or "PB5R" (12SAE)



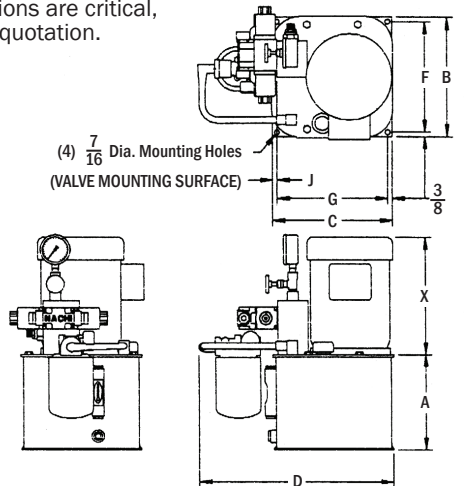
Piston/Vane Pump Unit
with Case Drain Air Cooler with By-Pass



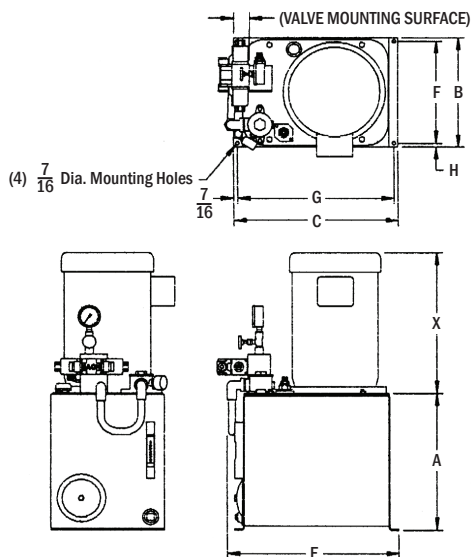
Piston/Vane Pump Unit
with Manifold Option "PB3C" (8SAE)
or "PB5C" (12SAE)

Dimensional Drawings

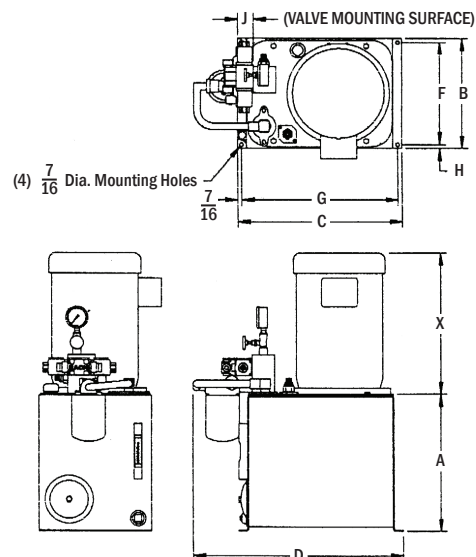
Measurements are approximate.
Where dimensions are critical,
obtain special quotation.



NV5 Gallon w/Inline Filter

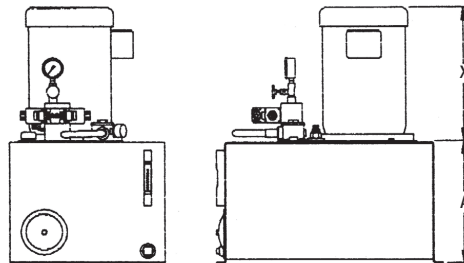
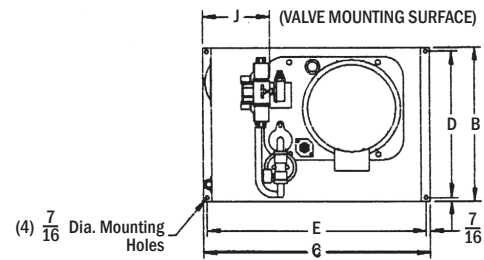
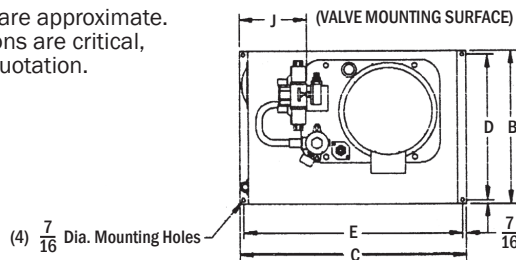


NV10 Gallon w/Intank Filter

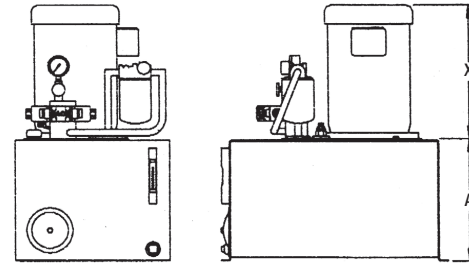


NV10 Gallon w/Inline Filter

Measurements are approximate.
Where dimensions are critical,
obtain special quotation.



NV20 Thru NV30 Gallon w/Intank Filter

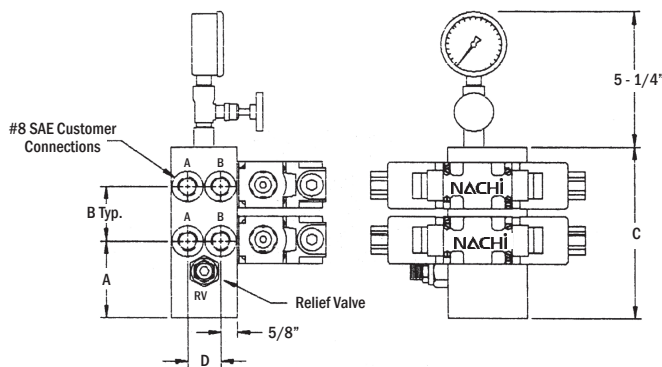


NV20 Thru NV30 Gallon w/Inline Filter

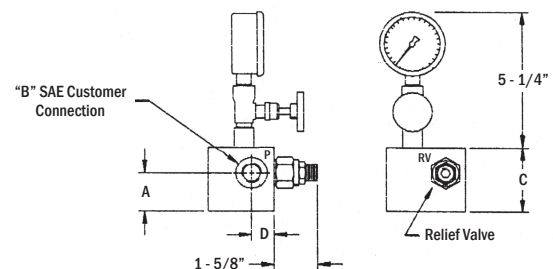
RESERVOIR	UNIT DIMENSIONS (INCHES)								
	A	B	C	D	E	F	G	H	J
NV5	10"	12.5"	14.5"	-	-	10"	13.5"	1.25"	.05"
NV10	19.7"	16.5"	19"	-	-	14"	13.5"	1.25"	.075"
NV20	23.7"	16.5"	19"	-	-	14"	17.5"	1.25"	.075"
NV30	35.7"	16.5"	19"	-	-	14"	17.5"	1.25"	.075"

HORSEPOWER	"X" (TEFC)
1	10 5/8
1.5	10 5/8
2	11 5/8
3	12 1/4
5	14 1/2
7.5	16 1/4
10	18 1/8
15	20 3/8

Manifold Dimensions



Manifold Option "D03/2R" shown

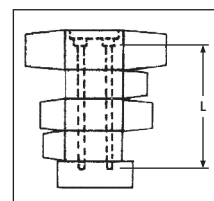


Manifold Option "PB3R" shown

MANIFOLD OPTIONS	MANIFOLD DIMENSION (INCHES)			
	A	B	C	D
PB3*	1.50	8	2.50	.84
PB5*	1.63	12	2.75	1.13

MANIFOLD OPTIONS	MANIFOLD DIMENSION (INCHES)			
	A	B	C	D
D03/1"	1.06"	2.13"	2.13"	1.75"
D03/2"	1.06"	2.13"	4.25"	1.75"
D03/3"	1.06"	2.13"	6.38"	1.75"
D03/4"	1.06"	2.13"	8.50"	1.75"
D05/1"	1.56"	3.25"	3.25"	2.12"
D05/2"	1.56"	3.25"	6.50"	2.12"
D05/3"	1.56"	3.25"	9.75"	2.12"
D05/4"	1.56"	3.25"	13.0"	2.12"

Optional Component Information - Bolt Kit Length



Bolt Length for D03	
Valve - 10 - 24 x 1 3/4	
Valve & module - 10 - 24 x 3 1/4	
Valve & 2 modules - 10 - 24 x 5	
Bolt Length for D05	
Valve - 1/4 - 20 x 2 3/4	
Valve & module - 1/4 - 20 x 5	
Valve & 2 modules - 1/4 - 20 x 7	

Note:

1. Bolt kits to be ordered separately when using modulators.
2. Bolt kits are furnished with directional valves when no modulators are required.
3. All "D03" modulators are 40mm thick.
4. "D05" modulators are 55mm thick.



Horizontal Power Unit

NACHI Standard Horizontal Hydraulic Power Units offer standard systems complete with:

- Reservoir, Pump, Pump Motor Adaptor, Electric Motor, Motor Channel, Flexible Coupling, Pressure Control Relief Valve for

Gear Pumps.

- Pressure Compensated Piston or Vane pumps.
- Pressure Gauge w/Shut Off, Air Breather/Filter Combination, Sight Gauge w/Thermometer, Drain Plug, Pressure and

Return Connections, Return Line Filter w/By-pass and Dirt Indicator, Suction Strainer w/3PSI By-Pass.

Features

Noise Levels:

Noise levels are well below the 90db (a) specified under the WALSH-HEALY ACT.

Standard Units:

Standard units can be ordered using the simple model codes. Optional selections can be obtained with the same codes. Custom units can be manufactured using standard unit components.

Capacities:

Reservoir capacities available from 10 gallon to 40 gallons. Reservoir capacities vs. pump flow can vary depending on

specific applications. Generally a 2:1 reservoir to pump ratio is acceptable. Pressures at specific pump flow will determine the hydraulic horsepower required. Refer to "TABLE A", below.

Quality:

Quality components and high manufacturing standards from such companies as VESCOR, DAMAN and others, make these factory assembled units fit virtually any application. The wide variety of pumps, motors, reservoirs, manifolds and choice of

options enable you to match your application requirements for optimum productivity and Cost-Effective operation.

Reliability:

Strict control of accepted hydraulic assembly practices, testing procedures, plus high quality components assure successful operation in a variety of industrial applications.

Low Cost:

Production line assembling, combined with minimal piping offers compact systems at low cost.

Operating Instructions

Fill reservoir with new premium grade hydraulic fluid (Mobil DTE26 or equal). It is highly recommended to filter all hydraulic fluid before filling the reservoir. Fluid level gauge will indicate proper level. Electric motor wiring must conform to the motor wiring nameplate. Jog motor to check proper rotation, indicated by the rotation arrow on the unit. Incorrect rotation can be reversed by interchanging any two lines on a three phase motor.

Relief or compensator control valve should be set at lowest pressure setting for startup. Decrease pressure by turning the adjusting screw counterclockwise. If pump does not prime, vent pump pressure line to atmosphere and into an open container to establish flow. After pump has primed, reconnect pressure line and run at lowest pressure setting to purge air from the system piping. Recheck the fluid level in the reservoir, as some fluid could be lost in the filling of piping and components. Most foreign material and contaminants will be trapped by the return line filter after a few hours of operation. The return line filter element should be replaced when gauge indicates. (See pg. 8 for spare element numbers). Most industrial applications should operate at a temperature below 140 degrees fahrenheit. At higher temperatures, problems are often experienced in maintaining reliable and consistent hydraulic control. Component service life is also reduced and hydraulic oil deteriorates. If the system tends to operate at an elevated temperature level, steps must be taken to reduce this elevated operating temperature.

Once a year or every 4000 hours of operation, the reservoir's air breather filter and the suction strainer should be replaced. The reservoir oil should be drained, and the reservoir cleaned. Dusty or contaminated environments may require more frequent cleaning and maintenance.

Pressures shown will load AC electric motors to their nameplate horsepower rating. Pressures shown should not be exceeded when system must be started at full pressure. Momentary pressures higher than those listed can be applied if sufficient operating time at lower pump

pressure or lower motor load during the cycle will provide for motor cooling. Dead head pressure loading would require full motor HP using a constant displacement gear pump. Dead head pressure with a pressure compensated Piston or Vane pump would require a small percentage of the full flow loading, consequently generating less heat. Actual HP requirements depend on the duty cycle and operating conditions. This is many times best determined by actual testing by the customer.

The components and piping are designed for the use of petroleum base fluids.

PRESSURE TABLE (PSI) AT 1800 RPM
Table "A"

GPM	HORSEPOWER REQUIREMENTS						
	2	3	5	7.5	10	15	20
GEAR PUMPS							
1.6	1821	2732	*				
2.4	1214	1821	*				
3.0	971	1457	2428	*			
5.2	560	841	1401	2101	2802		
7.0	416	624	1041	2101	2802		
9.0	325	486	809	1214	1619		
10.4	280	420	700	1051	1401	2101	2802
12.3	237	355	592	88	1185	1777	2369
PISTON PUMPS							
3.8	767	1150	1917	2876	*		
7.8	374	560	934	1401	1868	*	*
10.5	n/a	416	694	1041	1388	2081	2775
16.6	n/a	n/a	439	658	878	1317	1775
21.5	n/a	n/a	339	508	678	1017	1355
VANE PUMPS							
4.0	728	*					
7.9	369	553	992	1383	1844	*	
10.5	278	416	694	*			
14.2	n/a	309	513	770	1026	1539	*
7.9	n/a	238	396	594	792	*	

* Using this horsepower could cause pump to exceed maximum rated pressure

THEORETICAL PRESSURE TABLE (PSI)

Table "B"

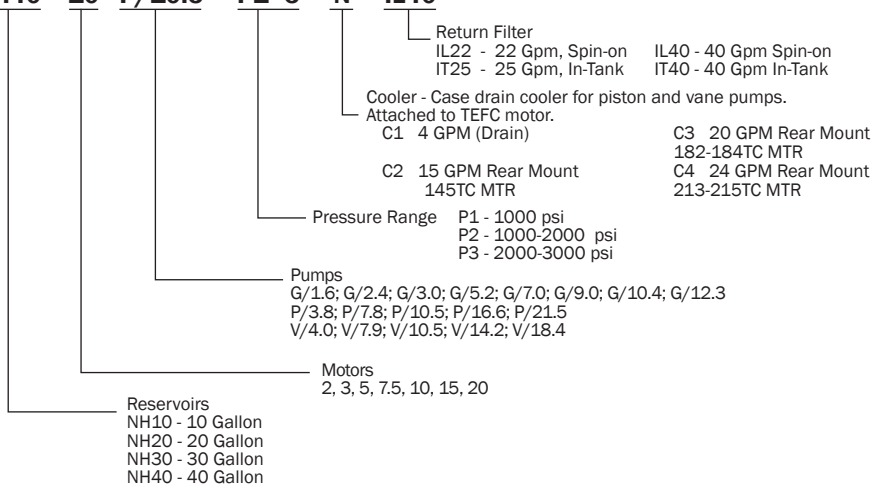
ORDERING CODE	THEORETICAL FLOW (GPM)	DISPLACEMENT CU IN/REV
GEAR PUMPS		
G/1.6	1.63	0.21
G/2.4	2.41	0.31
G/3.0	3.03	0.39
G/5.2	5.22	0.67
G/7.0	7.09	0.91
G/9.0	9.03	1.16
G/10.4	10.44	1.34
G/12.3	12.38	1.59

ORDERING CODE	THEORETICAL FLOW (GPM)	DISPLACEMENT CU IN/REV
PISTON PUMPS		
P/3.8	3.80	0.49
P/7.8	7.80	1.01
P/10.5	10.50	1.34
P/16.6	16.60	2.14
P/21.5	21.50	6.10
VANE PUMPS		
V/4.0	4.00	0.51
V/10.5	7.90	1.02
V/14.2	10.50	1.34
V/14.2	14.20	1.83
V/18.4	18.40	2.38

Reservoir Code

How to Order

NH40 - 10 - P/10.5 - P1~3 - N - IL40



NOTE: Piston and Vane Pumps must use 10 gallon or larger reservoir

Motor Enclosure

Nachi standard horizontal power units come with totally enclosed fan cooled motors (TEFC). These motors are intended for use where moisture, dirt, and/or corrosive materials are present in indoor or outdoor locations.

Motor Voltage

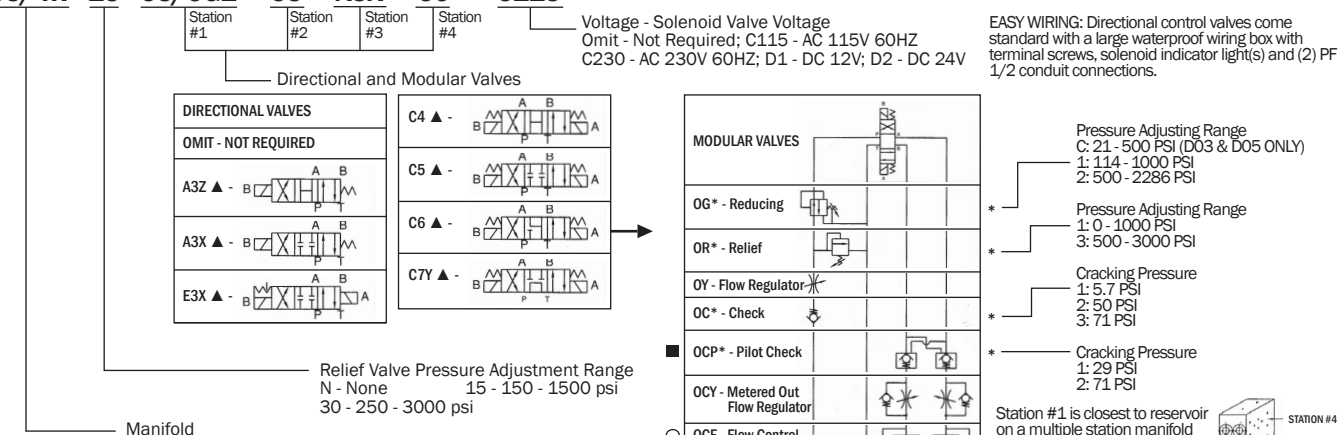
All standard horizontal power units come with 3 PHASE - 208-230/460V, 60HZ
 (Single phase and special voltages available upon request)

*Combination of reservoir and pumps are generally a 2:1 reservoir to pump flow ratio. Smaller pump and motor combinations may be mounted on larger reservoirs.

Manifold Code

How to Order

D05/4R - 15 - C5/OG1 - C5 - A3X - C6 - C115



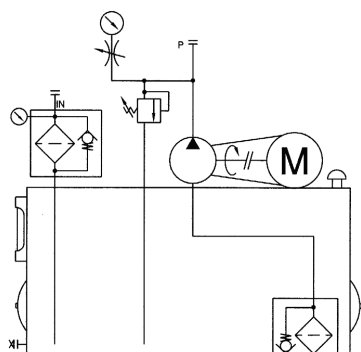
ALUMINUM MANIFOLD BLOCKS

D03/*R - D03 Directional valve manifold with relief valve. (*Number of valve stations required, 6 maximum. Consult factory if more stations are required.)	D08/*R - D08 Directional valve manifold with relief valve. (*Number of valve stations required, 2 maximum. Consult factory if more stations are required.)
D05/*R - D05 Directional valve manifold with relief valve. (*Number of valve stations required, 6 maximum. Consult factory if more stations are required.)	N - No Manifold, Pressure Connection at Pump (Piston and Vane Pumps Only)
	RV1 - No Manifold with 50 - 1000 PSI Relief Valve (Required for Gear Pumps)
	RV2 - No Manifold with 500 - 3000 PSI Relief Valve (Required for Gear Pumps)

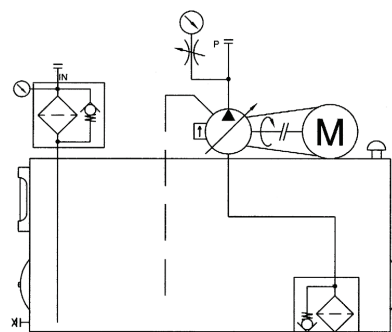
Note: "A" and "B" port connections on "D03" and "D05" manifolds are #8SAE (3/4 - 16 UNF).

Consult factory for additional configurations.

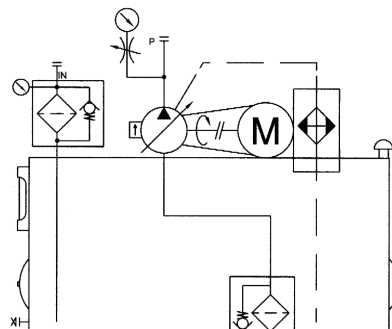
Schematics



Gear Pump Unit
with Manifold Option "RV*"



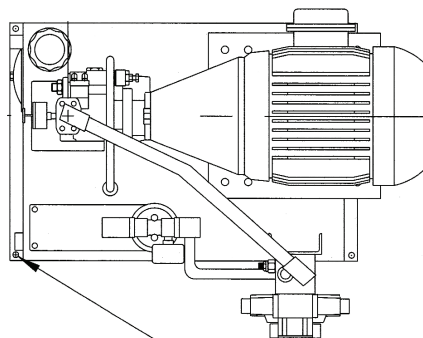
Piston/Vane Pump Unit
with Manifold Option "N"



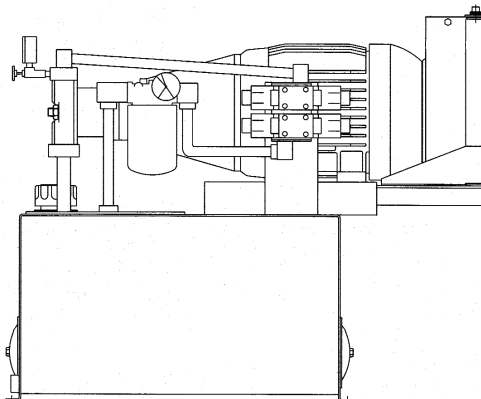
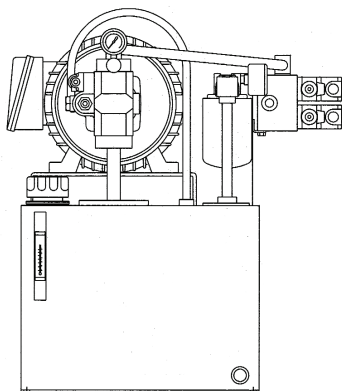
Piston/Vane Pump Unit
with "AO*" Cooler Option

Dimensional Drawings

Measurements are approximate.
Where dimensions are critical,
obtain special quotation.



(4) 7/16" DIA. MOUNTING HOLES



Dimensional Information

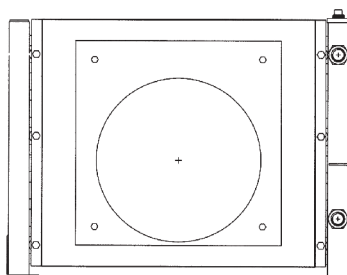
UNIT DIMENSIONAL INFORMATION

NHID	BASIC RESERVOIR DIMENSIONS						
	A	B	C	D	E	F	G
NH10	26	16	9.5	25.2	15	3.38	7
NH20	26	16	15.5	25.2	15	3.38	7
NH30	26	16	21.5	25.2	15	3.38	7
NH40	26	16	27.5	25.2	15	5.38	9.25

NHID	MANIFOLD ASSEMBLY HEIGHT (L DIMENSION)		
	D03	D05	D08
1 Station	12.00	12.00	CONSULT FACTORY
2 Station	12.00	12.00	
3 Station	12.00	12.00	
4 Station	12.00	15.25	
5 Station	14.25	18.50	
6 Station	16.25	21.75	

	MOTOR HORSEPOWER						
	2	3	5	7.5	10	15	20
J	9.95	11.88	11.88	13.50	13.50	16.59	16.59
K	7.04	8.08	8.08	9.31	9.31	10.96	10.96

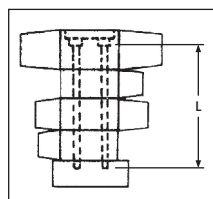
		PUMP/MOTOR ASSEMBLY LENGTH CHART (H DIMENSION)						
		MOTOR HORSEPOWER						
		2	3	5	7.5	10	15	20
AVAILABLE PUMPS	G/1.1	17.58						
	G/1.6	17.68	20.26					
	G/2.4	17.8	20.38					
	G/3.0	17.48	19.62	20.62				
	G/5.2	17.8	19.94	20.94	24.03	25.53		
	G/7.0	17.8	19.94	20.94	24.03	25.53		
	G/9.0	18.06	20.18	21.18	24.27	25.77	28.98	
	G/10.4	18.14	20.25	21.25	24.34	25.84	29.05	30.8
	G/12.3	18.14	20.25	21.25	24.34	25.84	29.05	30.8
	P/3.8	21.64	23.09	24.09	27.75			
	P/7.8	22.84	24.29	25.29	28.95	30.45	33.09	
	P/10.5	N/A	24.29	25.29	28.95	30.45	33.09	34.84
	P/16.6	N/A	N/A	27.44	30.29	31.79	34.43	36.18
	P/21.5	N/A	N/A	27.44	30.29	31.79	34.43	36.18
	V/4.0	16.75						
	V/7.9	17.26	18.96	19.96	23.05	24.55		
	V/10.5	17.26	18.96	19.96				
	V/14.2	N/A	19.74	20.74	23.83	25.33	27.97	
	V/18.4	N/A	19.74	20.74	23.83	25.33	27.97	



Air/Oil Return Oil Cooler

	GPM	Max Hp Removed
A01	15	.85 HP
A02	20	1.50 HP
A03	24	2.50 HP
A04	24	2.85 HP

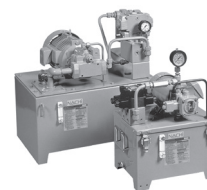
Optional Component Information - Bolt Kit Length



Bolt Length for D03	
Valve - 10 - 24 x 1 3/4	
Valve & module - 10 - 24 x 3 1/4	
Valve & 2 modules - 10 - 24 x 5	
Bolt Length for D05	
Valve - 1/4 - 20 x 2 3/4	
Valve & module - 1/4 - 20 x 5	
Valve & 2 modules - 1/4 - 20 x 7	

Note:

1. Bolt kits to be ordered separately when using modulators.
2. Bolt kits are furnished with directional valves when no modulators are required.
3. All "D03" modulators are 40mm thick.
4. "D05" modulators are 55mm thick.



NCP Series Standard Variable Pump Unit

NCP Series is a compact, low-cost standard unit that includes a variable vane pump (VDS, VDR, VDC Series) or a variable piston pump (PVS/PZS Series). The power unit is low-noise, low-heat, energy-efficient, and highly reliable. The NCP Series has been expanded to include a choice of models that are optimized for a very wide range of needs. Available tank capacities range from 30 l to 650 l.

Features

Low energy, high efficiency

A built-in low-noise, high-efficiency NACHI variable pump ensures low heat, high-efficiency, low-energy operation.

A rich range of options

A full selection of options include base block, cooler, terminal box, microseparator, oil pan, return filter, and more, so you can configure a unit that meets your particular needs.

A selection of versatile circuits

Virtually any type of circuit can be configured using ganged type NACHI modular valves.

Low cost, short lead time

Components are all standard and mass produced, so parts are readily available at low prices.

• Handling

- 1 All pump rotation is clockwise (rightward) when viewed from the shaft side.
- 2 See the table below for information about adjusting discharge volume and pressure.
- 3 For operating fluid, use regular oil equivalent to ISO VG 32 to 68 (Viscosity Index: 90 or greater).

	Adjusting Screw Rotation Direction	Pump type	
		VDS·VDC·PVS·PZS	VDR
Pressure	Clockwise	Increase	Decrease
	Counterclockwise	Decrease	Increase
Discharge rate	Clockwise	Decrease	
	Counterclockwise	Increase	

Specifications

- Note: 1. For direct connect type, use a Nachi Uni-pump.
 2. Fluid temperature limit is room temperature +25 °C setting conditions are full cutoff continual operation, tank located in a well-ventilated area.
 3. An unload circuit is required when the motor is started under condition -Δ. Contact your agent about the unload circuit.
 4. Unless specified otherwise, electrical systems and paint colors are NACHI standards (see page L-13).

Variable Vane Pump Series

Power supply for all types is 200V AC.

Model No.	Pump Model No.	Conne- ction	Motor (All External) kW, 4P	Tank Capacity l	Full Cutoff Pressure at Tank Fluid Temperature Limit Note 3) MPa(kgf/cm ²)			Approximate Weight kg
					No Fan Cooler	With Standard Fan Cooler	With High- power Fan Cooler	
(VC1A2) NCP-40-0.7VD1A2- M-12(21)	(VDC-1B-1A*-20) VDR-1B-1A*-22	Direct	0.75	40	3.0 (30.6)	8.0 (81.6)	-	70
(VC1A*) NCP-60-**VD1A*- M-12(21)	(VDC-1B-1A*-20) VDR-1B-1A*-22	Direct	1.5 2.2 3.7	60	4.5 (45.9)	9.0 (91.8)	-	90 95 115
(VC q A3) NCP-100-3.7VD q A3-C-12(21)	(VDC-1B-2A3-20) VDR-1B-2A3-22	Direct	3.7	100	7.0 (71.4)	-	-	155
2A* NCP-160-**VC w A*-M-12	VDC-2A-1A*-20 2A*	Coupling	5.5 7.5 11	160	3.5 (35.7)	6.5 (66.3)	8.5 (86.7)	240 250 300
2A* NCP-250-**VC w A*-M-12	VDC-2A-1A*-20 2A*	Coupling	7.5 11 15	250	4.5 (45.9)	7.0 (71.4)	9.5 (96.9)	300 350 375
NCP-400-**VC3A*- M-12	VDC-3A-1A*-20	Coupling	7.5 11 15 18.5 22	400	4.5 (45.9)	7.0 (71.4)	8.5 (86.7)	475 505 525 560 590
NCP-650-**VC3A*- M-12	VDC-3A-1A*-20	Coupling	11 15 18.5 22 30	650	6.0 (61.2)	8.5 (86.7)	10.0 (102.0)	600 620 660 685 750

- Note: 1. Contact your agent when mounting motors enclosed in parentheses. These motors require special handling concerning operating pressure, heat generation, etc.
 2. Equip a return filter for pressures of 7MPa or greater.
 3. A radiator is equipped as standard with the 100 l type.

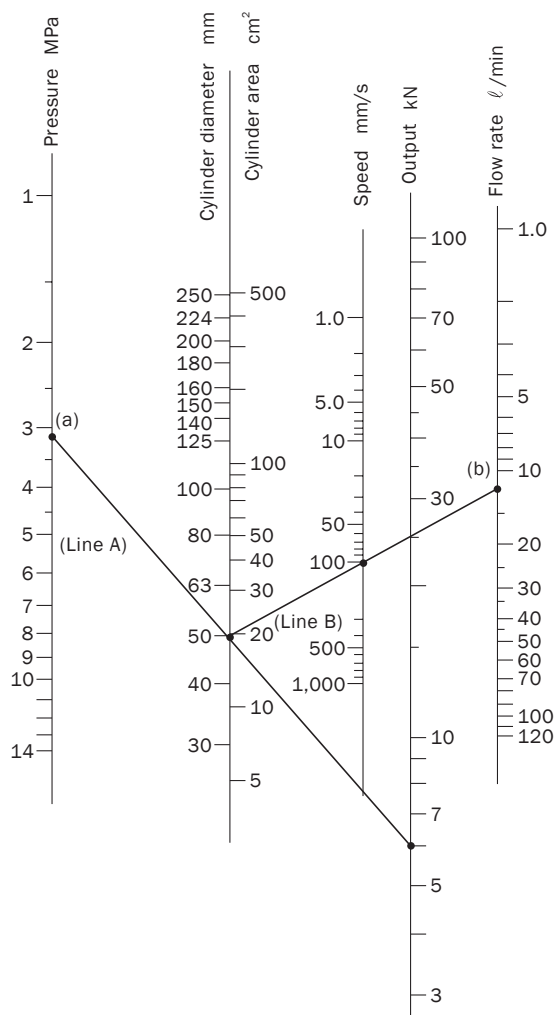
Variable Piston Pump Series

Power supply for all types is 200V AC.

Model No.	Pump Model No.	Conne- ction	Motor (All External) kW, 4P	Tank Capacity l	Full Cutoff Pressure at Tank Fluid Temperature Limit Note 3) MPa(kgf/cm ²)			Approximate Weight kg
					No Fan Cooler	With Standard Fan Cooler	With High- power Fan Cooler	
NCP-30-**PV8N*-R-12	PVS-0B-8N*-30	Direct	0.75 1.5	30	5.0 (51.0)	-	-	43 46
NCP-40-**PV8N*-R-12	PVS-0B-8N*-30	Direct	0.75 1.5	40	5.0 (51.0)	21.0 (214.1)	-	75 80
NCP-60-**PV8N*-R-12	PVS-0B-8N*-30	Direct	1.5 2.2 3.7	60	7.0 (71.4)	21.0 (214.1)	-	90 95 115
NCP-40-**PV16N*-R-12(21)	PVS-1B-16N*-12	Direct	0.75 1.5	40	4.5 (45.9)	21.0 (214.1)	-	75 80
NCP-60-**PV16N*-R-12(21)	PVS-1B-16N*-12	Direct	1.5 2.2 3.7	60	7.0 (71.4)	21.0 (214.1)	-	90 95 115
NCP-100-**PV ¹⁶ ₂₂ N*-R-12(21)	PVS-1B- ¹⁶ ₂₂ N*-12	Coupling	3.7 5.5 7.5	100	8.5 (86.7)	21.0 (214.1)	-	145 170 185
NCP-160-**PV35N*-R-12	PVS-2B-35N*-12	Coupling	5.5 7.5 11	160	7.0 (71.4)	14.0 (142.7)	21.0 (214.1)	235 245 295
NCP-250-**PV ³⁵ ₄₅ N*-R-12	PVS-2B- ³⁵ ₄₅ N*-12	Coupling	7.5 11 15	250	9.5 (96.9)	17.0 (173.3)	21.0 (214.1)	295 345 370
NCP-400-**PV70N*-R-12	PZS-3B-70N*-10	Coupling	7.5 11 15 18.5 22	400	5.5 (56.1)	14.0 (142.7)	16.0 (163.1)	490 525 545 580 605
NCP-650-**PV70N*-R-12	PZS-3B-70N*-10	Coupling	11 15 18.5 22 30	650	8.5 (86.7)	16.0 (163.1)	18.0 (183.5)	620 640 680 705 770

Note: All models in this series are equipped with a return filter as standard.

Specifications



[Example]

To determine the NCP Series model that drives a $\phi 50$ cylinder with an output of 6kN and speed of 100mm/s.

- Draw a line (Line A) between 6kN on the output line and the $\phi 50$ point on the cylinder diameter line. Extend Line A until it intersects with the pressure line at Point (a). Though Point (a) indicates a pressure of 3.1MPa, we need to add about 1MPa to compensate for pressure loss due to piping and other factors, so a pressure of 4MPa is required.
- From the $\phi 50$ point on the cylinder diameter line, draw a line (Line B) to the

100 mm/s point on the speed line. Extend Line B until it intersects with the flow rate line at Point (b), which indicates a required flow rate of 11.8 l/min.

- Based on the required flow rate of 11.8 l/min. and required pressure of 4MPa obtained above, we can now check the selection chart where we easily find out that the required model is NCP-60-1.5 VD1A3-12. Next, select the required option from Table 1 on the following page.

Flow rate l / min	Area	Pressure MPa	NCP Series Model	
			Variable Vane Pump Series	Variable Piston Pump Series
5	50/60Hz	3.5 to 5.0		NCP -30-0.7V8N1-R-12
10		4.5 to 8.0 8.0 to 14.0		NCP -40-1.5PV16N2-CR-12(21) -60-2.2PV16N2-CR-12(21)
15		1.0 to 3.0 3.0 to 4.5 4.5 to 7.0 7.0 to 14.0	NCP -40-0.7V*1A2-12(21) -60-1.5V*1A3-12(21)	NCP -60-2.2PV16N1-R-12(21) -60-3.7PV16N2-CR-12(21)
20		1.0 to 3.0 3.0 to 5.0 5.0 to 10.0 10.0 to 14.0	NCP -40-0.7V*1A2-12(21) -60-1.5V*1A3-12(21)	NCP -60-3.7PV16N2-(C)R-12(21) NCP -100-5.5PV16N2-CR-12(21)
25	50Hz	1.0 to 3.0 3.0 to 5.0 5.0 to 12.0 12.0 to 14.0	NCP -60-1.5V* q A2-12(21) -100-3.7V* q A3-C-12(21)	NCP -100-5.5PV22N2-(C)R-12(21) -100-7.5PV22N2-CR-12(21)
	60Hz	1.0 to 3.5 3.5 to 5.0 5.0 to 12.0 12.0 to 14.0	NCP -60-1.5V*1A2-12(21) -60-2.2V*1A3-C-12(21)	NCP -100-5.5PV16N2-(C)R-12(21) -100-7.5PV16N2-CR-12(21)
30	50/60Hz	1.0 to 3.5 3.5 to 5.0 5.0 to 8.0 8.0 to 14.0	NCP -60-2.2V* q A2-12(21) -100-3.7V* q A3-C-12(21)	NCP -100-5.5PV22N2-(C)R-12(21) -100-7.5PV22N2-CR-12(21)
35	50Hz	2.0 to 7.0 7.0 to 10.5 10.5 to 14.0	NCP -160-5.5VC2A3-(C)-12	NCP -160-7.5PV35N2-CR-12 -160-11PV35N2-CR-12
	60Hz	2.0 to 6.0 6.0 to 10.5 10.5 to 14.0	NCP -100-3.7V* q A3-C-12(21)	NCP -100-7.5PV22N2-CR-12(21)
40	50/60Hz	2.0 to 7.0 7.0 to 10.0 10.0 to 14.0	NCP -160-5.5VC2A3-(C)-12	NCP -160-7.5PV35N2-CR-12 -160-11PV35N2-CR-12
50		2.0 to 5.0 5.0 to 7.0 7.0 to 11.5 11.5 to 14.0	NCP -160-5.5VC w A3-(C)-12 -160-7.5VC w A3-C-12	NCP -160-11PV35N2-CR-12 -250-15PV45N2-CR-12
60	50Hz	2.0 to 7.0 7.0 to 10.0 10.0 to 14.0		NCP -250-7.5PV45N2-R-12 -250-11PV45N2-CR-12 -250-15PV45N2-CR-12
	60Hz	2.0 to 4.5 4.5 to 7.0 7.0 to 10.0 10.0 to 13.5	NCP -250-5.5VC w A3-12 -250-7.5VC w A3-C-12	NCP -250-11PV35N2-CR-12 -250-15PV35N2-CR-12
75	50Hz	2.0 to 4.5 4.5 to 7.0 7.0 to 10.0 10.0 to 13.0	NCP -400-7.5VC3A3-12 -400-11VC3A3-C-12	NCP -400-15PV70N3-CR-12 -400-18.5PV70N3-CR-12
	60Hz	2.0 to 5.5 5.5 to 8.0 8.0 to 11.0 11.0 to 13.5		NCP -250-7.5PV45N1-R-12 -250-11PV45N2-(C)R-12 -250-15PV45N2-CR-12 -250-18.5PV45N2-CR-12
90	50/60Hz	2.0 to 4.0 4.0 to 6.5 6.5 to 9.0 9.0 to 11.5 11.5 to 13.5	NCP -400-7.5VC3A3-12 -400-11VC3A3-C-12	NCP -400-15PV70N3-CR-12 -400-18.5PV70N3-CR-12 -400-22PV70N3-CR-12
	50Hz	2.0 to 6.0 6.0 to 8.0 8.0 to 10.0 10.0 to 12.0 12.0 to 14.0		NCP -650-11PV70N1-R-12 -650-15PV70N3-R-12 -650-18.5PV70N3-CR-12 -650-22PV70N3-CR-12 -650-30PV70N3-CR-12
100	50Hz	2.0 to 6.0 6.0 to 8.0 8.0 to 10.0 10.0 to 12.0 12.0 to 14.0		NCP -650-15PV70N3-R-12 -650-18.5PV70N3-CR-12 -650-22PV70N3-CR-12 -650-30PV70N3-CR-12
	60Hz	2.0 to 6.0 6.0 to 8.0 8.0 to 10.0 10.0 to 12.0 12.0 to 14.0	NCP -650-11VC3A3-12	NCP -650-15PV70N3-R-12 -650-18.5PV70N3-CR-12 -650-22PV70N3-CR-12 -650-30PV70N3-CR-12
110	60Hz	2.0 to 5.5 5.5 to 7.0 7.0 to 9.0 9.0 to 11.0 11.0 to 14.0	NCP -650-11VC3A3-12 -650-15VC3A3-(C)-12	NCP -650-18.5PV70N3-(C)R-12 -650-22PV70N3-CR-12 -650-30PV70N3-CR-12
	60Hz	2.0 to 5.0 5.0 to 7.0 7.0 to 8.5 8.5 to 10.0 10.0 to 13.5		NCP -650-11PV70N1-R-12 -650-15PV70N3-R-12 -650-18.5PV70N3-R-12 -650-22PV70N3-CR-12 -650-30PV70N3-CR-12

Note: 1. Contact your agent if you need a low-pressure NCP unit with piston pump.
2. If flow rate and pressure are not specified, products are configured with company standard settings before shipping.

3. When running items marked with a star (*) to the right of the table for long periods at pump setting pressure, fluid temperature may exceed 60 °C even when a fan cooler is used. In this case, use a water cooler.

4. Contact your agent for applications where there is the chance of frequent momentary return flow due to the use of ACC, or surge voltage generated due to the use of fast switching valve response and a high cycle.

Understanding Model Numbers

NCP - 100 - 3.7 * * * * - - 12(21)

Design number

21: Additional base block type

Option (Table 1)

Pump function

For variable vane pump

For variable piston pump

Pressure Capacity	2 MPa	3.5 MPa	7 MPa	10.5 MPa	14 MPa
8.3cm³/rev	OA1	OA2	OA3		
16.7cm³/rev	1A2		1A3	1A4	(1A5)
22.0cm³/rev	q A2		q A3		
30.0cm³/rev	2A2		2A3	2A4	(2A5)
38.9cm³/rev	w A2		w A3		
66.7cm³/rev	3A2		3A3	3A4	(3A5)

Pressure Capacity	2 to 7MPa	7 to 14MPa
8.0cm³/rev	8N1	8N2
16.5cm³/rev	16N1	16N2
22.0cm³/rev	22N1	22N2
35.0cm³/rev	35N1	35N2
45.0cm³/rev	45N1	45N2
70.0cm³/rev	70N1	70N2

Pump type

VC, VD: Variable vane

PV: Variable piston

Motor capacity

(0.4 to 30) kW, 4P (0.75kW only indicated as 0.7)

Tank volume

(30, 40, 60, 100, 160, 250, 400, 650) ℓ

NCP Series (standard variable pump unit)

Table 1: Option Symbols

Symbol	Description	Model Number and Description	30L	40 to 100L	160, 250L	400, 650L
B	Base Block (Design No. 12 Only)	MPU Series built-in	○ Note 2	○	○	○
C	Radiator	3A92-001-1050	○	○		
C1	General-purpose Fan Cooler	3A92-001-0000 16/15W Single-phase 200V AC 50/60Hz		○	○	○
C2	High-power Fan Cooler	3A92-002-0000 33/30W Single-phase 200V AC 50/60Hz			○	○
D	Terminal Wiring (Drive System + Control System)	Wiring from each electrical device to the terminal box (Drive System + Control System)	○	○	○	○
E	Terminal Wiring (Control System Only)	Wiring from each electrical device to the terminal box (Control System Only)	○	○	○	○
F	Mounting Foot for Forklift	See mounting foot for forklift specifications.		○		
M	Microseparator	MSB-110	○	○	○	○
N	Noise Control	Motor 6P specifications				○
P	Oil pan	See oil pan specifications.		○	○	○
R	Return Filter	WS-20-20-V(20 μ paper)	○			
R1	Return Filter	CF-O*(10 μ paper) FRS-**-20P*** (20 μ paper)		○ Note 3	○ Note 3	
R2	Return Filter	FPL-O*(10 μ paper)		○	○	
T	Temperature Gauge (With Fluid Level Gauge)	φ6 × 80L φ 25 (0 to 100°C) with guard φ8 × 120L φ 35	○	○	○	○
V	Vibration Control	Anti-vibration rubber, rubber hoses, etc.				○
W1	Self Leak Test	Tank leak test by NACHI		○	○	○
W2	Government-mandated Leak Test	Tank leak test by fire department		○	○	○
TH	Thermostat (Abnormal fluid temperature detection: Contact a)	TNS-C1070C (Contact on: 65° C and above)		○	○	○
PS	Pressure Switch (Abnormal pressure detection: Contact a)	CP20-223 Contact ON: (Pump Setting Pressure) -(1.5MPa) and above		○	○	○
FS	Float Switch (Low fluid level detection: Contact a)	OLV-2A Contact on: (Fluid Level Gauge Visual Low Level) -(10mm) or less		○	○	○
G	Fluid Level Gauge Guard	Protective cover installation	○	○	○	○
R3	Return Filter (Tank Top Type)	VLR*-**-P-S				
L	Anchor Hole Outer Side	Anchor hole set on outer side				
	Motor Abnormal Voltage	Reference Voltage Other than 200V AC 50/60Hz; 220V AC 60Hz		Supported for Design Number 5100A		
	Special Paint (Exterior)	Other than standard lacquer paint (phthalates, epoxy, etc.)				
	Piston Pump Variable Control Option	Other than standard control system N (NQ, RS, WS, RQS, etc.)				
	Fire Resistant Operating Fluid (W/G Type)	Water- or glycol-based hydraulic operating fluid (Contact your agent about other fluid types.)				
	Water Cooler	When capacity of pump DR fan cooler is insufficient				
	Electric Oil Heater	When there is the possibility of fluid pressure dropping below 0° C				

Note: 1. Design 12 when option symbol B is selected. (Base block additional 21 design is not applicable)

2. With the optional Symbol B capacity 30L, a special base block can be used in a configuration of up to 01 × 3.

3. Option symbol R1 CF-O* is applicable to pump functions *A2 and *NO only.

4. FRS-08-20P08T for option symbol R1, capacity 250L using a 45cm³/rev type.

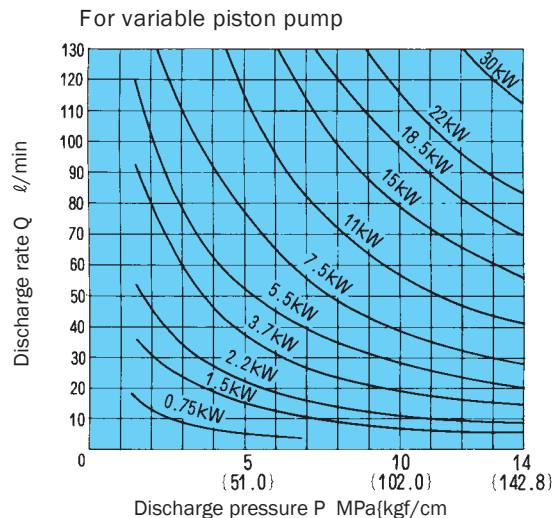
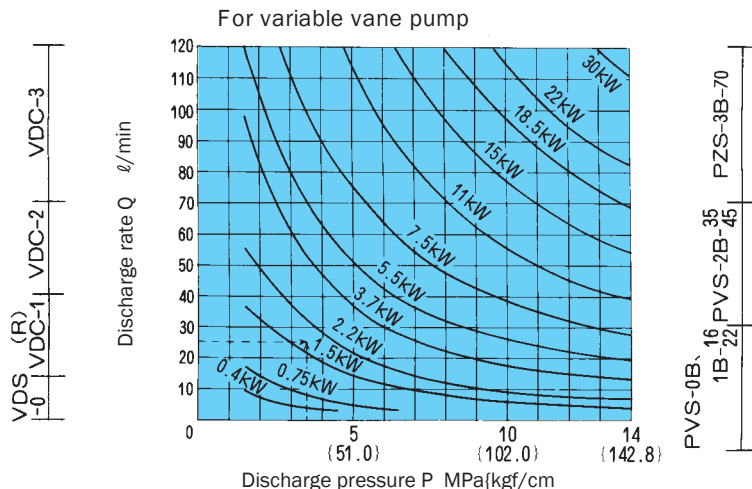
5. Contact Nachi for information about design number 5100A.

Selecting a Motor

- The lower side of the output curves for each of the motors shown in the graph indicates the operating range under rated output for that motor.
- Standard voltage for drive motor is 200 VAC, 50/60 Hz or 220 VAC, 60 Hz.

Example: To find the motor that can produce pressure of 3.5MPa {35.7kgf/cm²} and a discharge rate of 25r/min.
Since the intersection of the two broken

lines from a pressure of 3.5MPa {35.7kgf/cm²} and discharge rate of 25r/min intersect in the area under the 2.2kW curve, it means that a 2.2kW motor should be used.

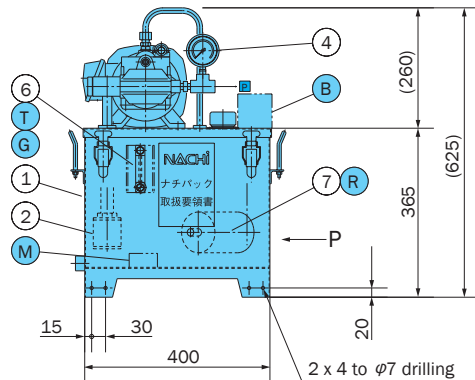
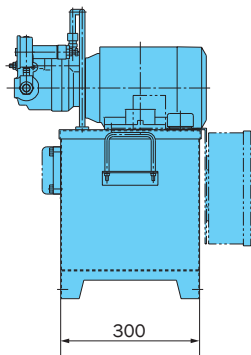
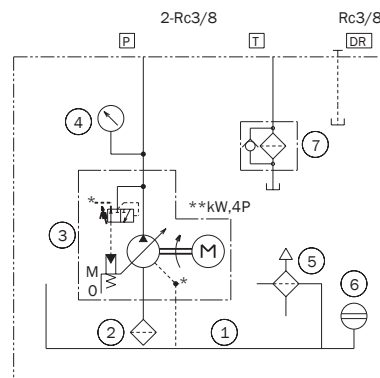
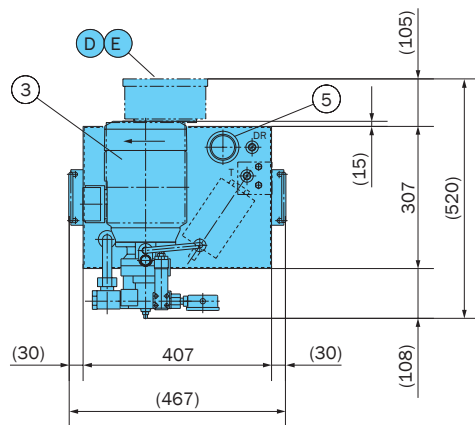


Installation Dimension Drawings

- Mini NCP Series
- NCP-30-**PV8N*-**-12

Note: Catalog dimensions, layout, and used devices are subject to change without notice. In particular, be sure to check in cases where dimensions are limited.

- Option item numbers are colored.

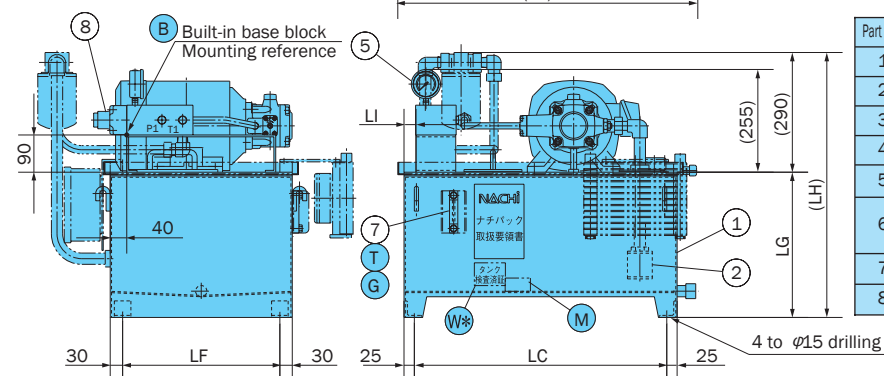
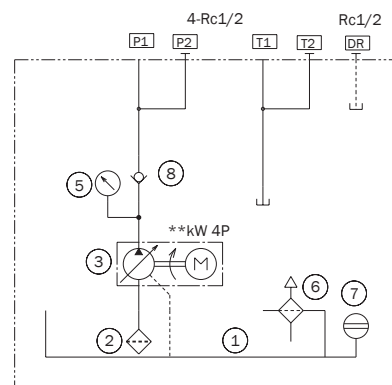
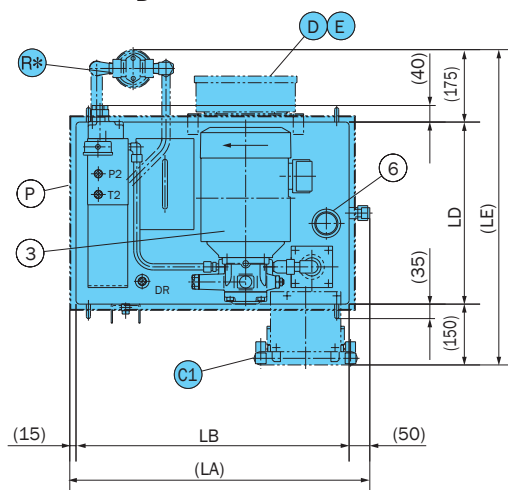


Part No.	Name	Model No.	Q'ty
1	Tank	30 l	1
2	Strainer	CS-06(150 mesh)	1
3	Uni-pump	UPV-0A-8N-**-A-4-31	1
4	Pressure gauge	AUR1/4-φ60 × **M	1
5	Fluid supply port/air breather	MSA-V30	1
6	Fluid level gauge	φ6 × 80L	1
7	Return filter	WS-20-20-V	1

NCP-40-0.7V^C_D 1A2-*-12

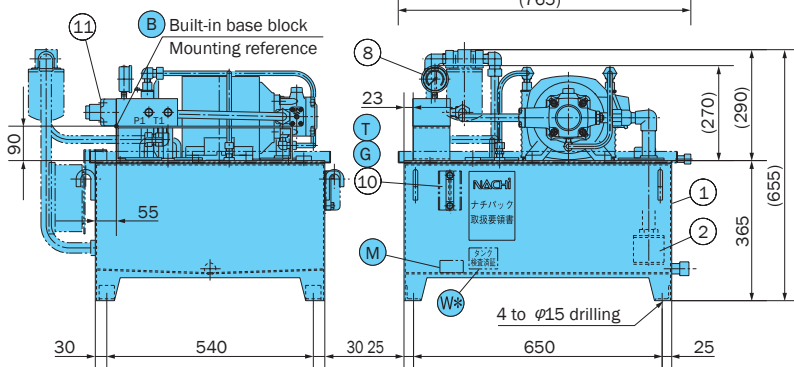
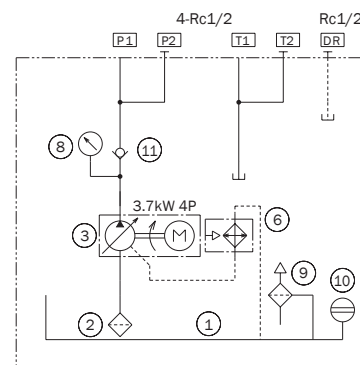
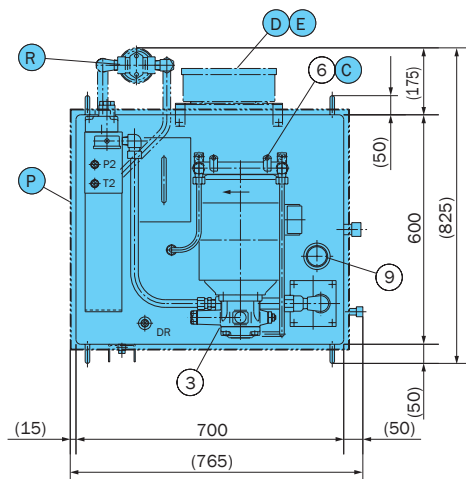
NCP-60-**V^C_D 1A*-*-12

Symbol	Dimensions (mm)	
	40 ℓ	60 ℓ
LA	625	725
LB	560	660
LC	510	610
LD	350	440
LE	675	765
LF	290	380
LG	300	350
LH	590	640
LI	31	33



Part No.	Name	Model No.	Q'ty
1	Tank	**ℓ	1
2	Strainer	CS-06(150 mesh)	1
3	Uni-pump	UVC(D)-1A-A-*-**4-26	1
4			
5	Pressure gauge	AUR1/4-φ60 × **M	1
6	Fluid supply port/air breather	MSA-V30	1
7	Fluid level gauge	φ6 × 80L	1
8	Check valve	CA-G03-1-20	1

NCP-100-3.7V^C_D 1A3-C-12

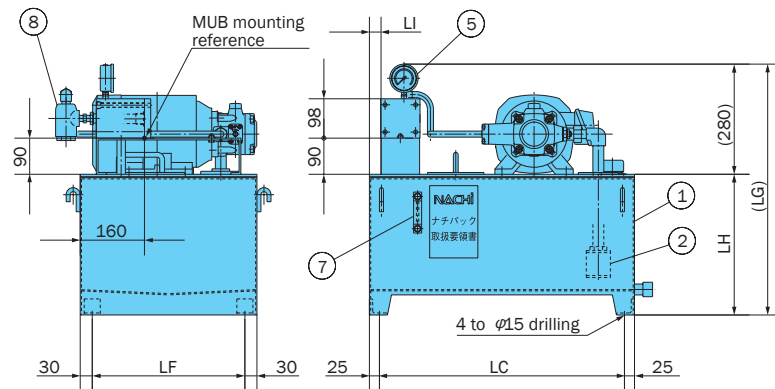
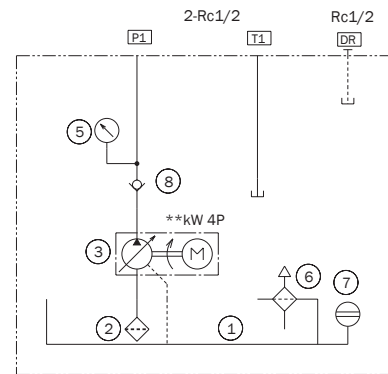
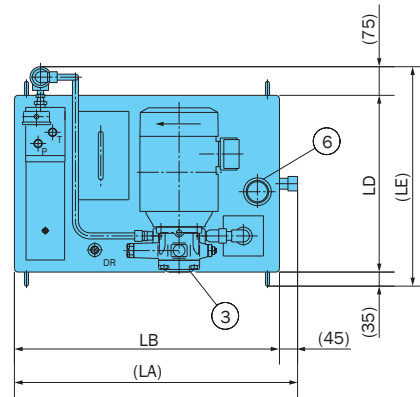


Part No.	Name	Model No.	Q'ty
1	Tank	100 ℓ	1
2	Strainer	CS-08(150 mesh)	1
3	Uni-pump	UVC(D)-1A-2A3-3.7-4-26	1
4			
5			
6	Radiator	3A92-001-1050	1
7			
8	Pressure gauge	AUR1/4-φ60 × **M	1
9	Fluid supply port/air breather	MSA-V30	1
10	Fluid level gauge	φ6 × 80L	1
11	Check valve	CA-G03-1-20	1

NCP-40-0.7VD1A2*-21

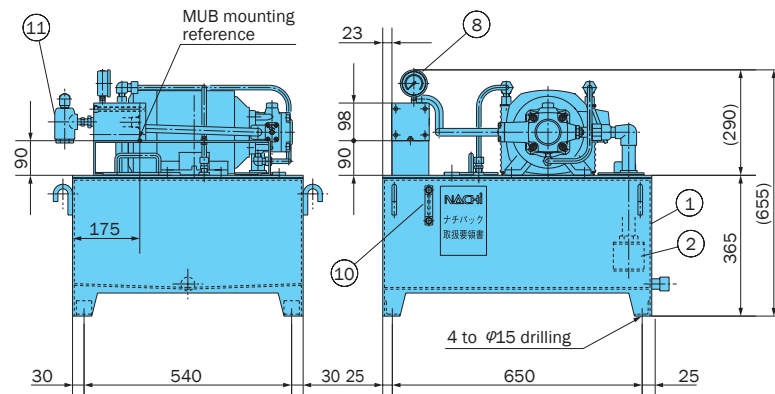
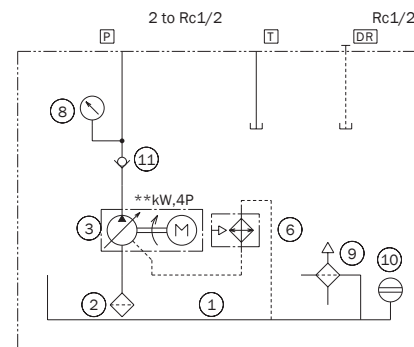
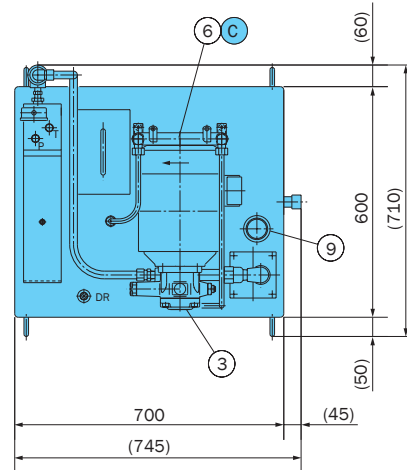
NCP-60-**VD1A*-21

Symbol	Dimensions (mm)	
	40 l	60 l
LA	605	705
LB	560	660
LC	510	610
LD	350	440
LE	460	550
LF	290	380
LG	580	630
LH	300	350
LI	31	33



Part No.	Name	Model No.	Q'ty
1	Tank	** l	1
2	Strainer	CS-06(150 mesh)	1
3	Uni-pump	UVD-1A-A*-**4-26	1
4			
5	Pressure gauge	AUR1/4-φ60 × **M	1
6	Fluid supply port/air breather	MSA-V30	1
7	Fluid level gauge	φ6 × 80L	1
8	Check valve	CA-T03-1-20	1

NCP-100-3.7VD1A3-C-21

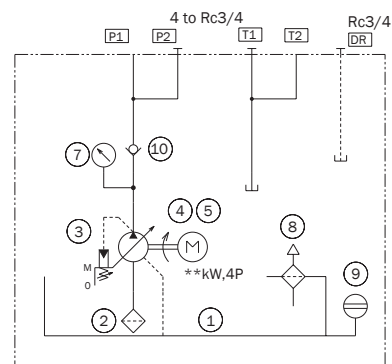
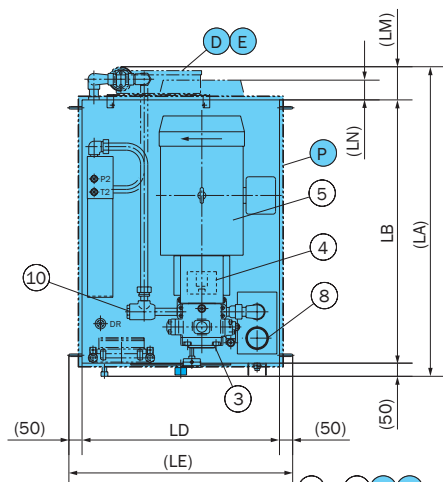


Part No.	Name	Model No.	Q'ty
1	Tank	100 l	1
2	Strainer	CS-08(150 mesh)	1
3	Uni-pump	UVD-1A-2A3-3.7-4-26	1
4			
5			
6	Radiator	3A92-001-1050	1
7			
8	Pressure gauge	AUR1/4-φ60 × 16M	1
9	Fluid supply port/air breather	MSA-V30	1
10	Fluid level gauge	φ6 × 80L	1
11	Check valve	CA-T03-1-20	1

NCP-160-**VC2A*-12

Symbol	Dimensions (mm)	
	160 ℓ	250 ℓ
LA	1120	1175
LB	850	1000
LC	780	930
LD	650	750
LE	750	850
LF	580	680
LG	415	495
LH	835	995
LI	385	420
LJ	420	500
LK	0	20
LL	100	215
LM	220	125
LN	75	0

NCP-250-**VC2A*-12

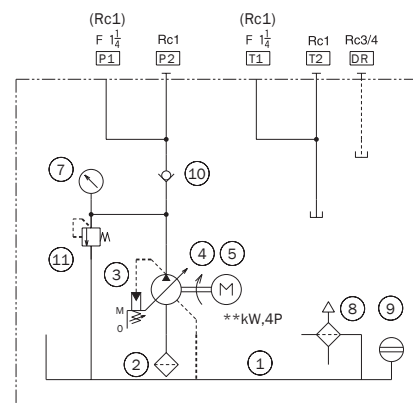
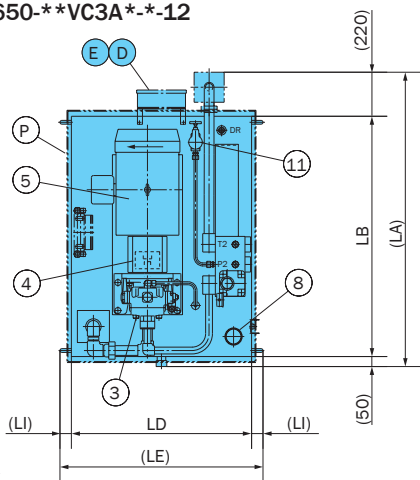


Part No.	Name	Model No.	Q'ty
1	Tank	** ℓ	1
2	Strainer	CS-10(150 mesh)	1
3	Uni-pump	VDC-2A-A*-20	1
4	Coupling	CR-***J	1
5	Motor	Fully closed external fan Terminal B *kW-4P	1
6			
7	Pressure gauge	AUR1/4-φ60 × **M	1
8	Fluid supply port/air breather	MSA-V50-VS10	1
9	Fluid level gauge	φ8 × 120L	1
10	Check valve	CA-T06-1-20	1

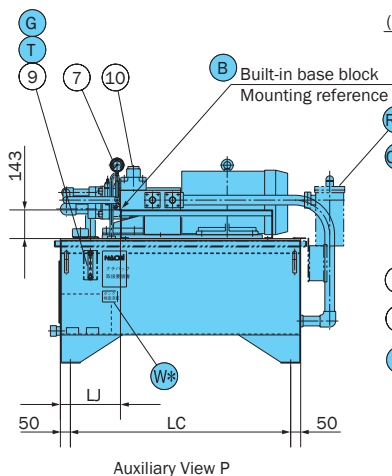
NCP-400-**VC3A*-12

Symbol	Dimensions (mm)	
	400 ℓ	650 ℓ
LA	1470	1790
LB	1200	1520
LC	1100	1420
LD	900	1010
LE	1014	1164
LF	800	910
LG	620	670
LH	1120	1170
LI	57	77
LJ	300	450

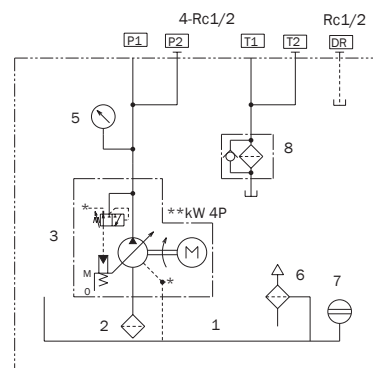
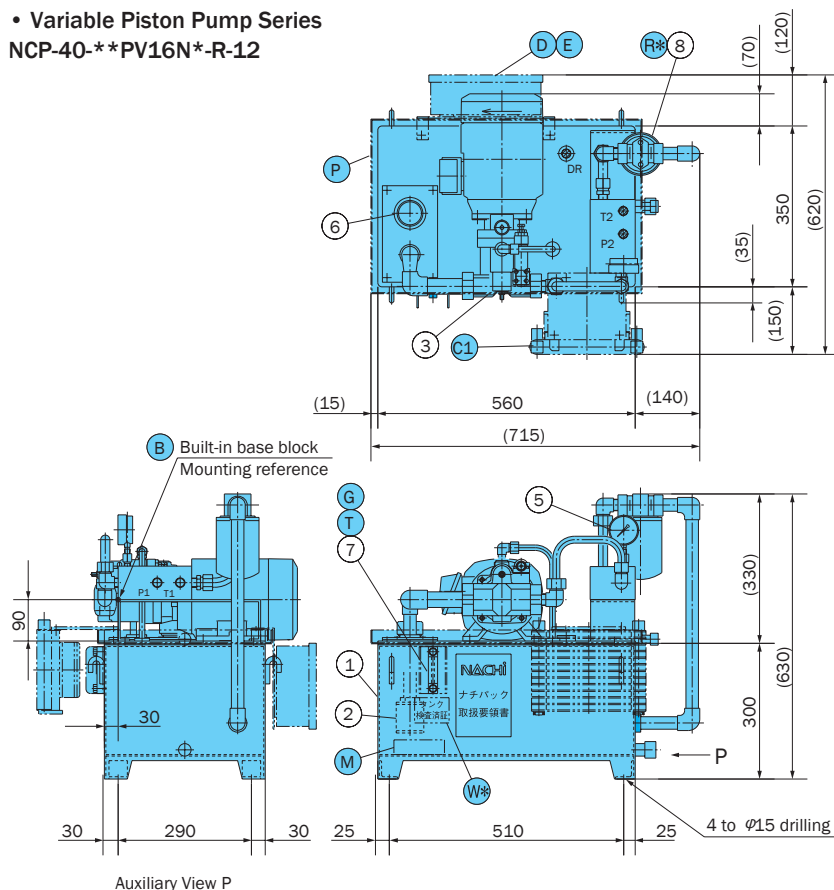
NCP-650-**VC3A*-12



Part No.	Name	Model No.	Q'ty
1	Tank	** ℓ	1
2	Strainer	CS-12(150 mesh)	1
3	Uni-pump	VDC-3A-1A*-20	1
4	Coupling	CR-***J	1
5	Motor	Fully closed external fan A terminal *kW-4P	1
6			
7	Pressure gauge	AUR1/4-φ60 × **M	1
8	Fluid supply port/air breather	MSA-V50-VS10	1
9	Fluid level gauge	φ8 × 120L	1
10	Check valve	CA-G10-1-20	1
11	Relief valve	R-T03-3-11	1

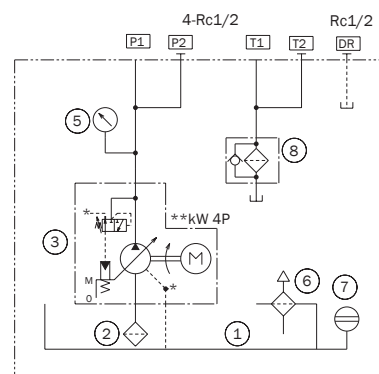
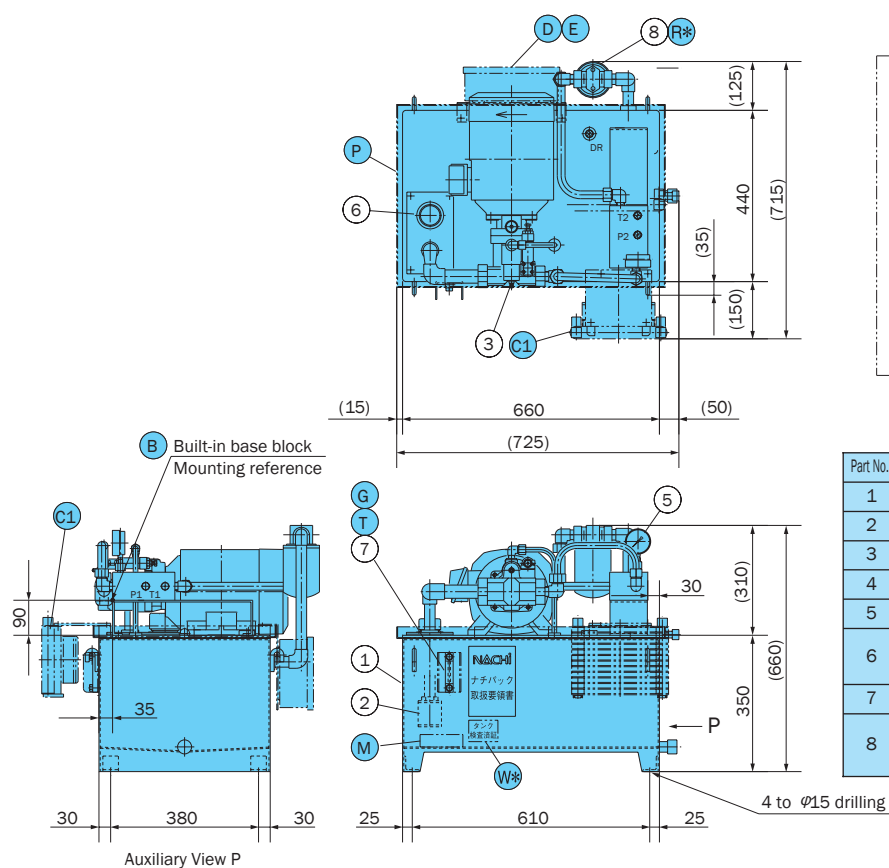


• Variable Piston Pump Series
NCP-40-**PV16N*-R-12



Part No.	Name	Model No.	Q'ty
1	Tank	40 l	1
2	Strainer	CS-06(150 mesh)	1
3	Uni-pump	UPV-1A-16N-**-A-4-17	1
4			
5	Pressure gauge	AUR1/4-φ60 × **M	1
6	Fluid supply port/air breather	MSA-V30	1
7	Fluid level gauge	φ6 × 80L	1
8	Return filter	(FPL-06)CF-06 10μ paper	1

NCP-60-**PV16N*-R-12

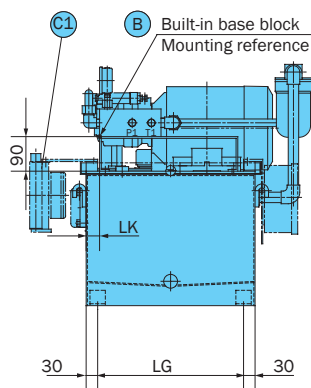
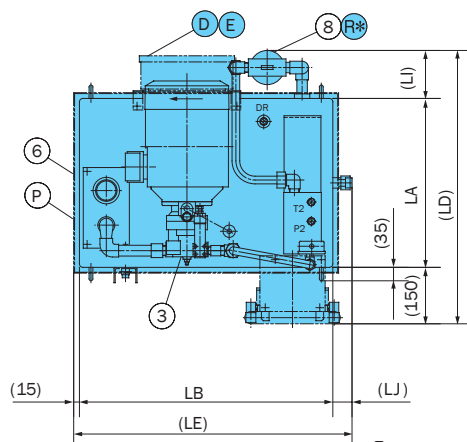


Part No.	Name	Model No.	Q'ty
1	Tank	60 l	1
2	Strainer	CS-06(150 mesh)	1
3	Uni-pump	UPV-1A-16N-**-A-4-17	1
4			
5	Pressure gauge	AUR1/4-φ60 × **M	1
6	Fluid supply port/air breather	MSA-V30	1
7	Fluid level gauge	φ6 × 80L	1
8	Return filter	(FPL-06)CF-06 10μ paper	1

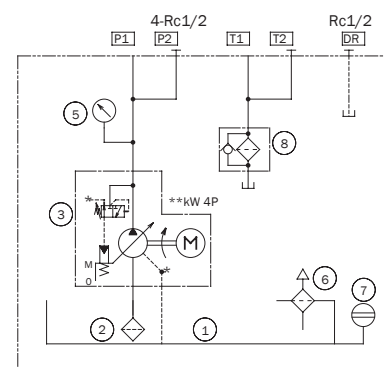
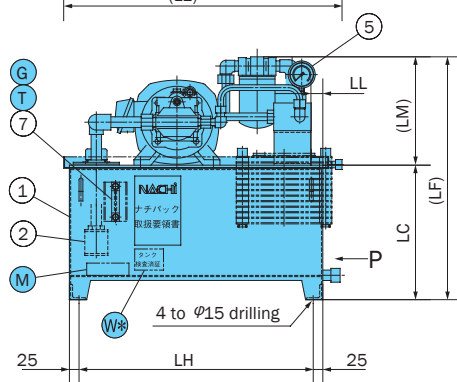
NCP-40-**PV8N*-*-12

NCP-60-**PV8N*-*-12

Symbol	Dimensions (mm)	
	40ℓ	60ℓ
LA	350	440
LB	560	660
LC	300	350
LD	620	715
LE	715	725
LF	630	660
LG	290	380
LH	510	610
LI	120	125
LJ	140	50
LK	30	35
LL	0	30
LM	330	310

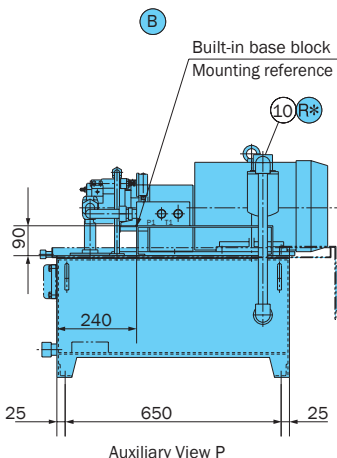
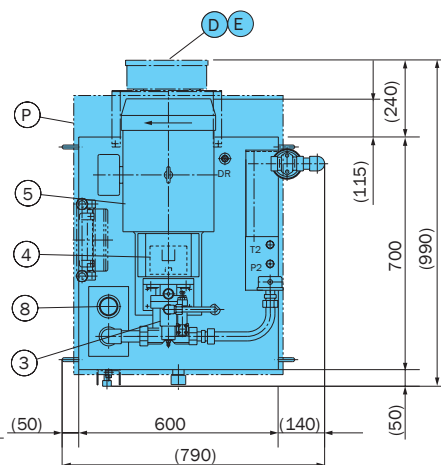


Auxiliary View P

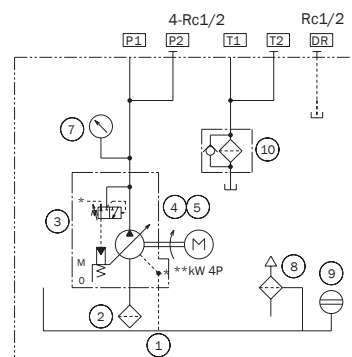
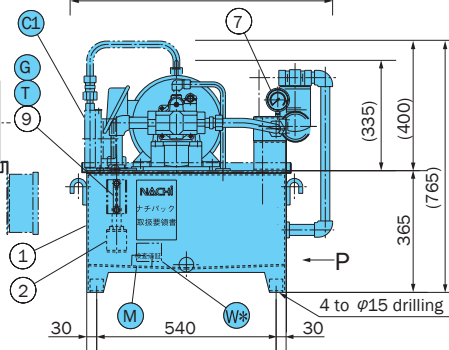


Part No.	Name	Model No.	Q'ty
1	Tank	**ℓ	1
2	Strainer	CS-06(150 mesh)	1
3	Uni-pump	UPV-0A-8N*-*-A-4-31	1
4			
5	Pressure gauge	AUR1/4-φ60 × **M	1
6	Fluid supply port/air breather	MSA-V30	1
7	Fluid level gauge	φ6 × 80L	1
8	Return filter	(FPL-06)CF-06 10μ paper	1

NCP-100-**PV¹⁶₂₂N*-*-12



Auxiliary View P

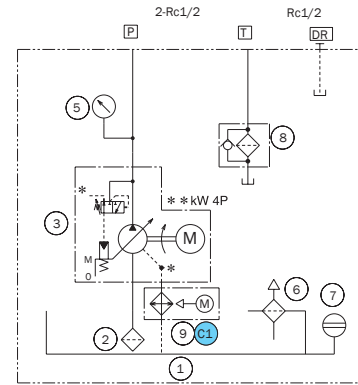
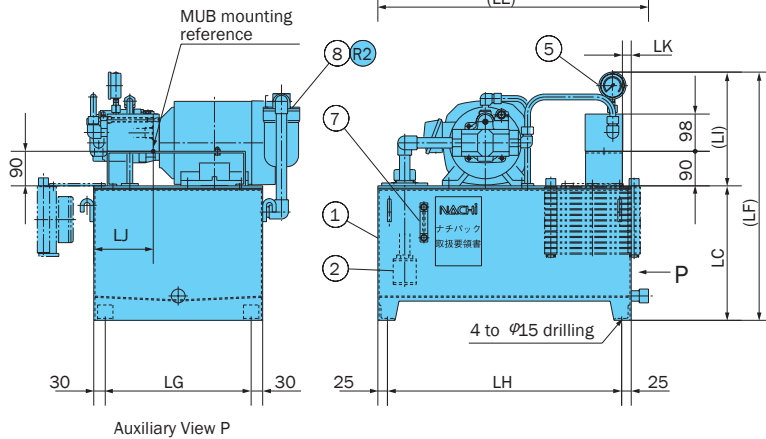
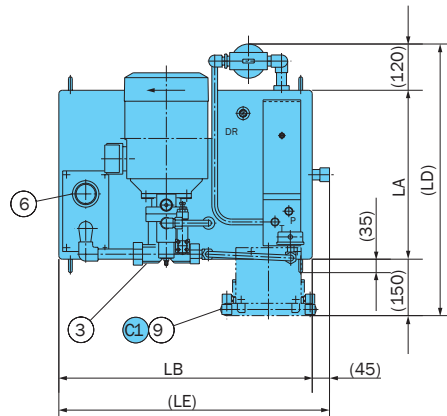


Part No.	Name	Model No.	Q'ty
1	Tank	100 ℓ	1
2	Strainer	CS-06(150 mesh)	1
3	Pump	PVS-1A-**N*-*-12	1
4	Coupling	CR-***J	1
5	Motor	Fully closed external fan A terminal **kW-4P	1
6			
7	Pressure gauge	AUR1/4-φ60 × **M	1
8	Fluid supply port/air breather	MSA-V30	1
9	Fluid level gauge	φ6 × 80L	1
10	Return filter	(FPL-06)CF-06 10μ paper	1

NCP-40-**PV16N*-(C1)R2-21

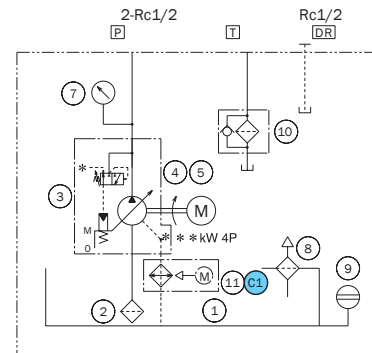
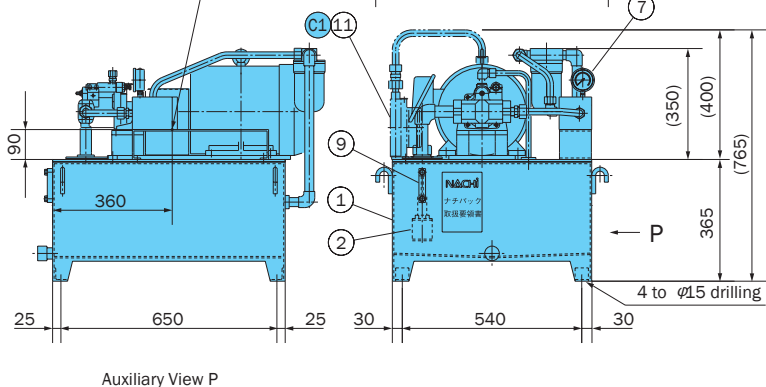
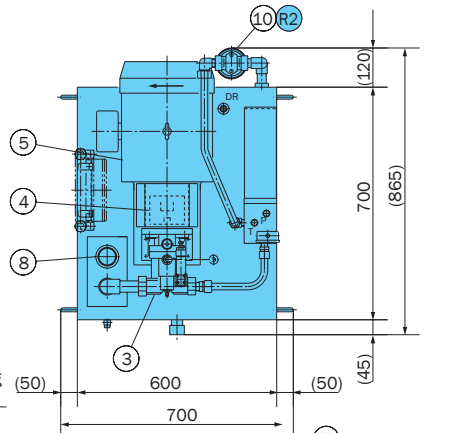
NCP-60-**PV16N*-(C1)R2-21

Symbol	Dimensions (mm)	
	40ℓ	60ℓ
LA	350	440
LB	560	660
LC	300	350
LD	620	710
LE	605	705
LF	630	665
LG	290	380
LH	510	610
LI	330	315
LJ	150	155
LK	0	30



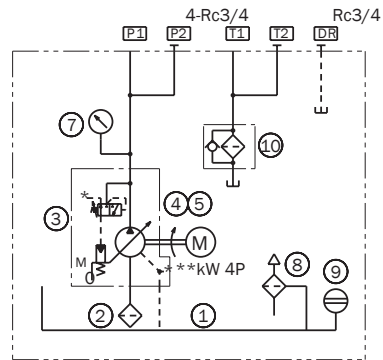
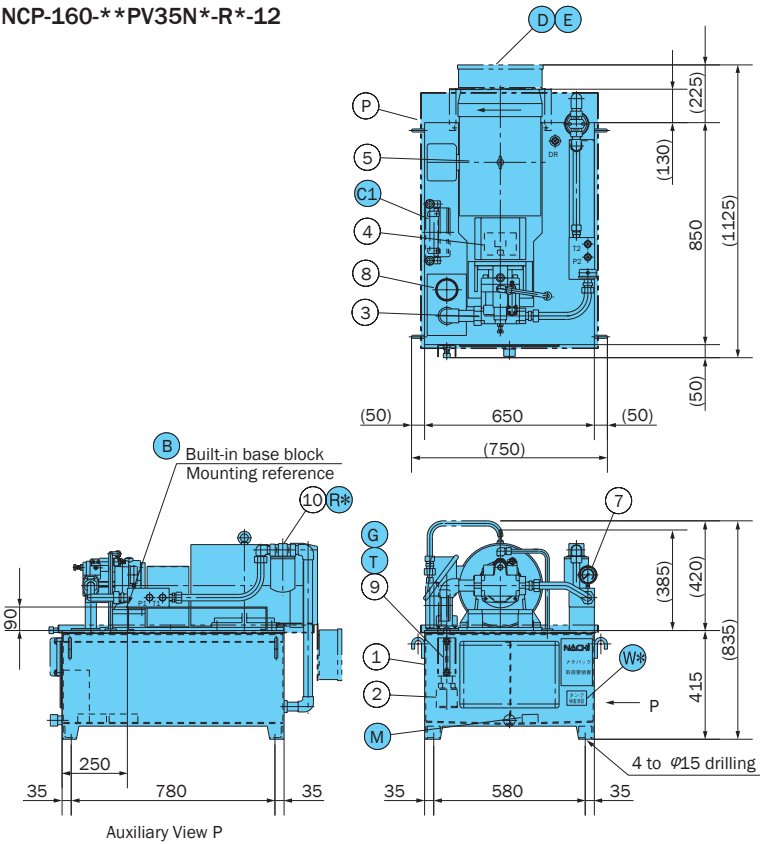
Part No.	Name	Model No.	Q'ty
1	Tank	**ℓ	1
2	Strainer	CS-06(150 mesh)	1
3	Uni-pump	UPV-1A-16N*-*A-4-17	1
4			
5	Pressure gauge	AUR1/4-φ60 × **M	1
6	Fluid supply port/air breather	MSA-V30	1
7	Fluid level gauge	φ6 × 80L	1
8	Return filter	FPL-06(10 μ paper)	1
9	Fan cooler	3A92-001-0000	1

NCP-100-**PV¹⁶₂₂N*-(C1)R2-21



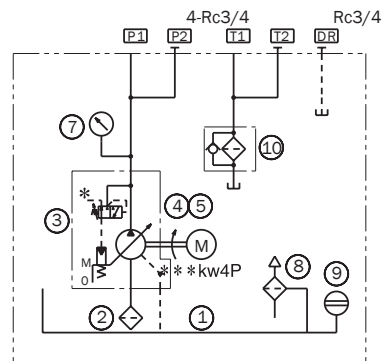
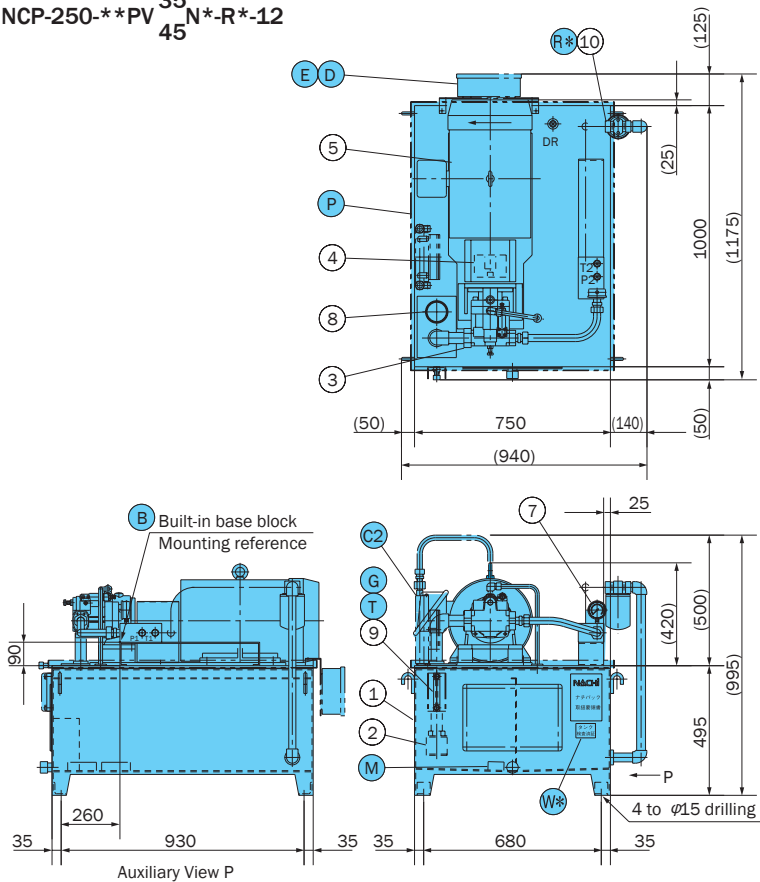
Part No.	Name	Model No.	Q'ty
1	Tank	100ℓ	1
2	Strainer	CS-06(150 mesh)	1
3	Pump	PVS-1A- ¹⁶ ₂₂ N*-*12	1
4	Coupling	CR-***J	1
5	Motor	Fully closed external fan A terminal *kW-4P	1
6			
7	Pressure gauge	AUR1/4-φ60 × **M	1
8	Fluid supply port/air breather	MSA-V30	1
9	Fluid level gauge	φ6 × 80L	1
10	Return filter	FPL-06(10 μ paper)	1
11	Fan cooler	3A92-001-0000	1

NCP-160-**PV35N*-R*-12



Part No.	Name	Model No.	Q'ty
1	Tank	160r	1
2	Strainer	CS-10(150 mesh)	1
3	Uni-pump	PVS-2A-35N*-12	1
4	Coupling	CR-***J	
5	Motor	Fully closed external fan A terminal **kW-4P	1
6			
7	Pressure gauge	AUR1/4- $\phi 60 \times$ **M	1
8	Fluid supply port/air breather	MSA-V50-VS10	1
9	Fluid level gauge	$\phi 8 \times 120L$	1
10	Return filter	(FPL-08)CF-08 10 μ paper	1

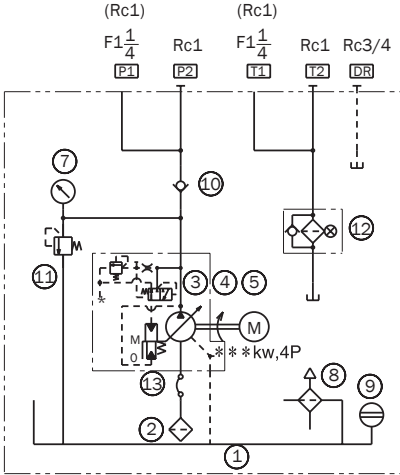
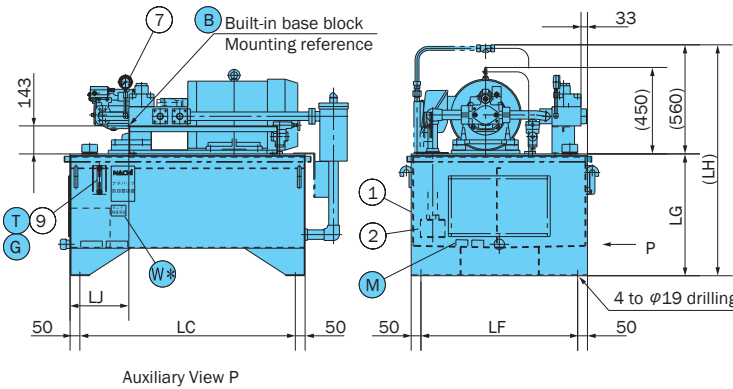
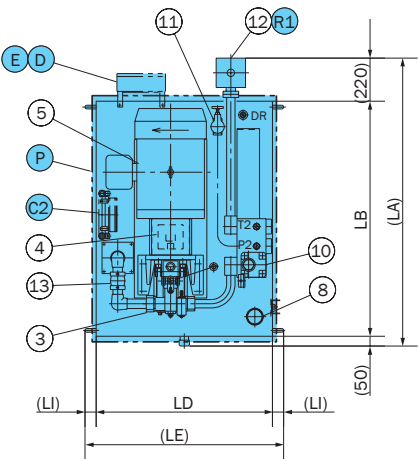
NCP-250-**PV³⁵₄₅N*-R*-12



Part No.	Name	Model No.	Q'ty
1	Tank	250l	1
2	Strainer	CS-10(150 mesh)	1
3	Uni-pump	PVS-2A-**N*-12	1
4	Coupling	CR-***J	1
5	Motor	Fully closed external fan A terminal **kW-4P	1
6			
7	Pressure gauge	AUR1/4- $\phi 60 \times$ **M	1
8	Fluid supply port/air breather	MSA-V50-VS10	1
9	Fluid level gauge	$\phi 8 \times 120L$	1
10	Return filter	FRS-08-20P08T(20 μ) (FPL-08)CF-08 10 μ paper	1

NCP-400-**PV70N*-R1*-12
NCP-650-**PV70N*-R1*-12

Symbol	Dimensions mm	
	400 ℓ	650 ℓ
LA	1470	1790
LB	1200	1520
LC	1100	1420
LD	900	1010
LE	1014	1164
LF	800	910
LG	620	670
LH	1180	1230
LI	57	77
LJ	300	450

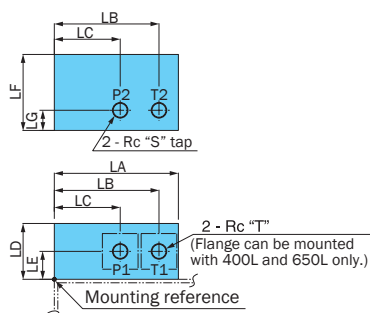


Part No.	Name	Model No.	Q'ty
1	Tank	** ℓ	1
2	Strainer	CS-12(150 mesh)	1
3	Uni-pump	PZS-3A-70N*-10	1
4	Coupling	CR-***J	
5	Motor	Fully closed external fan A terminal **kW-4P	1
6			
7	Pressure gauge	AUR1/4-φ60 × **M	1
8	Fluid supply port/air breather	MSA-V50-VS10	1
9	Fluid level gauge	φ8 × 120L	1
10	Check valve	CA-G10-1-20	1
11	Relief valve	R-T03-3-11	1
12	Return filter	FRS-12-20P-12F	1
13	Flexmaster joint	M1600-150-0350	1

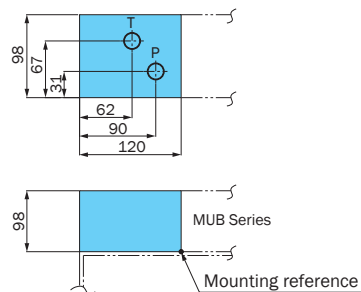
Note: Set (11) relief valve setting pressure so it is equivalent to pump setting pressure plus 1.0MPa {10.2kgf/cm²}.

Outlet Block Specifications

Design number 12
Outlet Block Dimensions



Design number 21
Outlet Block Dimensions

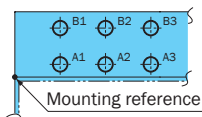


Tank Capacity	Dimensions (mm)							Outlet Size	
	LA	LB	LC	LD	LE	LF	LG	S	T
40L 60L 100L	160	135	85	72	36	98	26	1/2	1/2
160L 250L								3/4	3/4
400L 650L	300	260	160	98	49	148	48	1	JIS B 2291 SSA-32 (Rcl)

Option B

MPU Series Built-in

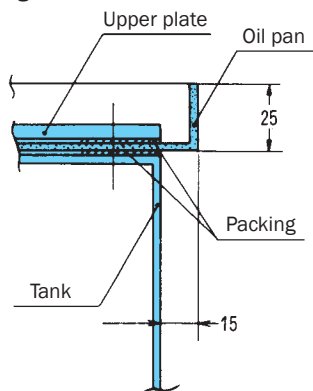
(See base block specifications for dimensions.)



Oil Pan Specifications

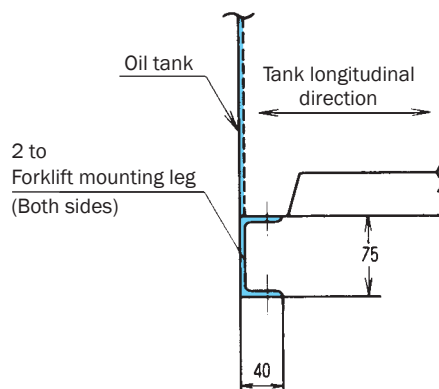
A "headband type" oil pan is standard, and an oil pan drain is provided at one location (Rc3/8).

Structural Diagram



Forklift Mounting Leg Specifications

Forklift Mounting Leg Specifications



Standard Specifications

1. Paint Color: Mancel No. 5B6/3 (lacquer)

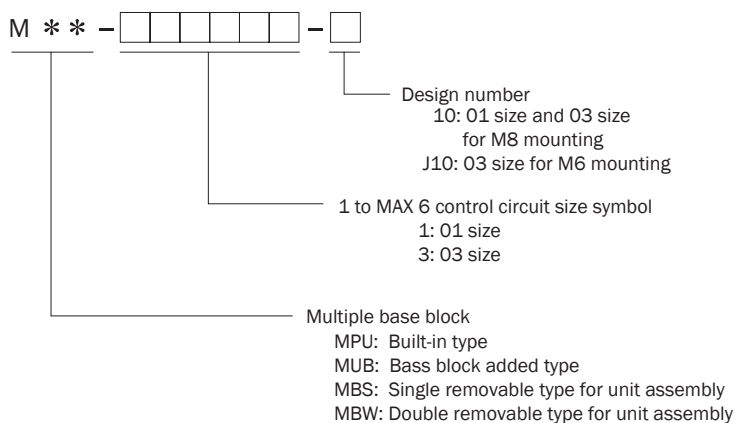
2. Motor Specifications:

Note: Mancel No. 5B/0.5 for tank capacity 30L uni-pump motor only.

		Wiring	Color Coding	Terminal number	Terminal	Terminal box specifications
Control System	SA SS	VCT-1.25mm ²	Single SOL White, Black	1, 2 - Consecutive numbers (Common: C)	Y Type Solderless	Inner : Mancel No. 2.5Y8/2 Dust-tight type, cover fastened by screws
			Double SOL Red, White, Black, Green			
Drive System	to 3.7kW 5.5kW to	VCT	Red, White, Black, Green	U, V, W, E	Round Solderless	Outer : Mancel No 5B6/3 (Lacquer)
		IV + PF	Black (3) + Green			

Base Block Specifications

Understanding Model Numbers

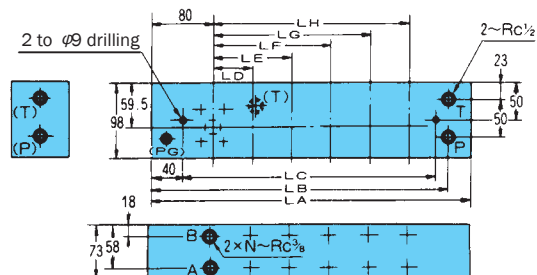


• MPU Series (Unit Built-in)

This base block is a special type built into the NCP Series.

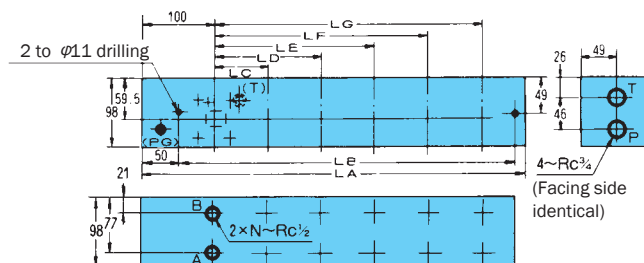
Block Model Numbers, Appearance, Dimensions

01 size



Model No.	Dimensions (mm)									Weight kg
	LA	LB	LC	LD	LE	LF	LG	LH	N	
MPU -1-10	160	130	75						1	8.3
-11-10	210	180	125	50					2	10.9
-111-10	260	230	175	50	100				3	13.4
-1111-10	310	280	225	50	100	150			4	16.0
-11111-10	360	330	275	50	100	150	200		5	18.6
-111111-10	410	380	325	50	100	150	200	250	6	21.2

03 size



Model No.	Dimensions (mm)								Weight kg
	LA	LB	LC	LD	LE	LF	LG	N	
MPU -3-J10(10)	160	95						1	11.1
-33-J10(10)	235	170	75					2	16.3
-333-J10(10)	310	245	75	150				3	21.5
-3333-J10(10)	385	320	75	150	225			4	26.7
-33333-J10(10)	460	395	75	150	225	300		5	31.9
-333333-J10(10)	535	470	75	150	225	300	375	6	37.0

Note: 1. There are two types of mounting bolts available for the 03 size: M6 and M8. Be sure to specify the type of bolt you need.

M6 : SA, SS-J Series

M8 : SS Series

2. When using the 01/03 combination type

a) The installation pitch uses the 03 size dimensions shown above, and for A and B ports only the 01 size installation part is Rc3/8.

b) In the case of MPU-313131-J10, for example, valve installation locations 1, 3, and 5 counting from the left are 03 size, while 2, 4, 6 are 01 size.

Other

Space is limited in accordance with tank capacity, so use the basic data in the following table when designing the circuit.

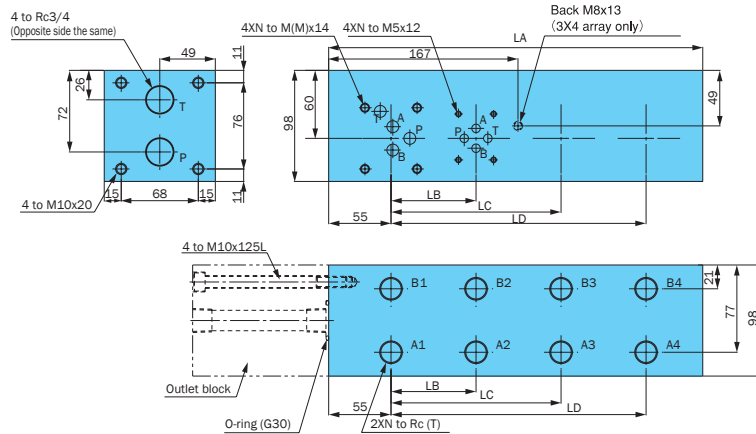
	Tank Capacity	01 Space Block	03 Space Block
VD* Series	30 ℓ	Up to 3	
	40 ℓ	Up to 4	Up to 3
	60 ℓ	Up to 5	Up to 3
	100 ℓ	Up to 6	Up to 5
	160 ℓ	Up to 6	Up to 5
	250 ℓ	Up to 6	Up to 6
PVS Series	400, 650 ℓ		Up to (2, 4, 6) + Up to (3, 2, 1)
	30 ℓ	Up to 3	
	40 ℓ	Up to 4	Up to 3
	60 ℓ	Up to 5	Up to 3
	100 ℓ	Up to 6	Up to 4
	160, 250 ℓ	Up to 6	Up to 6
	400, 650 ℓ		Up to (2, 4, 6) + Up to (3, 2, 1)

Note: Using in series larger than those noted above causes overhang from the top plate.

• MUB Series (Base Block Additional Configurations)

This series makes it easy to add an option base block using only four mounting bolts. The following shows the range of the possible addition. In this configuration, the NCP unit design number becomes 21.

Block Model Numbers, Appearance, Dimensions



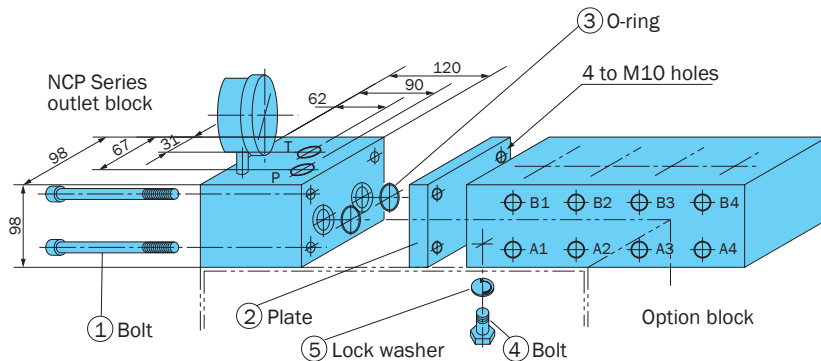
Model No.	Dimensions (mm)							Weight kg
	LA	LB	LC	LD	N	M	T	
MUB-1-10	105				1	-	3/8	7.6
MUB-3-J10(10)	105				1	6(8)	1/2	7.6
MUB-11-10	180	75			2	-	3/8	12.8
MUB-33-J10(10)	180	75			2	6(8)	1/2	12.8
MUB-111-10	255	75	150		3	-	3/8	18.0
MUB-333-J10(10)	255	75	150		3	6(8)	1/2	18.0
MUB-1111-10	330	75	150	225	4	-	3/8	23.2
MUB-3333-J10(10)	330	75	150	225	4	6(8)	1/2	23.2

- Note:
- There are two types of mounting bolts available for the O3 size: M6 and M8. Be sure to specify the type of bolt you need.
M6 : SA, SS-J Series
M8 : SS Series
 - When using the O1/O3 combination type
 - The installation pitch uses the O3 size dimensions shown above, and for A and B ports only the O1 size installation part is Rc3/8.
 - In the case of MUB-3131-J10, for example, valve installation locations 1 and 3 counting from the left are O3 size, while 2, 4 are O1 size.
 - When using a 2-speed plate, a special MUB type is used.
Contact your agent for more information.

Option Base Block Installation Procedure

Loosen bolts ① and ④ and remove plate ②. Next, after checking to ensure that O-ring ③ is installed, install the option base block using ①, ④, and ⑤.

- Note:
- ④ and ⑤ are used only in 3 and 4 multi configurations.
 - In single and double configurations, ④ and ⑤ are just removed.

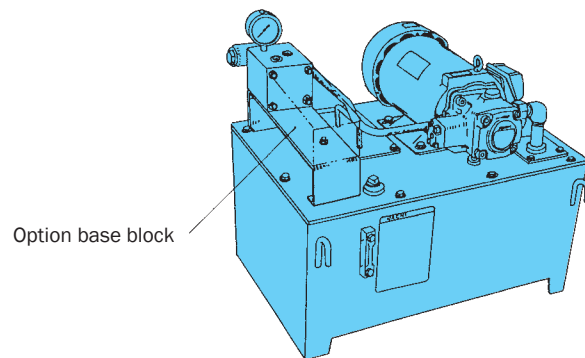


21 Design Series Scope

This series consists of a total of six best-seller piston and vane types with 40, 60, and 100 ℓ tanks. Note that piston Z type and vane VC type are not included.

Option Base Block Addition Scope

Tank Capacity	O1 Base Block	O3 Base Block
40 ℓ	Up to 2	Up to 2
60 ℓ	Up to 3	Up to 3
100 ℓ	Up to 4	Up to 4



Part No.	Name	Model No.
1	Hexagon Socket Head Bolt	M10 × 125
2	Plate	98 × 98 × 15t
3	O-ring	1B-G30
4	Hex bolt	M8 × 25
5	Lock washer	For M8

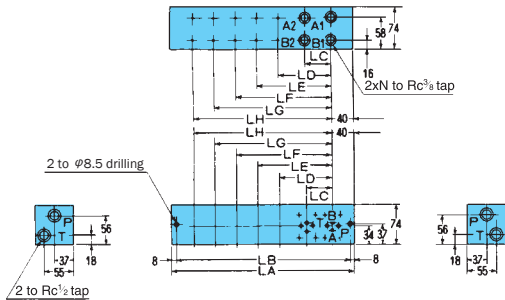
• MBS, MBW Series (Unit Assembly Type)

This base block is used to install the valve unit only around machinery.

Block Model Numbers, Appearance, Dimensions

MBS Series (Single Ejection Multi Block)

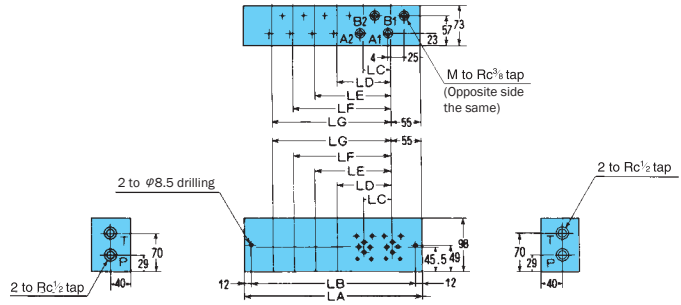
01 size



Model No.	Dimensions (mm)									Weight kg
	LA	LB	LC	LD	LE	LF	LG	LH	N	
MBS -1-10	80	64							1	3.4
-11-10	130	114	50						2	5.5
-111-10	180	164	50	100					3	7.6
-1111-10	230	214	50	100	150				4	9.8
-11111-10	280	264	50	100	150	200			5	11.9
-111111-10	330	314	50	100	150	200	250		6	14
-1111111-10	380	364	50	100	150	200	250	300	7	16

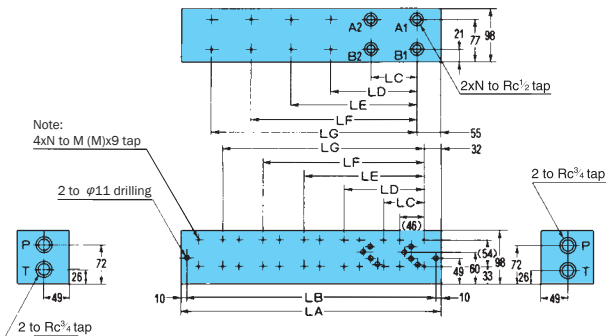
MBW Series (Double Ejection Multi Block)

01 size



Model No.	Dimensions (mm)									Weight kg
	LA	LB	LC	LD	LE	LF	LG	M	N	
MBW -1-10	110	86						2x2	1	5.7
-11-10	160	136	50					4x2	2	8.3
-111-10	210	186	50	100				6x2	3	10.9
-1111-10	260	236	50	100	150			8x2	4	13.4
-11111-10	310	286	50	100	150	200		10x2	5	16
-111111-10	360	336	50	100	150	200	250	12x2	6	18.6

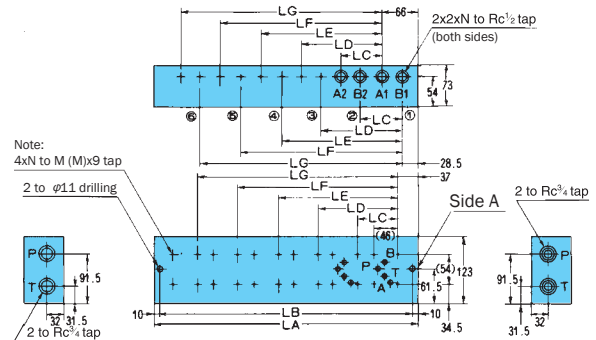
03 Size (01, 03 Connection Type)



Model No.	Dimensions (mm)									Weight kg
	LA	LB	LC	LD	LE	LF	LG	M ^{mm}	N	
MBS-3 -J10(10)	110	90						6(8)	1	8.2
-**-J10(10)	185	165	75					6(8)	2	13.8
-***-J10(10)	260	240	75	150				6(8)	3	19.4
-****-J10(10)	335	315	75	150	225			6(8)	4	25.0
-*****-J10(10)	410	390	75	150	225	300		6(8)	5	30.7
-*****-J10(10)	485	465	75	150	225	300	375	6(8)	6	36.3

- Note: 1. There are two types of mounting bolts available for the 03 size: M6 and M8. Be sure to specify the type of bolt you need.
M6 : SA, SS-J Series
M8 : SS Series
2. When using the 01/03 combination type
- The installation pitch uses the 03 size dimensions shown above, and for A and B ports only the 01 size installation part is Rc3/8.
 - In the case of MBS-313131-J10, for example, valve installation locations 1, 3, 5 counting from the right are 03 size, while 2, 4, 6 are 01 size.

03 Size (01, 03 Connection Type)



Model No.	Dimensions (mm)									Weight kg
	LA	LB	LC	LD	LE	LF	LG	M ^{mm}	N	
MBW -3-J10(10)	120	100						6(8)	1	8.4
-**-J10(10)	195	175	75					6(8)	2	13.6
-***-J10(10)	270	250	75	150				6(8)	3	18.9
-****-J10(10)	345	325	75	150	225			6(8)	4	24.1
-*****-J10(10)	420	400	75	150	225	300		6(8)	5	29.4
-*****-J10(10)	495	475	75	150	225	300	375	6(8)	6	34.6

- Note: 1. There are two types of mounting bolts available for the 03 size: M6 and M8. Be sure to specify the type of bolt you need.
M6 : SA, SS-J Series
M8 : SS Series
2. When using the 01/03 combination type
- The installation pitch uses the 03 size dimensions shown above, and for A and B ports only the 01 size installation part is Rc3/8.
 - In the case of MBS-313131-J10, for example, valve installation locations 1, 3, and 5 counting from the right are 03 size, while 2, 4, 6 are 01 size.



NSP Series Compact Variable Pump Unit

Compact hydraulic units are widely used as a power source in such machine tool applications as NC lathe check opening and closing, tool rotation, machining center spindle raise and lower operations, etc.

During pressure holding, NSP unit enables machine efficiency that delivers energy savings of approximately 40% when compared with standard Nachi units, all in a compact, lightweight hydraulic unit.

Features

Space-saving, lightweight design

A smaller tank capacity makes it easier for the unit to fit in, and greatly reduces space requirements.

New structure increases efficiency

A structure that draws on years of accumulated know-how includes an improved pump joint that provides more efficient operation.

Greatly improved cooling capacity

A powerful, energy-efficient built-in cooling system eliminates the need for fan motor wiring and coolant pipes.

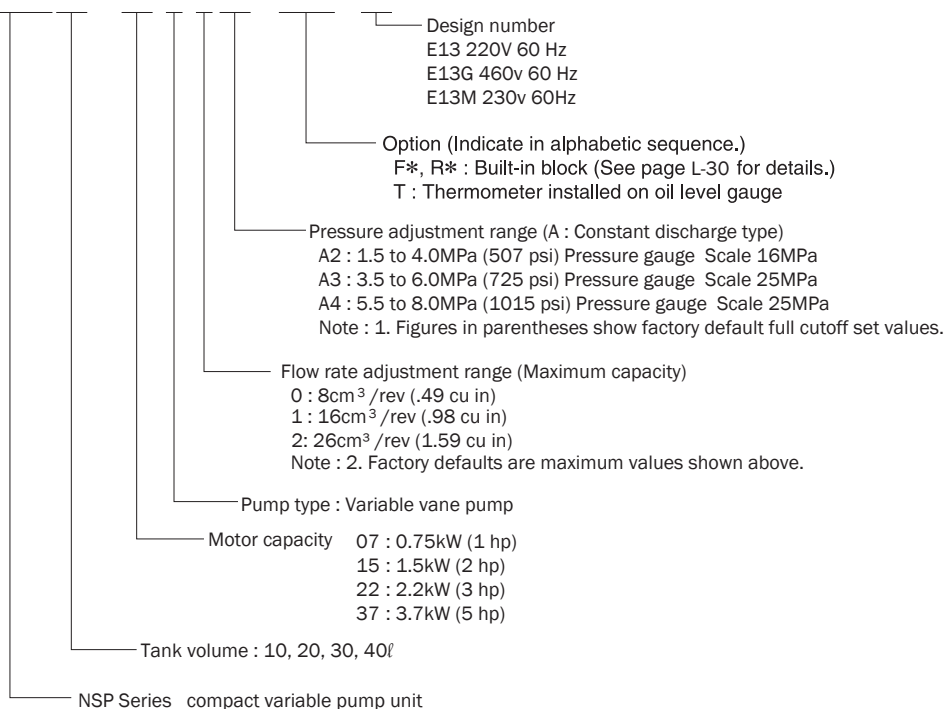
Specifications

Item	Model No.	NSP-*.VOA*	NSP-*.V1A*	NSP-*.V2A*
Pump Capacity	cm ³ /rev	8.0	16.0	26.0
Maximum Pressure	MPa (psi)	8.0 (1160 psi) (Full Cutoff Pressure)		7.0 (Full Cutoff Pressure) * Allowed peak pressure is 13.0
Motor Output	kW (hp)	0.75, 1.5 (1, 2)	1.5, 2.2 (2, 3)	2.2, 3.7 (3, 5)
Tank Capacity	ℓ	10, 20		30, 40
Installation Space	mm	300 × 400		340 × 450
Approximate Weight	kg	37 (10 ℓ, 1.5kW, excluding options)		63 (30 ℓ, 2.2kW, excluding options)
Pump Volume 60 Hz		3.8 gpm	7.6 gpm	12 gpm

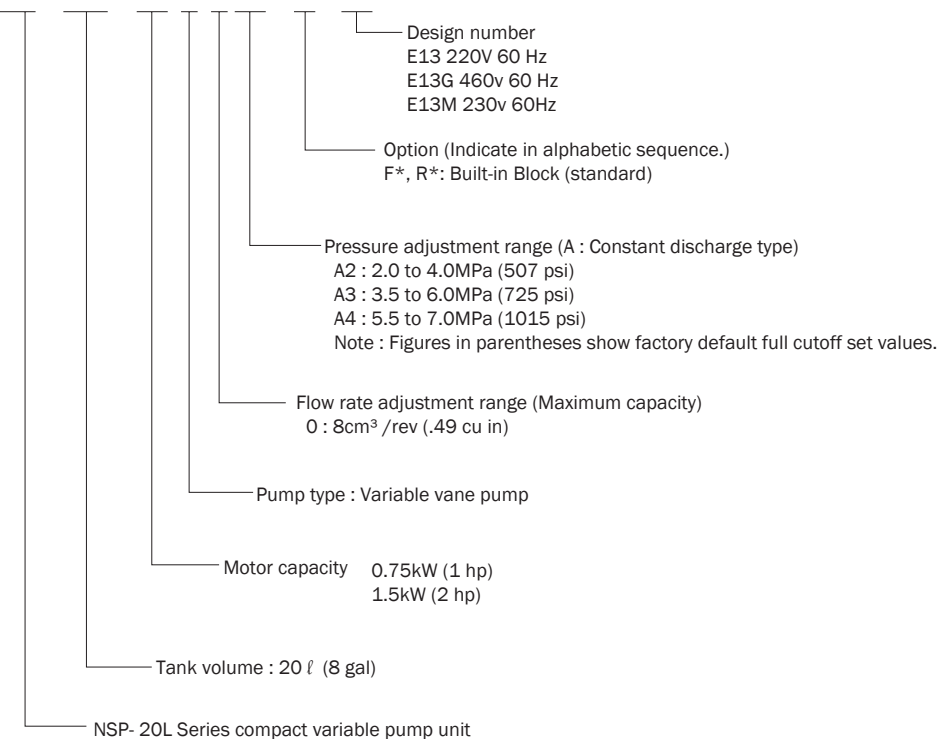
Understanding Model Numbers

- Note: 1. Note that there are certain restrictions on pump capacity and motor capacity combinations. See the Selection Precautions on page L-23 before selecting a model.
2. Design numbers are subject to change without notice.

NSP - 10 - 07 V 0 A2 - F2T - E13



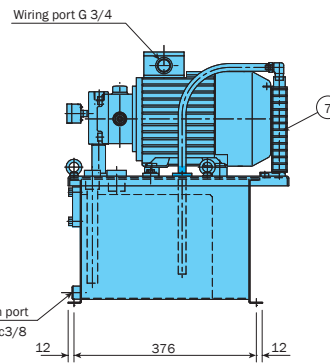
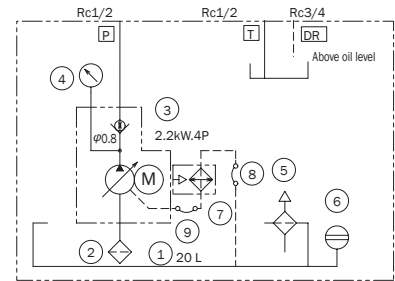
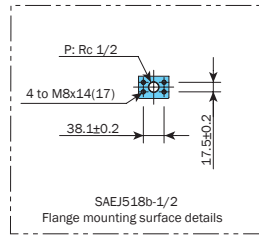
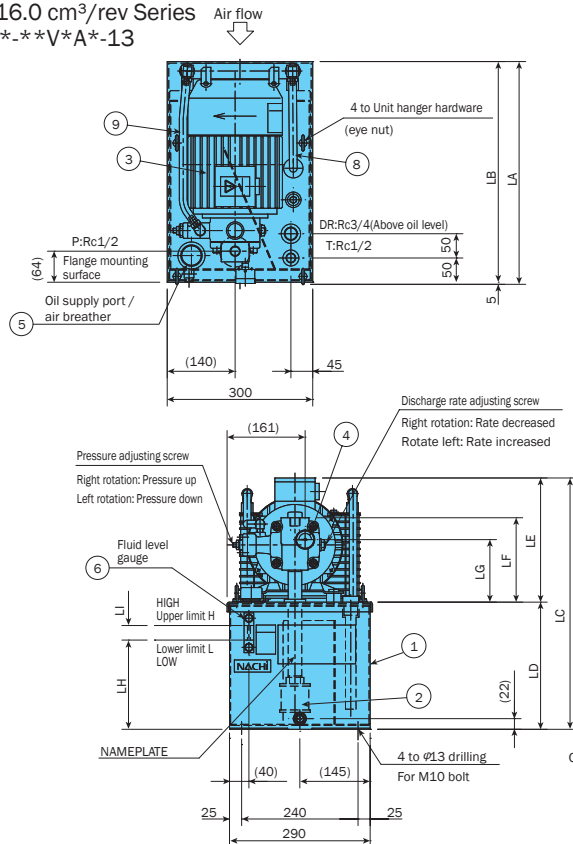
NSP - 20L - 07 V 0 A2 - F - 13



Design Drawings, Dimension Tables

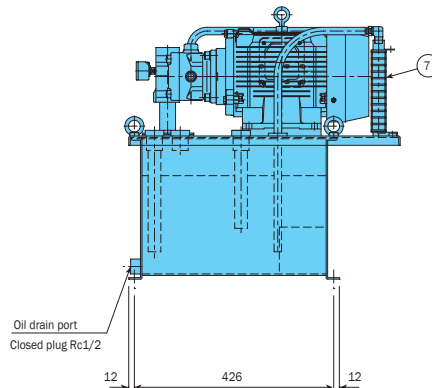
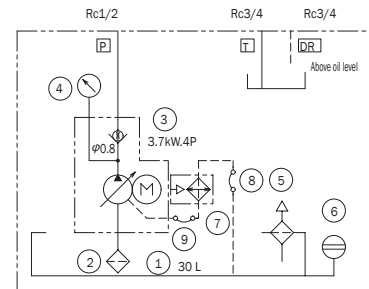
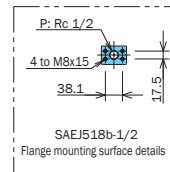
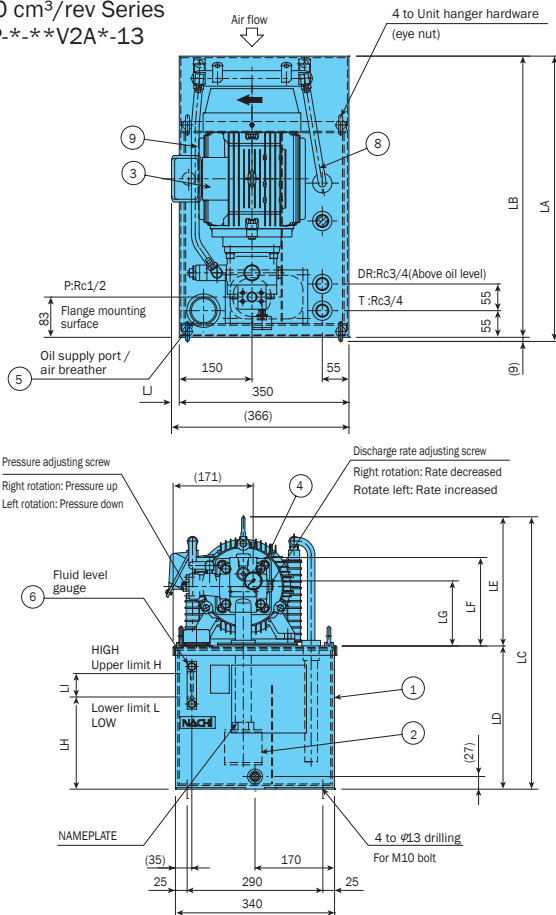
Note: See the following page for dimensions.

8.0, 16.0 cm³/rev Series
NSP-***V*A*-13



Part No.	Part Name
1	Oil tank
2	Suction strainer
3	Uni-pump
4	Pressure gauge
5	Fluid supply port/air breather
6	Fluid level gauge
7	Radiator
8	Flexible hose
9	Flexible hose

26.0 cm³/rev Series
NSP-***V2A*-13



Part No.	Part Name
1	Oil tank
2	Suction strainer
3	Uni-pump
4	Pressure gauge
5	Fluid supply port/air breather
6	Fluid level gauge
7	Radiator
8	Flexible hose
9	Flexible hose

8.0, 16.0cm³/rev Series

Model No.	Motor (kW-P)	Dimensions											Approximate Weight (kg)
		LA	LB	LC	LD	LE	LF	LG	LH	LI	H	L	
NSP-10-07V*A*-*-13	0.75 - 4	405	400	394	160	234	154	109	102	10	10L	9L	33
NSP-10-15V*A*-*-13	1.5 - 4	430	425	396		236	164	119					37
NSP-10-22V*A*-*-13	2.2 - 4	460	455	422		262	174	129					42
NSP-20-07V*A*-*-13	0.75 - 4	405	400	496	262	234	154	109	185	30	20L	17L	35
NSP-20-15V*A*-*-13	1.5 - 4	430	425	498		236	164	119					39
NSP-20-22V*A*-*-13	2.2 - 4	460	455	524		262	174	129					44

(Excluding operating fluid)

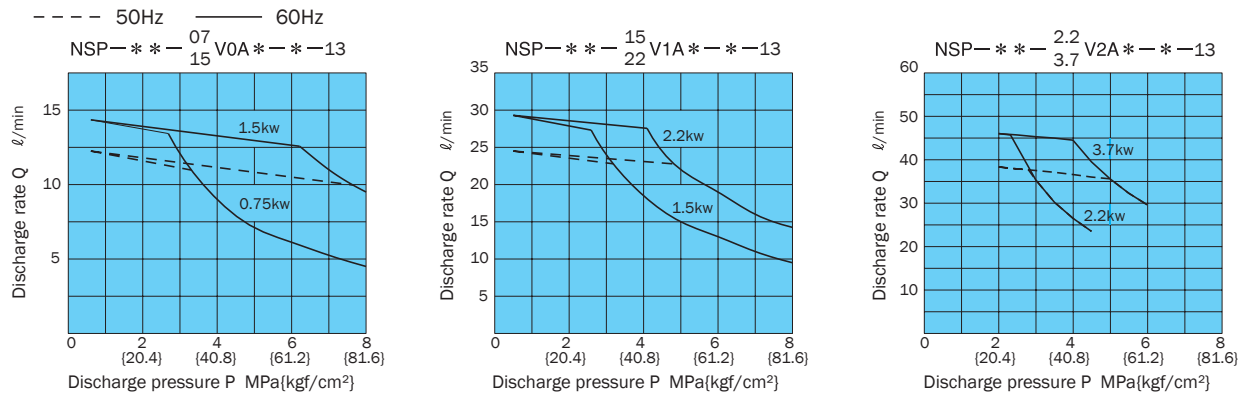
26.0cm³/rev Series

Model No.	Motor (kW-P)	Dimensions												Approximate Weight (kg)
		LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ	H	L	
NSP-30-22V2A*-*-13	2.2 - 4	564	555	619	306	234	177	127	197	50	9	30L	23L	63
NSP-30-37V2A*-*-13	3.7 - 4	589	580	661		276	189	139			15			73
NSP-40-22V2A*-*-13	2.2 - 4	564	555	619	385	234	177	127	256	70	9	40L	31L	67
NSP-40-37V2A*-*-13	3.7 - 4	589	580	661		276	189	139			15			77

(Excluding operating fluid)

Selecting a Motor

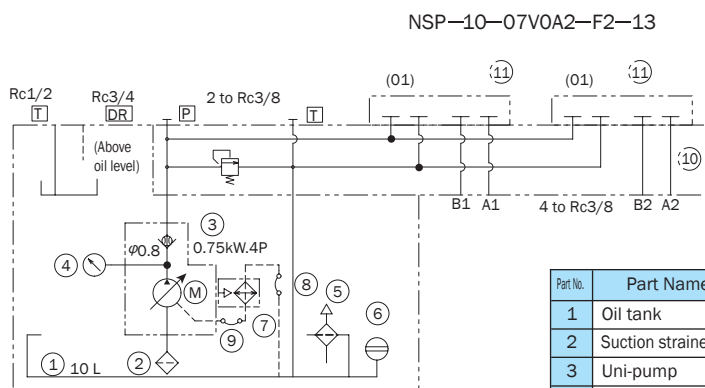
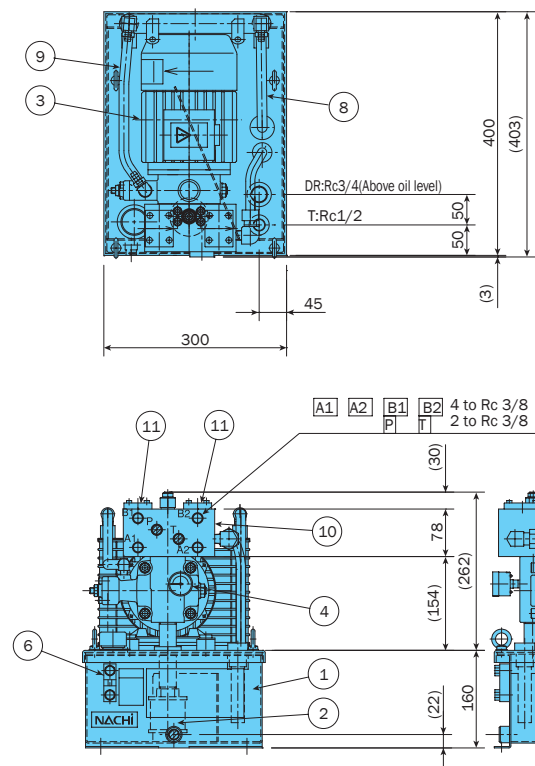
NSP Motor Selection Curves (Standard voltage for drive motor is 200 VAC, 50/60 Hz or 220 VAC, 60 Hz.)



* See page B-40 for the characteristics of the drive motor.

[Block Addition Example]

NSP-10-07V0 A2-F2-13

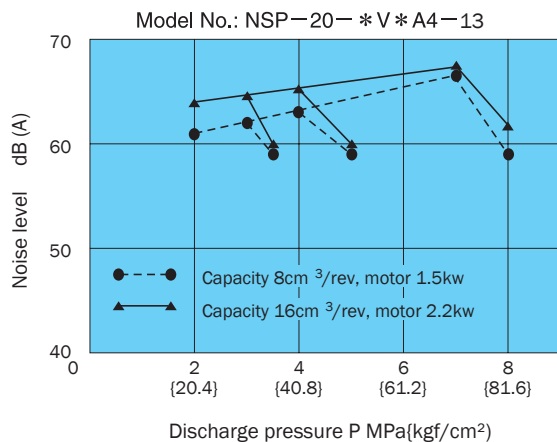


Part No.	Part Name
1	Oil tank
2	Suction strainer
3	Uni-pump
4	Pressure gauge
5	Fluid supply port/air breather
6	Fluid level gauge
7	Radiator
8	Flexible hose
9	Flexible hose
10	Base Blocks
11	End Plates

☆ : Part numbers 10 and 11 are options. Part number 11 is standard when a block is equipped.

Performance Characteristics

Noise Characteristics



Conditions

(The values shown in the graph to the left are typical characteristics under the following conditions.)

Operating Fluid: ISO VG32 equivalent

Fluid Temperature: 40±5°C

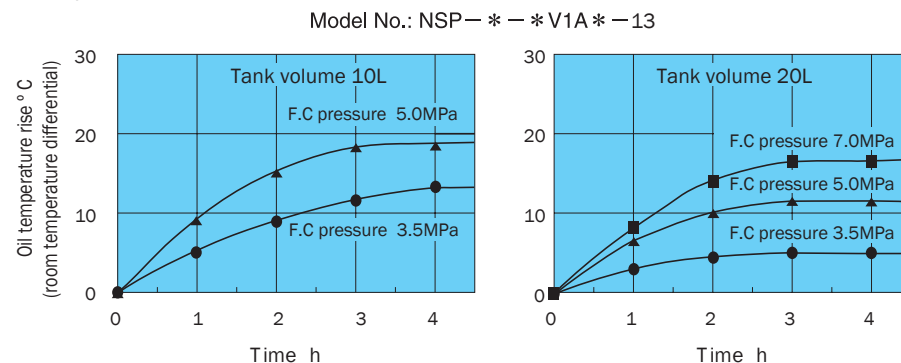
Revolution Speed: 1800min⁻¹

Measurement Distance:

1 meter around the unit
(Average value from four directions)

Note: Noise characteristics are affected by the condition of the floor and stand where the unit is mounted, whether there are noise reflective items nearby, and other factors. Such factors can produce different characteristics than those indicated above.

Fluid Temperature Characteristics



Note: For information about power consumption, see the data for the UVN Series variable vane uni-pump on page B-41.

Conditions

(The values shown in the graph to the left are typical characteristics under the following conditions.)

Operating Fluid: ISO VG32 equivalent

Revolution Speed: 1800min⁻¹

Room Temperature: 29 °C

Motor: 0.75 to 2.2kW

Note) 1. Note that continuous operation at pressures of 5.0MPa or greater with the 10 l tank cause a large rise in fluid temperature. A 20 l tank is recommended in this case.
2. Rises in fluid temperature depend on actual operating conditions, and so actual temperatures may be different from those indicated above.

Selection Precautions

• Model Combinations

The table below shows the standard pump and motor combinations.

Pump \ Motor kW	0.75	1.5	2.2	3.7
0A*	○	○	○	○
1A*		○	○	○
2A2			○	○
2A3			○	○
2A4				○

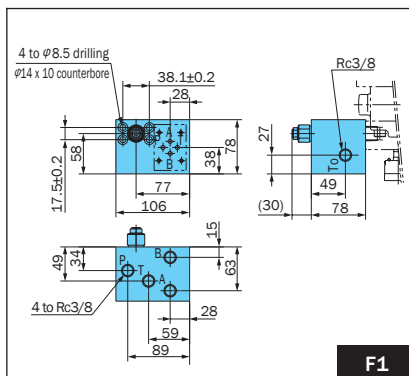
A 30ℓ tank capacities with 8.0 or 16.0 cm³/rev are special specifications.

A model equipped with a block comes with a stopper plate on the block.

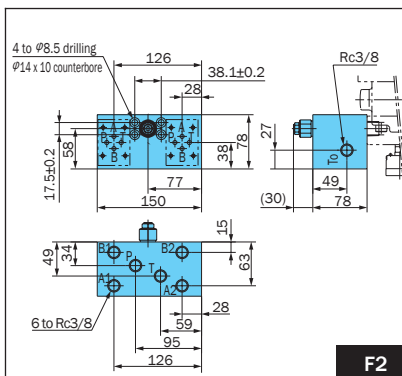
• Circuit Configuration

The basic configuration is a standard NSP-** plus an external manifold (circuit).

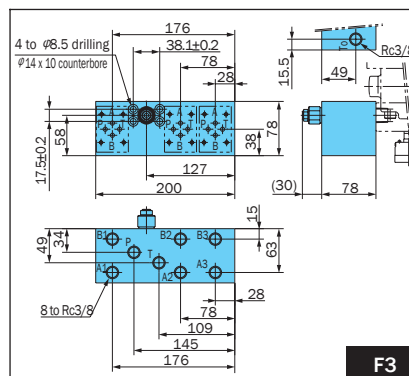
Option Details



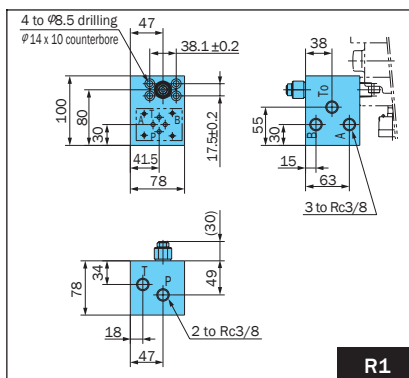
F1



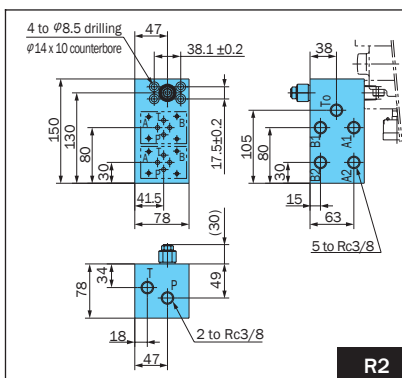
F2



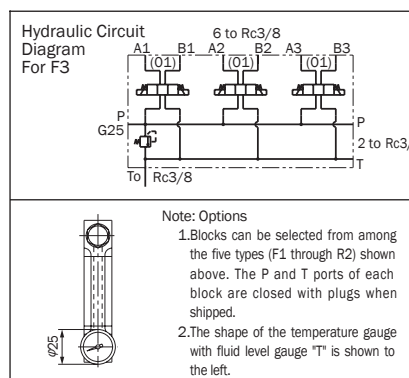
F3



R1



R2



Handling Overview

Startup Precautions

Check to make sure that the operating fluid in the tank is at the prescribed level.

- Upper Limit Mark (Yellow): Prescribed fluid level (nominal capacity)
- Lower Limit Mark (Red): Minimum fluid level

Hydraulic Operating Fluid: General oil-based operating fluid equivalent to ISO VG32

Perform electrical wiring exactly as shown below.

Motor and Power Supply Polarity	If wiring is performed incorrectly...
R → U	• Electric pump rotates in reverse, fluid is not discharged
S → V	Continued operation can damage the pump.
T → W	• Attach a pressure gauge to the discharge side and check for pressure rise.

Perform repeated motor starts and stops to bleed air from the interior of the pump and the suction piping. A no-load circuit allows faster bleeding.

Provide piping with sufficient flexibility between the unit and external manifold.

Make sure the maximum peak pressure (setting pressure + surge pressure) during operation does not exceed 14MPa.

The following are typical pipe conditions at a reference maximum peak pressure at 14MPa or less as reference.

Rubber hose (for 14MPa) 1/2" x 2m (Pipe Capacity: 250cm³) pump operating conditions: 1MPa→7MPa, full cutoff

At pressures in excess of 14MPa, equip a circuit side surge cutoff relief valve.

- Built-in Manifold Block

When a manifold block (optional) is built

into the pump, make sure the block and valve total weight is not greater than 15kg.

Block Type	F1R1	F2R2	F3
Block Weight (kg)	4.5	6.5	8.5
Allowable Additional Weight (kg)	10.5	8.5	6.5

Contact your agent for information about equipping a circuit.

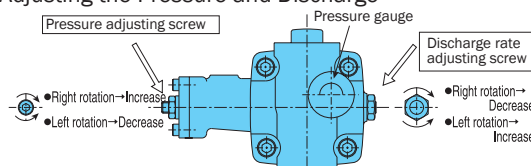
The 26 cm³/rev series blocks are different, contact us for information.

- Paint Specifications

The interior and exterior of the tank and the motor are covered with a melanin baked-on resin coating, while the pump is spray painted with a lacquer finish. Color is Nachi standard color (Mancel No. 5B6/3).

Contact your agent about specifying external paint colors.

- Adjusting the Pressure and Discharge



Note: Do not touch anything except the adjustment screw shown above.

- Maintenance and Inspection

Fluid Temperature: Use in an area where the temperature is 15° C to 60° C.

Operating Fluid Replacement Cycle: Perform the initial fluid replacement after three months of operation. After that, replace fluid when it becomes dirty or once a year, whichever comes first.

Radiator Fin Cleaning and Fin Strainer Cleaning: Every six months or 4,000 hours of operation, whichever comes first.

- Environment

Temperature: 10 to 35° C

Avoid areas exposed to mist of water-soluble coolant.



NSP-L Series Compact Variable Pump Unit

Compact hydraulic units are widely used as a power source in such machine tool applications as NC lathe check opening and closing, tool rotation, machining center spindle raise and lower operations, etc.

During pressure holding, NSP-L unit enables machine efficiency that delivers energy savings of approximately 40% when compared with standard Nachi units, all in a compact, lightweight hydraulic unit.

Features

Space-saving, lightweight design

A smaller tank capacity makes the power unit more compact, and greatly reduces space requirements.

New structure increases efficiency

Based on years of experience, the structure includes an improved pump joint that provides more efficient operation.

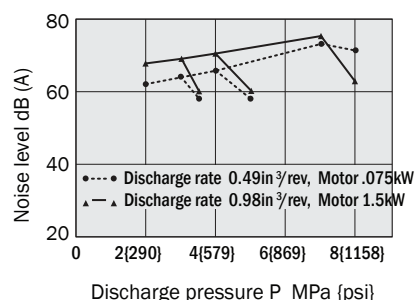
Greatly improved cooling capacity

A powerful, energy-efficient built-in cooling system eliminates the need for fan motor wiring and coolant pipes.

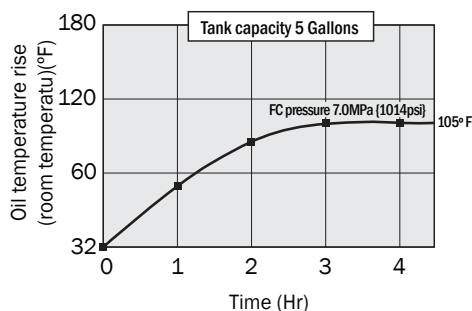
Specifications

Item	Model No.	NSP-*.VOA*	NSP-*.V1A*
Pump Capacity	cm ³ /rev	8.0	16.0
Maximum Pressure	MPa (psi)	8.0 (1160 psi) (Full Cutoff Pressure)	
Motor Output	kW (hp)	0.75, 1.5 (1, 2)	1.5, 2.2 (2, 3)
Tank Capacity	ℓ	20	
Installation Space	mm	300 × 400	
Approximate Weight	kg	39 (20 ℓ, 1.5kW, excluding options)	
Pump Volume 60 Hz		3.8 gpm	7.6 gpm

Noise Characteristics



Oil Temperature Characteristics



Conditions

The value on the left-hand drawing represents typical characteristics under the following conditions:
Oil used: ISO VG32 or its equivalent
Speed: 1800 min-1
Room temperature: 65°F
Motor: 0.75~1.5kW

Understanding Model Numbers

NSP - 20L - 07 V 0 A2 - F - 13

Design number

E13 220 Volt 60 Hz
E13G 460 Volt 60 Hz
E13M 230 Volt 60 Hz

Option (Indicate in alphabetic sequence.) F*: Built-in block*=1~2 Temp gauge standard

Pressure adjustment range (A: constant discharge type)

A2: 2.0 to 4.0 MPa (507 psi)
A3: 3.5 to 6.0 MPa (725 psi)
A4: 5.5 to 7.0 MPa (1015 psi)

Note: 1. Figures in parentheses show factory default full cutoff set values.

Flow rate adjustment range (Maximum capacity) 0: 8 cm³ / rev (.49 cu in)
1: 16 cm³ / rev (.98 cu in)

Pump type: Variable vane pump

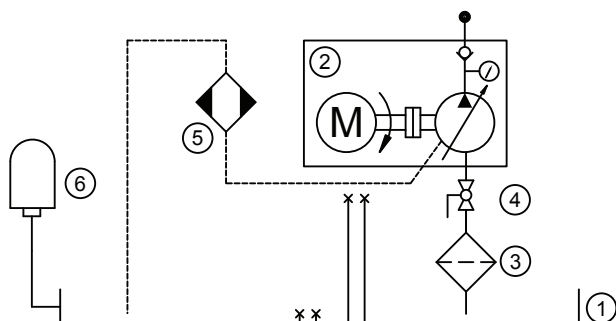
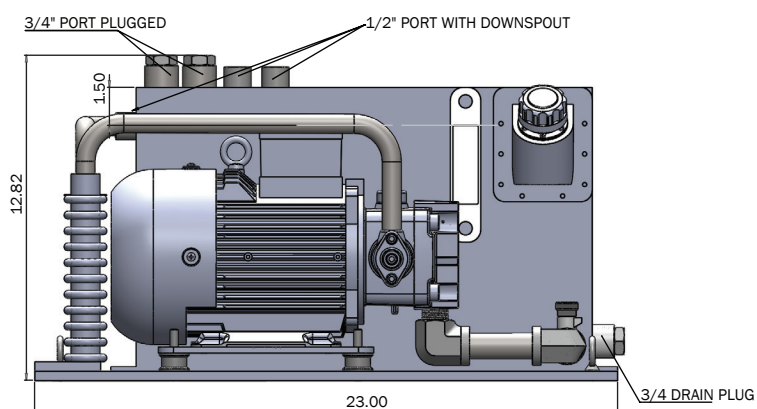
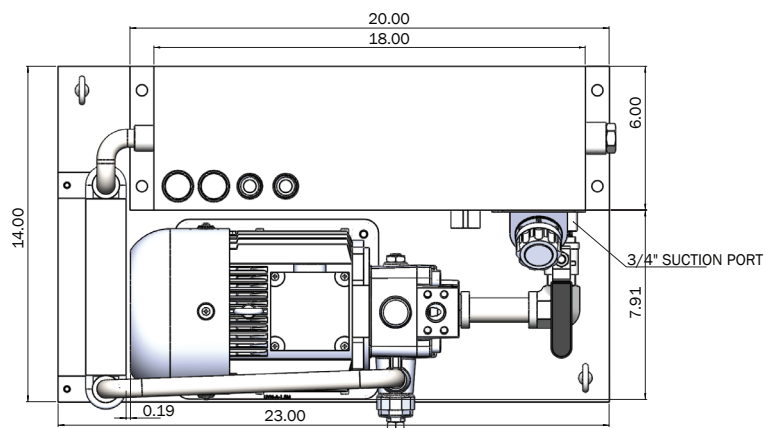
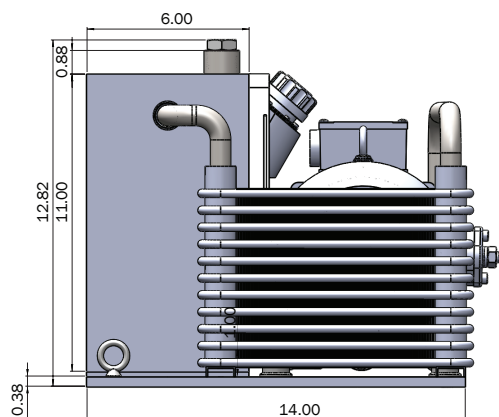
Motor capacity: 0.75 kW (1 HP)
1.5 kW (2 HP)

Tank volume: 20 ℓ (5 gal)

NSP-20L Series compact variable pump unit

Design Drawings & Dimensions

8.0, 16.0 cm³ / rev Series
NSP-20L-**V*A*-13



NSP-20L-07V0A*-(*)-E13

NSP-20L-15V0A*-(*)-E13

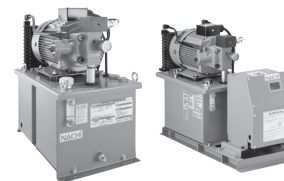
NSP-20L-15V1A*-(*)-E13

() 220V 60 Hz

(G) 460V 60 Hz

(M) 230V 60 Hz

PART NO.	PART NAME
1	NL-4 L Shape Reservoir
2	UVN-1A-1A4-1.5-4-11 Pump Motor
3	SUS-A088-068-N16F Strainer
4	948-173 3/4" Ball Valve
5	3A92-001-1050 Cooler
6	SM57XL-10 Filler/Breather



Inverter Drive NSP Series Energy-saving Variable Pump Unit with Inverter Drive

The "Inverter Drive NSP Series" is a hydraulic unit that reduces energy consumption by approximately 60% (dwelling, in-house comparison) compared to the standard unit by adding an energy saving NSP Series inverter drive. They are great for jobs that need to dwell for long periods.

Features

Hydraulic fluid temperature is kept at room temperature +1.5°C

The NSP series benefits your entire system by lowering oil temperature to improve machining accuracy, lengthen the life of seals and hydraulic fluid, and reduce factory air conditioning costs.

NSP-20E-22V1A4-13

6.0MPa maintained while dwelling

Quiet operation at only 53dB (A)

NSP-20E-22V1A4-13

6.0MPa dwelling

4-directional average

Standard unit sound level is 64dB (A)

Easy Operation

Starts up as soon as the power is turned on

Absolutely no external commands or delicate electrical adjustments needed because the pump's RPMs are controlled automatically in response to the load.

Operates with the inverter removed also

Can operate as an NSP unit just by switching out the wiring in case of emergencies.

Production lines continue running even if there is trouble with the inverter because it is based on our reliable NSP unit and keeps running as a regular NSP unit.

Inverter drive function can be installed separately later

If you are already using an NSP unit, you can add the inverter drive function by installing the inverter control box kit, which is sold separately.

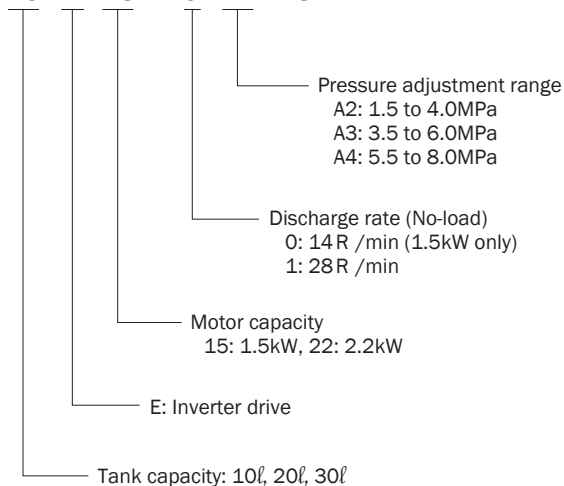
Specifications

1. Power Supply Rated Input Current	3φAC200 to 220V, 50/60Hz 9.7A/1.5kW, 13.4A/2.2kW 22.4A/3.7kW	
2. Pressure Adjustment Range	8, 16cm ³ /rev series A2: 1.5 to 4.0MPa A3: 3.5 to 6.0MPa A4: 5.5 to 8.0MPa	26cm ³ /rev series A2: 2.0 to 4.0MPa A3: 3.5 to 6.0MPa A4: 5.5 to 7.0MPa
3. Output Flow (at No-load)	0A*: 14ℓ /min, 1A*: 28ℓ /min 2A*: 46ℓ /min	
4. Hydraulic Fluid	Standard mineral-based hydraulic fluid (equivalent to ISO VG32)	
5. Hydraulic Fluid Temperature	10 to 60:	
6. Color of Paint	Munsell number 5B 6/3 (NACHI color)	
7. Ambient Temperature/ Humidity	0 to 35 / 20 to 85%RH (non-condensation) (Keep the unit away from water-soluble cutting fluid mist.)	

Understanding Model Numbers

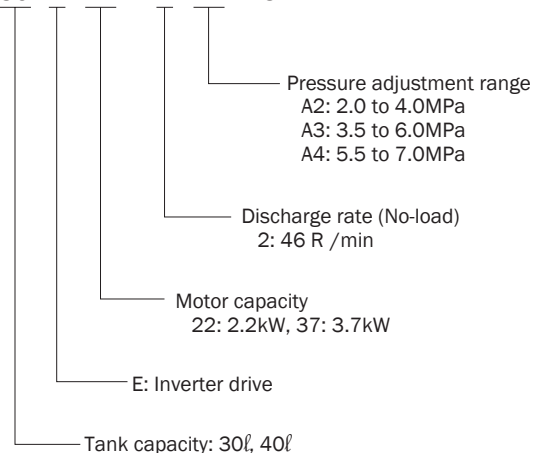
8.0, 16.0 cm³/rev Series

NSP - 20 - E - 15 V - 0 - A2 - 13



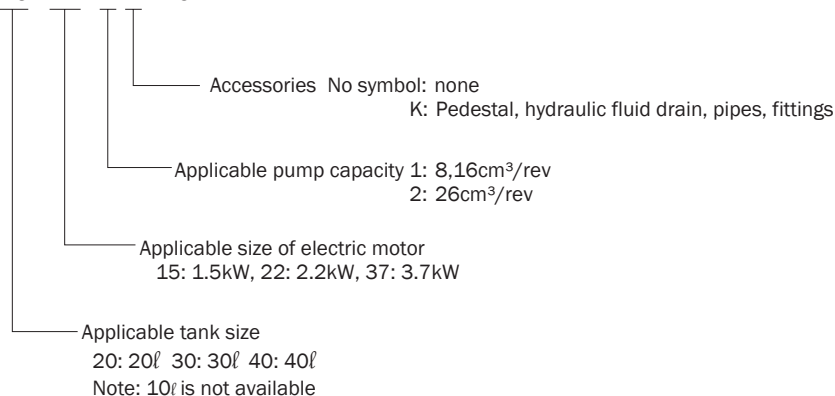
26.0 cm³/rev Series

NSP - 30 - E - 22 V - 2 - A2 - 13



Inverter Control Box Kit Specifications

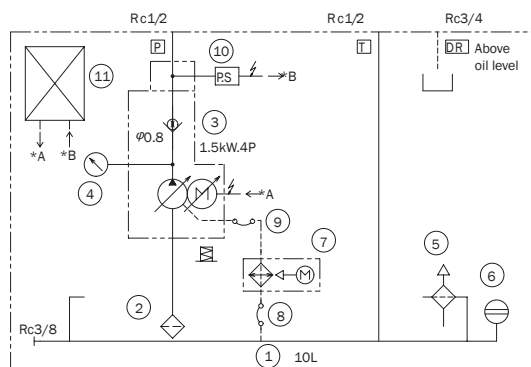
EBK - 20 - 22 - 1 K - 10



Hydraulic Unit

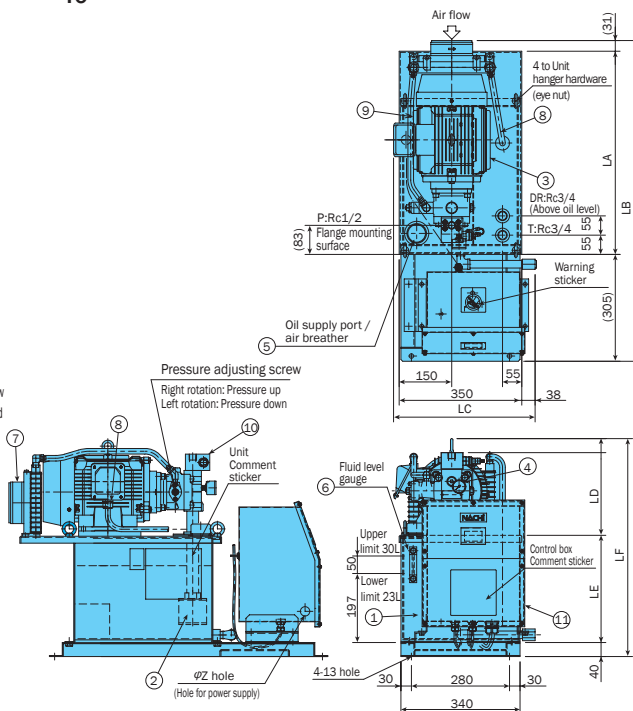
L 36

26.0cm³/rev Series
NSP- 30
40 E-**V2A*-13



Part No.	Part Name	Part No.	Part Name
1	Oil tank	7	Fan cooler
2	Suction strainer	8	Flexible hose
3	Uni-pump	9	Flexible hose
4	Pressure gauge	10	Pressure sensor
5	Fluid supply port/air breather	11	Inverter control box
6	Fluid level gauge		

26.0cm³/rev Series
NSP- 30
40 E-**V2A*-13



8.0, 16.0cm³/rev Series

Model No.	Dimensions					Approximate Weight (kg)
	LA	LB	LC	LD	LE	
NSP-10E-15V*A*-13	465	491	211	503	-	51
NSP-10E-22V1A*-13	485	521	221	523	-	56
NSP-20E-15V*A*-13	425	750	211	262	545	65
NSP-20E-22V1A*-13	455	780	221		564	71
NSP-30E-15V*A*-13	425	750	211	364	647	70
NSP-30E-22V1A*-13	455	780	221		666	76

26.0cm³/rev Series

Model No.	Dimensions							Approximate Weight (kg)
	LA	LB	LC	LD	LE	LF	Z	
NSP-30E-22V2A*-13	555	895	409	229	306	582	21	84
NSP-30E-37V2A*-13	580	915	415	241			27	96
NSP-40E-22V2A*-13	555	895	409	229	385	661	21	89
NSP-40E-37V2A*-13	580	915	415	241			27	101

Precautions

- Turning the inverter on and off by cutting the main power supply (circuit breaker) significantly reduces the life of the inverter and should be limited to once an hour.
Contact us if you need to start and stop operations frequently.
- Do not change or adjust any switches except the inverter parameter settings and the pressure setting switches.
- Use a flexible hose with a 1/2 inch inner diameter that is 2 meters long and is rated for maximum pressure of 14MPa to connect the hydraulic unit's P port (output port) and the external manifold (or actuator).
- Maximum peak pressure (set pressure + surge pressure) must be 14MPa or below for the 8 and 16cm³/rev series, and 13MPa or below for the 26cm³/rev series.
Install a relief valve to cut surges in the circuit if the maximum peak pressure exceeds these figures.

[For 10ℓ tanks]

- Leakage amount in the hydraulic circuits must be 1ℓ/min or less. Contact us if leakage in the hydraulic circuit exceeds 1ℓ/min.
- Level of hydraulic fluid in the tank must stay within the visible range on the fluid level meter (approximately 1.5ℓ).



NACHI NN Pack High-Pressure Standard Variable Pump Unit

Newly developed compact variable pump unit has environmentally friendly low hydraulic fluid temperature for cutting and manufacturing equipment hydraulic units. Extensive lineup in the series to handle requirements exactly.

Features

Low hydraulic fluid temperature = room temperature + 7 °C

NNP-20-22P16N1-20
60Hz, 7MPa Full cut-off in
continuous operation

Fan to cool pump drain is standard equipment, hydraulic fluid temperatures are kept low using tank construction focused on anti-foaming.

A wide selection of models from which to choose

Basic Series: 10 types
Pump Variable Controllers: 5 types
Options: 8 types

A wide range of models provides a selection of capacity levels, and selecting a variable control mechanism helps to reduce energy needs.

Specifications

Power supply: AC200V-50/60Hz AC220V-60Hz

Model No.	Pump Capacity cm ³ /rev	Motor capacity kW-P	Maximum Pressure (Full Cutoff Pressure) MPa(kgf/cm ²)	Tank Capacity ℓ	Fan Cooler Motor Input W(at50/60Hz)	Standard Weight kg (Note)
NNP-20-22P8N***-20	8.0	2.2 - 4	21(214)	20	16/15W Single-phase	65
NNP-20-37P8N***-20		3.7 - 4		20		75
NNP-20-22P16N***-20	16.5	2.2 - 4	21(214)	20		70
NNP-30-37P16N***-20		3.7 - 4		30		80
NNP-20-22P22N***-20	22.0	2.2 - 4	14(143)	20	33/30W Single-phase	70
NNP-30-37P22N***-20		3.7 - 4		30		80
NNP-40-37P35N***-20	35.0	3.7 - 4	21(214)	40		105
NNP-60-55P35N***-20		5.5 - 4		60		125
NNP-80-37P45N***-20	45.0	3.7 - 4	14(143)	80		120
NNP-80-55P45N***-20		5.5 - 4		80		130

Note: Operating fluid is not included in options

Understanding Model Numbers

NNP - 20 - 22 P 16 N2 - * - 20**

Design number

Option (Table 1)

Pressure adjustment range
(N: Pressure compensation type)

N0 : 2.0 to 3.5MPa

N1 : 2.0 to 7.0MPa

N2 : 3.0 to 14.0MPa

N3 : 3.0 to 21.0MPa

Note: N3 is not available
for flow rate adjustment
ranges 22 and 45

Flow rate adjustment range (Maximum capacity)

8 : 8cm³/rev 35 : 35cm³/rev

16 : 16.5cm³/rev 45 : 45cm³/rev

22 : 22cm³/rev

Pump type: Variable piston pump

Motor capacity: 22: 2.2kW; 37: 3.7kW; 55: 5.5kW

Tank volume: 20, 30, 40, 60, 80ℓ

NACHI NN pack

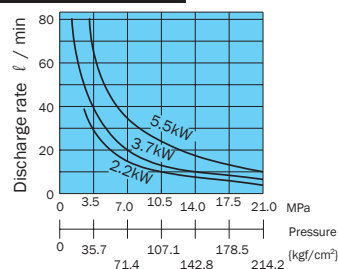
Table 1: Option Symbols (Specify in alphabetic sequence.)

Symbol	Description
F*	F*Type block (See block specifications.)
R*	R*Type block (See block specifications.)
G	Fluid level gauge guard
H	Temperature switch (Contact on at fluid temperature of 65 °C)
M	Microseparator
P	Bottom oil pan
S	Float switch (Contact on at fluid low limit level)
T	Fluid level gauge with temperature gauge (with guard)
W	Self Leak Test

Note: Return filter and fan cooler are equipped as standard.

Selecting a Motor

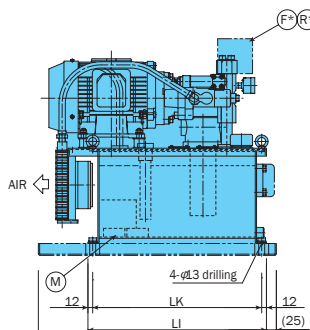
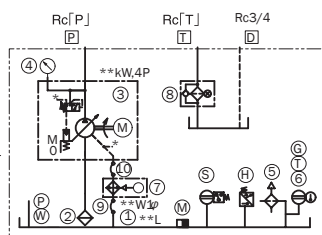
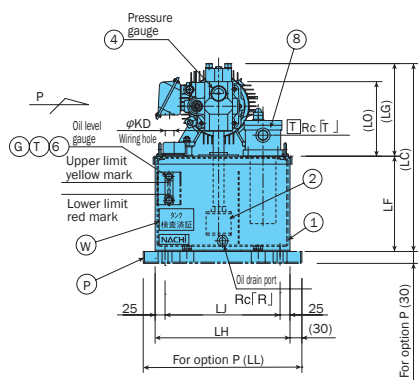
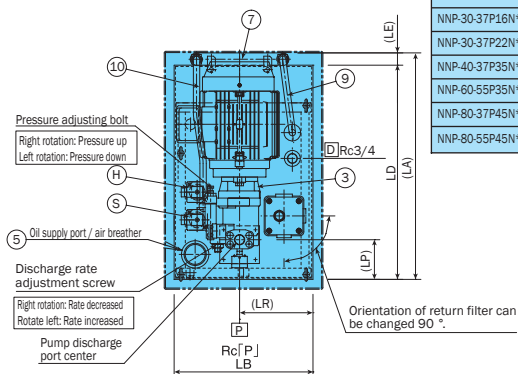
The lower sides of the curves for each of the motors shown in the graph, indicate the operating range under rated output for that motor.



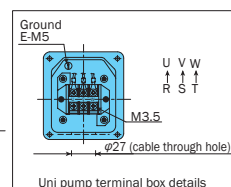
Tank Capacity and Motor/Pump Combinations

	Motor capacity (kW-P)	2.2 – 4			3.7 – 4					5.5 – 4	
	Pump Capacity (cm³/rev)	8	16	22	8	16	22	35	45	35	45
Tank Capacity (ℓ)	20ℓ	○	○	○	○						
	30ℓ					○	○				
	40ℓ							○			
	60ℓ									○	
	80ℓ								○		○

Design Drawings, Dimension Tables

[illegible]

Auxiliary View P



Uni pump terminal box details

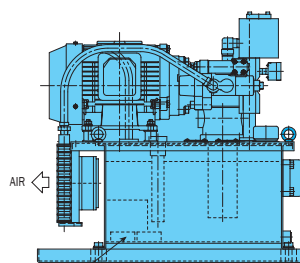
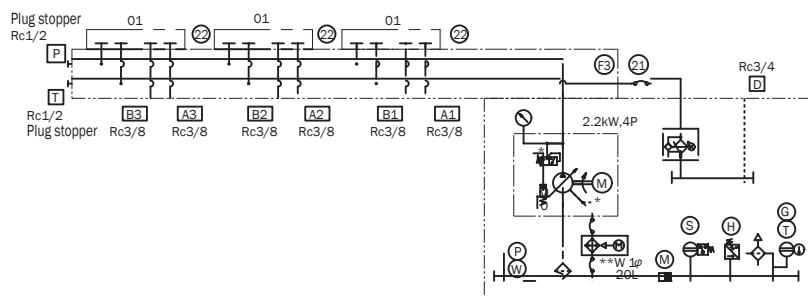
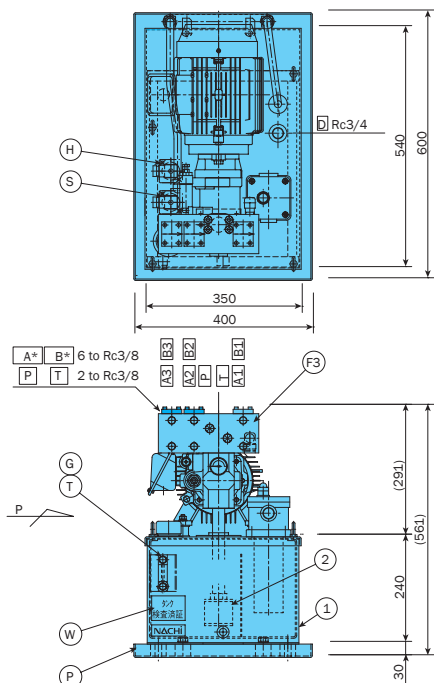
Part No.	Part Name
1	Fluid tank
2	Suction strainer
3	Uni-pump
4	Pressure gauge
5	Fluid supply port/air breather
6	Fluid level gauge
7	Fan cooler
8	Return filter
9	Flexible hose
10	Flexible hose

Options

Part No.	Part Name
F*	Built-in block (F Type)
R*	Built-in block (R Type)
G	Fluid level gauge with guard
H	Temperature switch
M	Microseparator
P	Bottom oil pan
S	Float switch
T	Fluid level gauge with temperature gauge (with guard)
W	Self leak test

Option Installation Example

Model No. : NNP-20-22P16N2-F3HMPSTW-20



Auxiliary View P

Symbol	Name
11	Flexible hose
12	End Plates

Note: Part numbers 11 and 12 are standard with a built-in block.

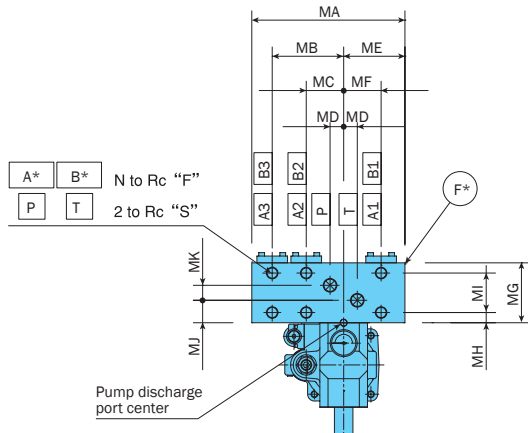
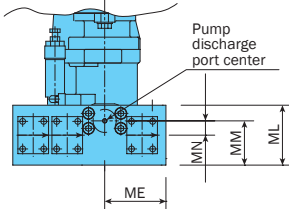
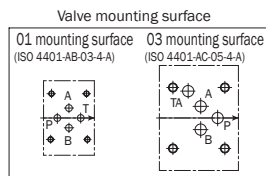
F* and R* Block Specifications

Note: Note that there are certain restrictions on block-equipped combinations. See the Selection Precautions on page L-32.

Options F1, F2, F3, F6

Symbol	Description	Model No.	
		Tank Capacity 20, 30 l	Tank Capacity 40, 60, 80 l
F1	F1 Type Block (01 x 1)	F1-1A	F1-2A
F2	F2 Type Block (01 x 2)	F2-1A	F2-2A
F3	F3 Type Block (01 x 3)	F3-1A	F3-2A
F6	F6 Type Block (03 x 1 - M6)	F6-1A-M6 (Standard M6)	F6-2A-M6 (Standard M6)

Tank Capacity	Options	Dimensions																
		MA	MB	MC	MD	ME	MF	MG	MH	MI	MJ	MK	ML	MM	MN	N	F	S
20r	F1	133	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
	F2	175	-	-	20	90	55	88	15	58	33	22	88	65	21	4	3/8	1/2
	F3	225	105	55	-	-	-	-	-	-	-	-	-	-	-	6	-	-
30r	F6	152	-	-	25	102	67	103	18	67	39	25	103	80	26	2	1/2	3/4
	F1	143	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
	F2	183	-	-	20	96	58	88	15	58	33	22	98	68	24	4	3/8	1/2
40r	F3	233	108	58	-	-	-	-	-	-	-	-	-	-	-	6	-	-
	F6	155	-	-	25	105	70	103	18	67	39	25	103	73	-	2	1/2	3/4
	F1	143	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
60r	F2	183	-	-	20	96	58	88	15	58	33	22	98	68	24	4	3/8	1/2
	F3	233	108	58	-	-	-	-	-	-	-	-	-	-	-	6	-	-
	F6	155	-	-	25	105	70	103	18	67	39	25	103	73	-	2	1/2	3/4
80r	F1	143	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
	F2	183	-	-	20	96	58	88	15	58	33	22	98	68	24	4	3/8	1/2
	F3	233	108	58	-	-	-	-	-	-	-	-	-	-	-	6	-	-
80r	F6	155	-	-	25	105	70	103	18	67	39	25	103	73	-	2	1/2	3/4
	F1	143	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
	F2	183	-	-	20	96	58	88	15	58	33	22	98	68	24	4	3/8	1/2
	F3	233	108	58	-	-	-	-	-	-	-	-	-	-	-	6	-	-
	F6	155	-	-	25	105	70	103	18	67	39	25	103	73	-	2	1/2	3/4

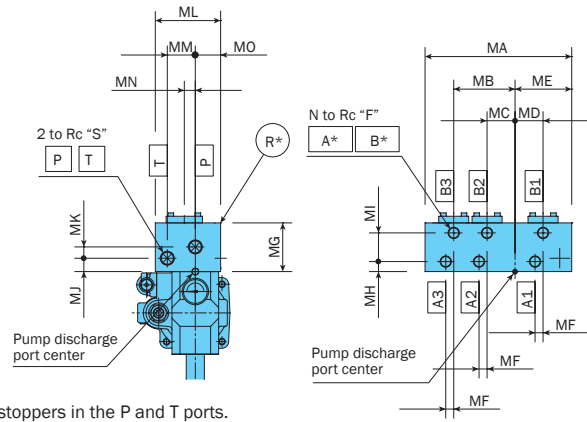
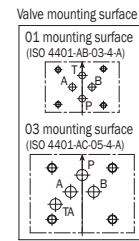
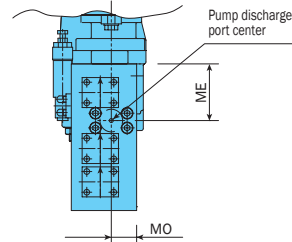


Note: Each block is shipped with plug stoppers in the P and T ports.

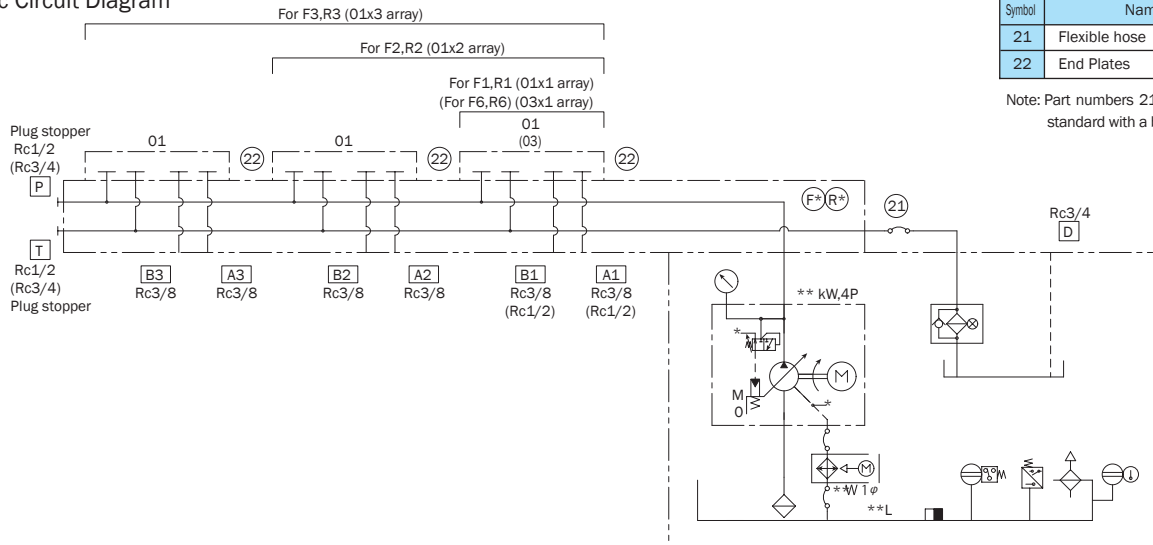
Options R1, R2, R3, R6

Symbol	Description	Model No.	
		Tank Capacity 20, 30 l	Tank Capacity 40, 60, 80 l
R1	R1 Type Block (01 x 1)	R1-1A	R1-2A
R2	R2 Type Block (01 x 2)	R2-1A	R2-2A
R3	R3 Type Block (01 x 3)	R3-1A	R3-2A
R6	R6 Type Block (03 x 1 - M6)	R6-1A-M6 (Standard M6)	R6-2A-M6 (Standard M6)

Tank Capacity	Options	Dimensions																
		MA	MB	MC	MD	ME	MF	MG	MH	MI	MJ	MK	ML	MM	MN	MO	N	F
20r	R1	123	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
	R2	170	-	-	42	85	12	73	15	43	20	17	98	42	16.5	38	4	3/8
	R3	220	92	42	-	-	-	-	-	-	-	-	-	-	-	-	6	1/2
30r	R6	160	-	-	54	119	0	98	18	62	49	0	108	47	9	-	2	1/2
	R1	132	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
	R2	180	-	-	45	92	13	73	15	43	23	14	103	45	16.5	40	4	3/8
40r	R3	230	95	45	-	-	-	-	-	-	-	-	-	-	-	-	6	1/2
	R6	167	-	-	57	122	0	98	18	62	49	0	110	47	9	-	2	1/2
	R1	132	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
60r	R2	180	-	-	45	92	13	73	15	43	23	14	103	45	16.5	40	4	3/8
	R3	230	95	45	-	-	-	-	-	-	-	-	-	-	-	-	6	1/2
	R6	167	-	-	57	122	0	98	18	62	49	0	110	47	9	-	2	1/2
80r	R1	132	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
	R2	180	-	-	45	92	13	73	15	43	23	14	103	45	16.5	40	4	3/8
	R3	230	95	45	-	-	-	-	-	-	-	-	-	-	-	-	6	1/2
80r	R6	167	-	-	57	122	0	98	18	62	49	0	110	47	9	-	2	1/2
	R1	132	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
	R2	180	-	-	45	92	13	73	15	43	23	14	103	45	16.5	40	4	3/8
	R3	230	95	45	-	-	-	-	-	-	-	-	-	-	-	-	6	1/2
	R6	167	-	-	57	122	0	98	18	62	49	0	110	47	9	-	2	1/2



Hydraulic Circuit Diagram



Symbol	Name
21	Flexible hose
22	End Plates

Note: Part numbers 21 and 22 are standard with a built-in block.

Typical Performance Characteristics

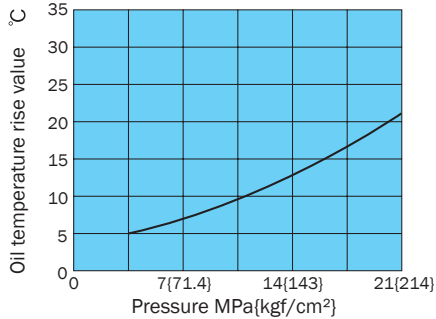
Fluid Temperature Rise Characteristics - Full Cutoff

These graphs show fluid temperature rise during continuous operation.

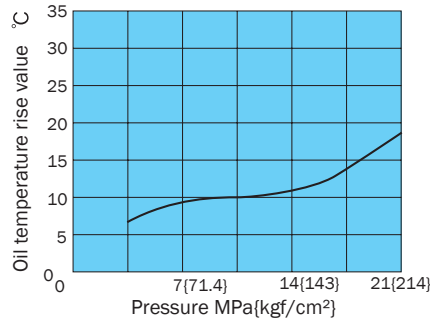
- Tank Fluid Pressure = Room Temperature + Fluid Temperature Rise Value
- Operating Fluid: ISO VG32 equivalent
- Revolution Speed: 1800min⁻¹ (60Hz)

Note: The fluid temperature rise value depends on actual operating conditions, and so actual temperatures may be different from those indicated above.

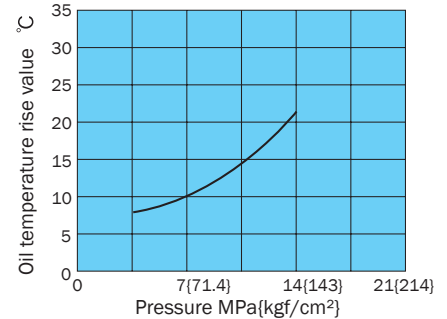
NNP-20-22P16N*-10



NNP-60-55P35N*-10



NNP-30-37P22N*-10



Noise Characteristics - Measurement Position

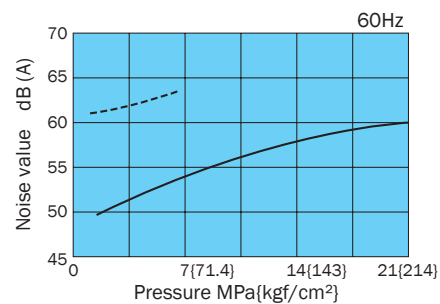
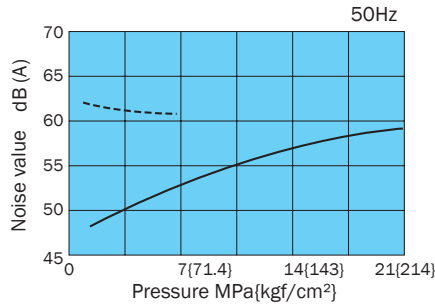
These graphs show noise values at locations one meter in front of and behind the pump.

- ISO VG32 equivalent
- Fluid Temperature: 40±5°C

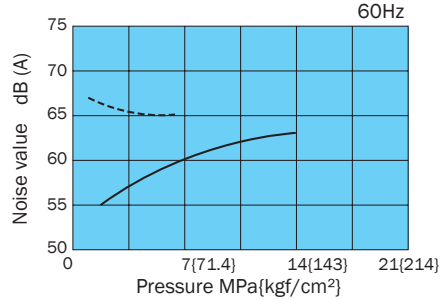
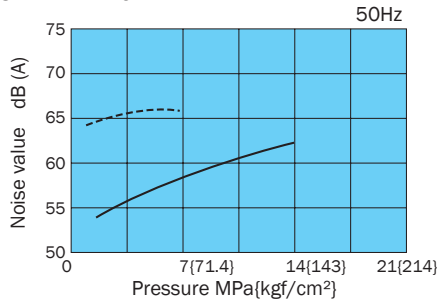
Note: Noise characteristics are affected by the condition of the floor and stand where the unit is mounted, whether there are noise reflective items nearby, and other factors. Such factors can produce different characteristics than those indicated below.

----- Full flow
—— Full cutoff

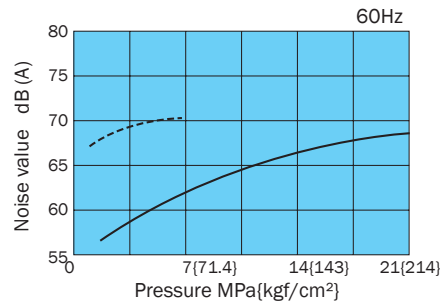
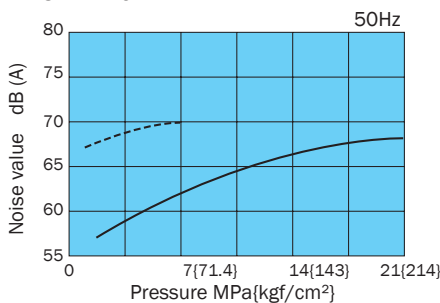
NNP-20-22P16N*-10



NNP-30-37P22N*-10



NNP-60-55P35N*-10



Selection Precautions

- **Standard Accessories**
A return filter with visual clogging inspection tool, and a fan cooler are equipped as standard.
- **Options**
Options F* and R* cannot be selected for inclusion with an 8N* pump (NNP-**-*P8N* Type).
For optional F* and R* blocks, up to three blocks can be specified for O1 size, and only one block can be specified for O3 size. Note, however, that the total weight of blocks and valves should not exceed 20kg.

• Tank Capacity 20ℓ, 30ℓ

Block Type	F1	F2	F3	F6	R1	R2	R3	R6
Block Weight (kg)	7.5	9.5	12.5	11.5	6.5	8.5	11.0	12.0
Allowable Additional Weight (kg)	12.5	10.5	7.5	8.5	13.5	11.5	9.0	8.0

• Tank Capacity 40ℓ, 60ℓ, 80ℓ

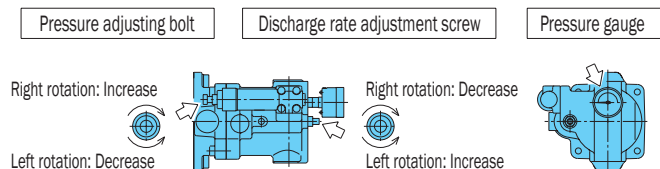
Block Type	F1	F2	F3	F6	R1	R2	R3	R6
Block Weight (kg)	8.5	11.0	14.0	11.5	7.0	9.5	12.0	12.5
Allowable Additional Weight (kg)	11.5	9.0	6.0	8.5	13.0	10.5	8.0	7.5

Note: M6 is the standard mounting tap for O3 size.

Handling Overview

- **Hydraulic Operating Fluid**
Use general oil-based operating fluid equivalent to viscosity grade ISO VG32 or 46. Just contact us regarding options to petroleum based hydraulic operating fluid. The following is the viscosity grade and operating pressure.
 • Up to 7.0MPa: ISO VG32
 • 7.0MPa or higher: ISO VG46
 Keep the moisture content of the operating fluid below 0.1% vol. Excessive moisture in the fluid creates the risk of short-circuiting and current leakage.
 Contaminated operating fluid can lead to malfunction and shortened pump life. Manage operating fluid so that contamination is maintained at class NAS10 or lower.
- **Startup Precautions**
Before starting the pump, inch the electric drive to make sure there is hydraulic fluid being sucked up.
Check to make sure that the operating fluid in the tank is at the prescribed level.
 • Upper Limit Mark (Yellow): Prescribed fluid level (nominal capacity)
 • Lower Limit Mark (Red): Minimum fluid level
 Do not touch the surface of the pump while it is operating, it is very hot.

Adjusting the Pressure and Discharge Rate



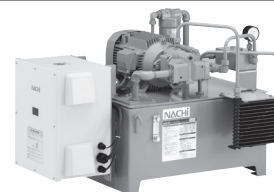
- O1, O3 size solenoid valves and modular valves can be selected.
- With option F* and R*, block and cylinder piping is hoses, configured by Nachi.
- Contact your agent for information about equipping a circuit.
- Option P is a bottom type oil pan.
The oil pan does not have an oil drain port.
The oil drain port is secured in place with the same mounting holes as the hydraulic unit.
- Option W is a leak test performed by Nachi.
- **Circuit Configuration**
Allow for sufficient flexibility in the piping between the NN pack, external manifold, and actuator.
- **Paint**
Nachi-Fujikoshi standard color: Mancel No. 5B6/3 (Iacquer)
However, the electric drive is Munsell No. N7.
Contact your agent about specifying external paint colors.

- **Electrical Wiring**
Perform electrical wiring exactly as shown below.

Motor and Power Supply	If wiring is performed incorrectly...
R - U S - V T - W	<ul style="list-style-type: none"> • Electric pump rotates in reverse, fluid is not discharged • Attach a pressure gauge to the discharge side and check for pressure rise.

- Do not forget to ground the pump!
 • After wiring is complete, be sure to cover the terminal box with the cover that comes with it.
 • Do not forget to wire the fan motor of the fan cooler. The power supply is single-phase 200V AC, non-polarity.
 Provide a no fuse breaker on the main power supply to protect electric circuitry against shorts and other current leakage, and as protection against motor overload. Also provide a leak breaker to protect against the risk of electric shock, etc.
- **Air intake and Exhaust**
Take care so there is nothing blocking the area around air intake and exhaust of the pump drain fan cooler. Also, be sure to locate the pump in an well-ventilated area where heat will not build up.
- **Transport and Installation**
Use the hangers when transporting the pump.
Since this is a stationary type pump, secure it with bolts on a vibration-free, level surface.

- **Maintenance and Inspection**
Fluid Temperature: Use the pump in an area where the temperature is 10°C to 60°C.
Operating Fluid Replacement Cycle: Perform the initial fluid replacement after three months of operation. After that, replace fluid when it becomes dirty or once a year, whichever comes first.
Strainer and Tank Internal Inspection and Cleaning: Every three months
Return Filter Element Inspection: Every three months (replace as required)
Fan Cooler Fin Inspection and Cleaning: Every six months
- **Environment**
Temperature: 10 to 35°C
Avoid areas exposed to mist of water-soluble coolants, etc.



Inverter Drive NCP/NNP Series Energy-Saving Variable Pump Unit with Inverter Drive

By adding an inverter drive to our NCP/NNP series standard variable pump unit, we created the inverter drive NCP/NNP series hydraulic units to achieve great energy savings. They are great for jobs that need to dwell for long periods.

Features

Low increase in hydraulic fluid temperature

Maintained at room temperature +2.5:.

- NNP-60E-55P35N1-10
- 7MPa maintained while dwelling

40% energy savings compared to the NCP unit

- NCP-60E-3.7PV16N3-C1R2-12
- 21MPa while dwelling (in contrast to standard unit)

Quiet

Sound level is 52dB (A).

- NNP-20E-22P16N1-10
- 7MPa while dwelling
- One meter behind pump

Easy Operation

Can start as soon as power is turned on.

Absolutely no external commands or delicate electrical adjustments needed.

- Operates even with the inverter removed in emergencies.

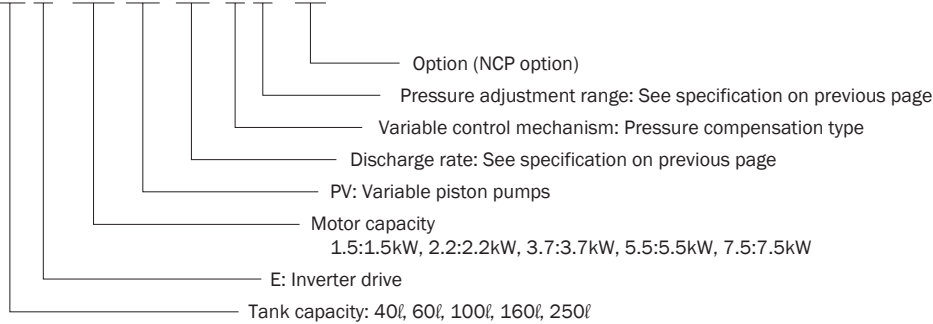
Specifications

1. Power Supply Rated Input Current	3φ AC200 to 220V, 50/60Hz 9.8A/1.5kW (NCP series only) 13.5A/2.2kW 22.5A/3.7kW 21.4A/5.5kW 29.1A/7.5kW (NCP series only)
2. Pressure Adjustment Range	N0: 2.0 to 3.5MPa N1: 2.0 to 7.0MPa N2: 3.0 to 14.0MPa N3: 3.0 to 21.0MPa
3. Output Flow (Theoretical Value at No-load)	8: 14.4ℓ /min 16: 29.7ℓ /min 22: 39.6ℓ /min 35: 63.0ℓ /min 45: 81.0ℓ /min
4. Hydraulic Fluid	Standard mineral-based hydraulic fluid ISO VG32 or 46
5. Hydraulic Fluid Temperature	0 to 60:
6. Ambient Temperature/Humidity	10 to 35: /20 to 85%RH (non-condensation)
7. Color of Inverter Box	Munsell no. 2.5Y9/1 (cream)

Understanding Model Numbers

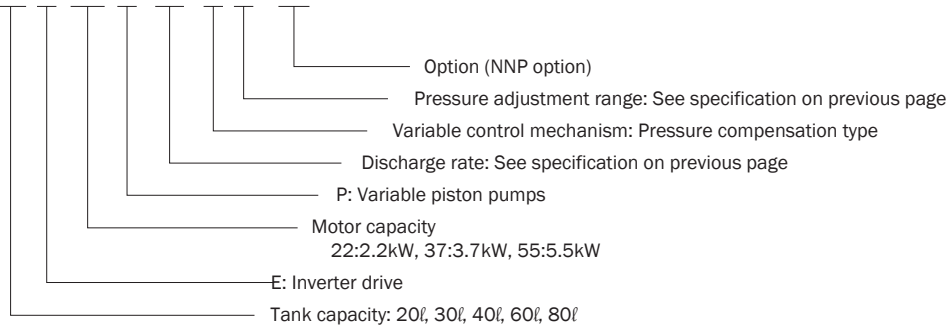
Inverter Drive NCP Series

NCP - 60 E - 3.7 PV 16 N 2 - ** - 12



Inverter Drive NNP Series

NNP - 20 E - 22 P 16 N 2 - ** - 10



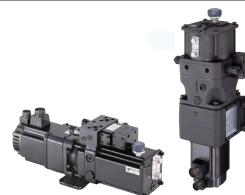
Design Drawings, Dimension Tables

Contact us for more information.

Precautions

- Turning the inverter on and off by cutting the main power supply (circuit breaker) significantly reduces the life of the inverter and should be limited to once an hour.
Contact us if you need to start and stop operations frequently.
- Do not change or adjust any switches except the inverter parameter settings and the pressure setting switches.
- Allow for sufficient flexibility in the piping between the hydraulic unit, external manifold, and actuator.
(Recommended: Flexible hose that is at least 1 meter long)
- Some options are not compatible with the inverter drive models, contact us for more information.
- Contact us if excessive leakage in the external hydraulic circuit limits energy saving efficiency.

Power Meister



By adding an inverter drive to our NCP/NNP series standard variable pump unit, we created the inverter drive NCP/NNP series hydraulic units to achieve great energy savings. They are great for jobs that need to dwell for long periods.

Features

Compact Hydraulic System

- Superior energy savings
- High precision

AC servo motor controls rotational speed and direction of pump.
Generates flow and pressure to match the operating cycle of machinery and to stop during idle times.

Incredible energy savings by only operating when necessary.
Position, Speed and Pressure are controlled with great precision by using a high-speed digital processing servo controller.

Specifications

Electric Motor	AC servo motor (0.5~7.5kW) (0.7~10.0HP)
Piston Pump	(2.0~15.8 cm ³ /rev) (0.12~0.96 in ³ /rev)
Ambient Temperature/ Humidity	0~+40 °C (32~104 °F) / 20~90% RH
Fluid Temperature	5~60 °C (41~140 °F)
Recommended Fluid	ISO VG32~68 (VG 46 recommended)
Range of Viscosity	20~200 mm ² /s (cSt)
Cleanliness Level	NAS class 10
Setting Range of Relief Valve	3.5~30MPa (508~4350 psi)
Maximum Pressure	30MPa (4350 psi)
Color	Black

Understanding Model Numbers

UPS - 0 A - 7 V 20 C 1 S 4 - HS - 1 - (11)

Design No. 10 = For Motor Power 05, 10, 15, 20, 55 & 75
11 = For Motor Power 29 & 44

Option for Reservoir - : No Option
H: Temperature Switch
S: Float Switch

Voltage of Shut Off Valve
4: 24 V DC

Range of Differential Valve Pressure 1:0.8~7MPa (116~1015 psi)

Option of Circuit - : No Option
C: Differential Pressure Valve
S: Shut Off Valve

Servo Motor Output 20:2.0kW (2.7 HP) (See below for details)

Installation - V: Vertical
H: Horizontal

Pump Capacity - 7: 6.7 cm³/rev (0.41 in³/rev) See below for other capacities)

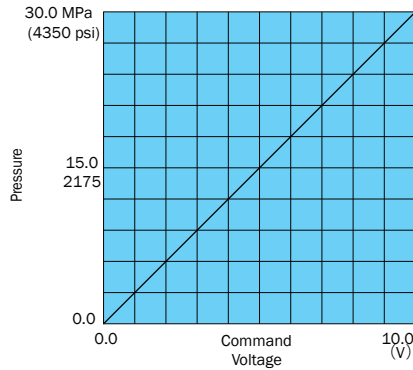
Mounting - A: Foot type mounting

Pump Size - 00: Pump Capacity 2 & 4
0: Pump Capacity 5 & 7
1: Pump Capacity 11, 13 & 16

POWER Meister Unit

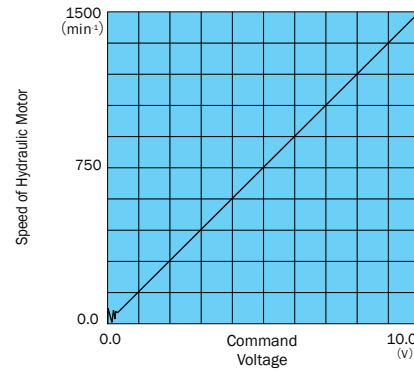
Performance Characteristics

Pressure: Pressure Command Voltage - Pressure Characteristic (0-100%)



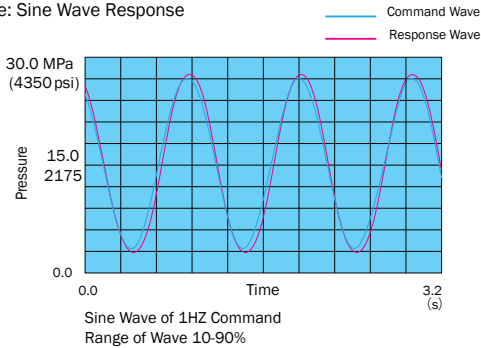
30MPa (4350 psi) at 10V Minimum Pressure: 0.15 MPa (22 psi)
Command of 0V → 10V → 0V Maximum Pressure: 30 MPa (4350 psi)

Speed: Speed Command Voltage- Speed Characteristic (0-100%)

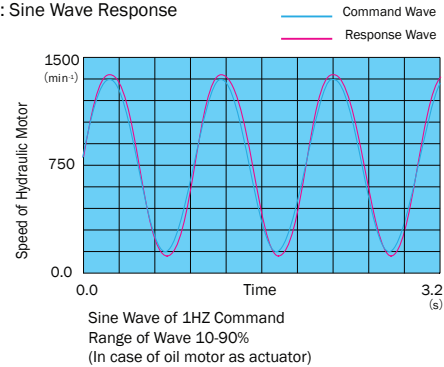


1500 min⁻¹ at 10V Minimum Speed: 50 min⁻¹
Command of 0V → 10V → 0V Maximum Speed: 1500 min⁻¹
(In case of oil motor as actuator)

Pressure: Sine Wave Response

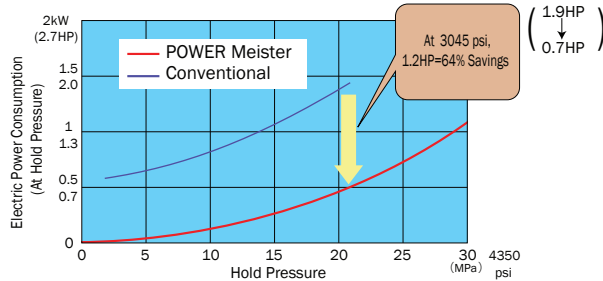


Speed: Sine Wave Response



Hold Pressure: Electric Power Consumption Characteristic

Hydraulic Unit (UPS)
Pump 0.29 in³/rev, Motor 2.7HP



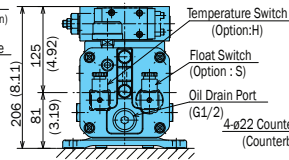
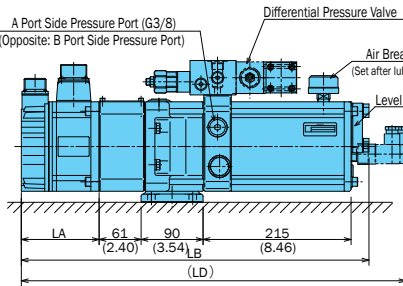
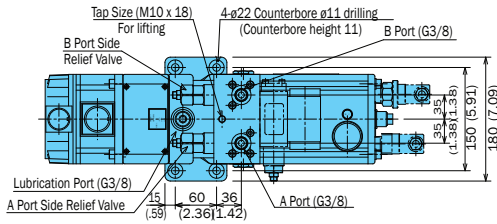
Ref. 2.2kW unipump (variable piston pump)
Consumption at full cut off (N=1.800 min⁻¹)

Installation Dimensional Drawings

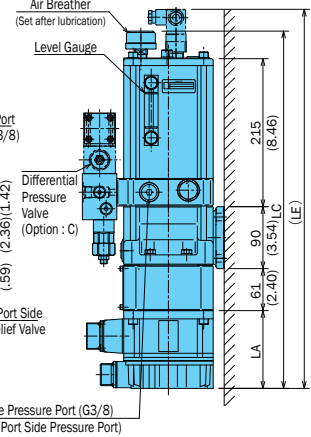
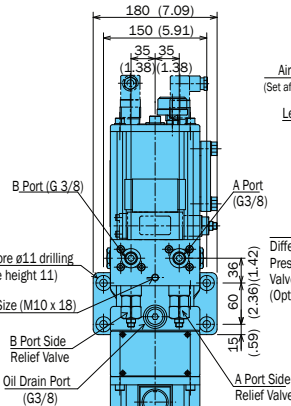
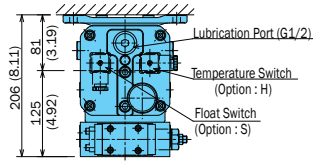
UPS-00A Series

Option : Without option S (Shut Off Valve)

UPS-00A-*H**** (Horizontal type)



UPS-00A-*V**** (Vertical type)



mm (inch) / kg (lbs)						
UPS Model	L A	L B	LC	LD	LE	(Note 2) Weight
UPS-00A-*V05	113 (4.45)	505 (19.88)	519 (20.43)	559 (20.01)	551 (21.69)	28 (61.7)
UPS-00A-*V10	133 (5.24)	525 (20.67)	539 (21.22)	579 (22.80)	571 (22.48)	30 (66.2)
UPS-00A-*V15	152 (5.98)	544 (21.42)	558 (21.97)	598 (23.54)	590 (23.23)	31 (68.4)
UPS-00A-*V20	171 (6.73)	563 (22.17)	577 (21.93)	617 (24.29)	609 (23.98)	33 (72.8)

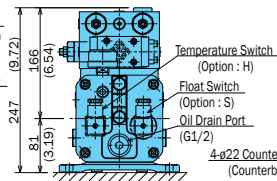
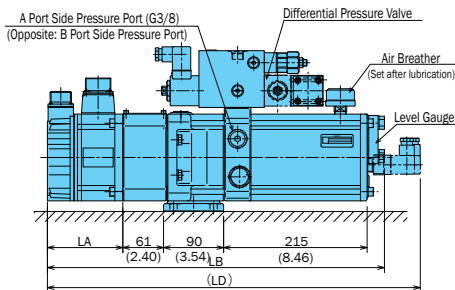
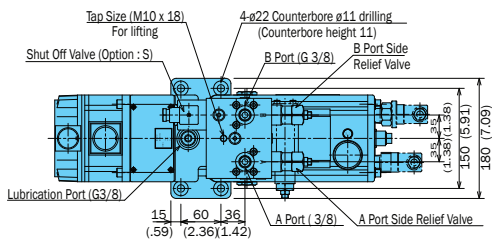
Note 1: Dimensions in (parentheses) and two dot chain lines are for circuit options C and S and tank options H and S.

Note 2: Does not include circuit or tank options or weight of hydraulic fluid.

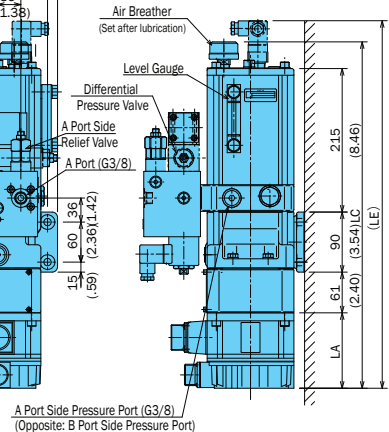
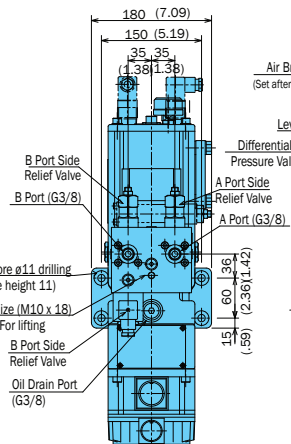
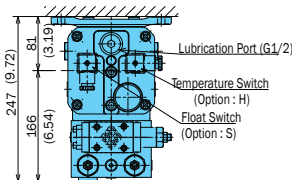
Note 3: Install the air breather face up.

Option : With option S (Shut Off Valve)

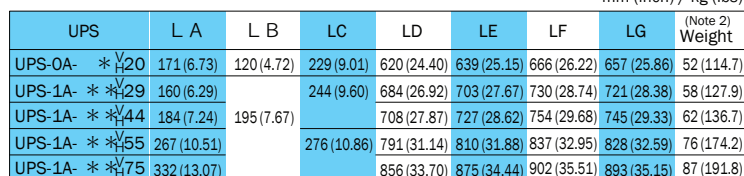
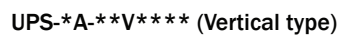
UPS-00A-*H****S4 (Horizontal type)



UPS-00A-*V****S4 (Vertical type)

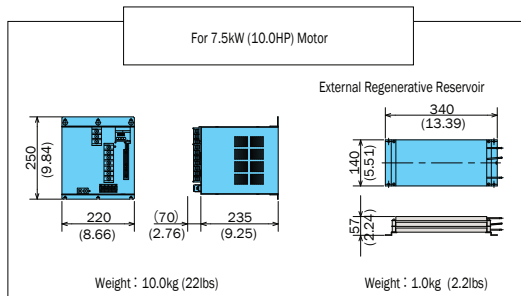
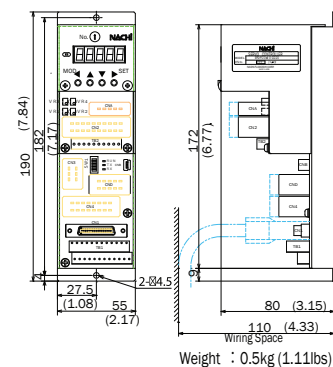


UPS-00*A-**H*** (Horizontal type)



Note 1: Dimensions in (parentheses) and two dot chain lines are for circuit options C and S and tank options H and S.
 Note 2: Does not include circuit or tank options or weight of hydraulic fluid.
 Note 3: Install the air breather face up.

Servo Controller - EPD-PD3-10-D2-20





Power Fit

Energy-Saving Power Unit - Variable Displacement Piston Pumps Driven by AC Servo Motor. Precise Pressure Flow Control Based on Machine Motion

Features

- Energy saving type power unit with two displacement piston pumps driven by AC servo motor.
- Pressure and flow is controlled by motor drive speed and pump displacement.

Pressure and flow can be set digitally at given value by control panel.

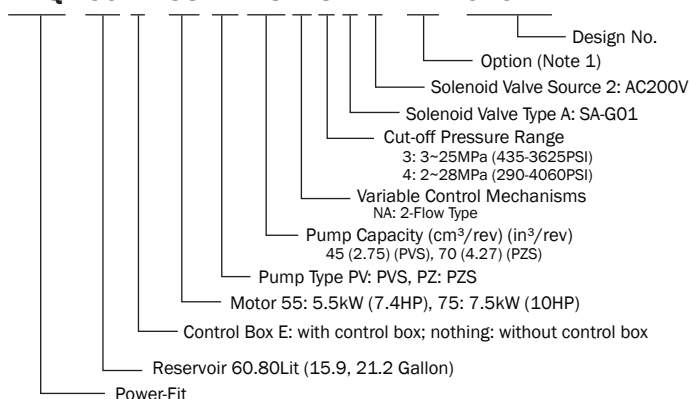
- Multiple settings of pressure and flow are possible by an external signal input.

Specifications

Model	Max. pressure	Max. flow	Pump Displacement Hi/Lo (initial setting)	Servo motor	Reservoir
NPQ-60E-55PV45N3A2-6161A	3625PSI (25MPa)	23.8GPM (90 L/min)	2.74 / 0.73"cu in (45 / 12cm ³ /rev)	7.37HP (5.5kW)	15.85GAL (60L)
NPQ-80E-75PZ70N4A2-6161A	4061PSI (28MPa)	37GPM (140 L/min)	4.27 / 1.04"cu in (70 / 17cm ³ /rev)	10.05HP (7.5kW)	21.13GAL (80L)

Understanding Model Numbers

NPQ - 60 E - 55 PV 45 N 3 A 2 - ** - 6161A

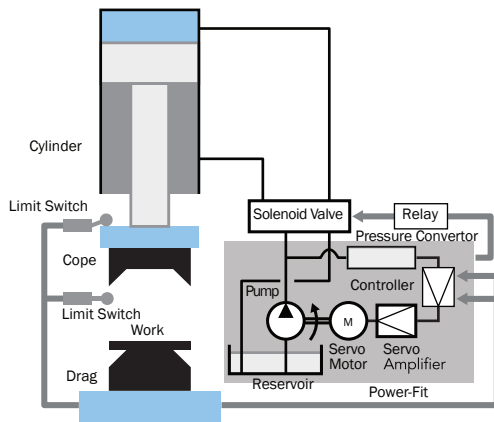


Notes: G: Guard Level Gauge H: Thermostat M: Microseparator P: Oil Pan
S: Float Switch (for lower) T: Level Gauge with Thermometer

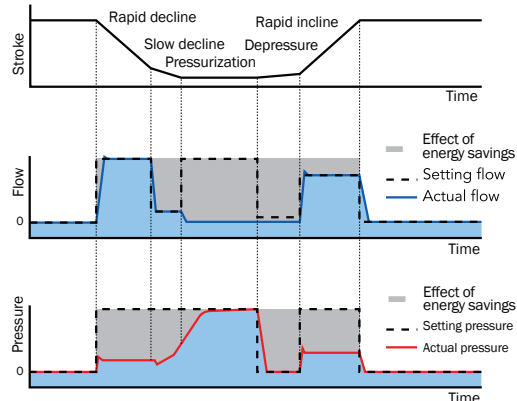
Outline Diagram

- Speed (flow) and force (pressure) are automatically controlled by controller based on load situation.

- No need to use additional valves for flow and pressure control.



Example of Press Motion



PHV Wheel Motors

Features

This product is the 2 speed hydraulic motor with reduction gear for the crawler type machine, which is a mini-excavator or a similar one in the operating condition and the operating rate.

Remove the upper side plug of "DRAIN PORTS"(DR1 or DR2), and then connect directly to the tank after installing this wheel motor to the machine.

Please refer to page M3 and the instruction manual for other notes.

Specifications

Model No.	SPECIFICATION (THEORETICAL)								(Note 3)	(Note 4)		(Note 5)	(Note 6)		(Note 7)	
	Code for Hyd.Motor Displacement				Code for Gear Ratio		Final Displacement		Max. Pressure	Max.Output Torque (Theoretical, Lo mode)		Max. Flow	Max.Output Speed (Theoretical, Hi mode)		Option	
	Lo mode		Hi mode		code:*3	ratio	Lo mode	Hi mode		Intermittent	Continuous		Wheel Motor	Hyd.Motor	Parking Brake Torque	
	code:*1	in ³	code:*2	in ³			psi	Ft. Lbs							Ft. Lbs	rpm
PHV-1B-1213A-(P)-10	1	.57	3	.28	A	1/25.26	240.0	118.7	3552	689	556	2.5	80	(2021)	365	14.5
PHV-1B-1213B-(P)-10					B	1/36.96	351.1	173.7		1010				3.6	(2957)	
PHV-1B-1223A-(P)-10	2	.66	3	.34	A	1/25.26	275.3	141.5	3407	791	556	2.9	80	(2021)	365	14.5
PHV-1B-1223B-(P)-10					B	1/36.96	402.9	207.0		1113				4.3	(2957)	
PHV-1B-1233A-(P)-10	3	.69	3	.35	A	1/25.26	288.0	146.5	3552	953	556	3.0	80	(2021)	365	14.5
PHV-1B-1233B-(P)-10					B	1/36.96	421.3	214.4		1113				4.5	(2957)	
PHV-1B-1243A-(P)-10	4	.75	3	.37	A	1/25.26	313.2	156.6	3552	900	556	3.3	80	(2021)	365	14.5
PHV-1B-1243B-(P)-10					B	1/36.96	458.3	229.2		1113				4.8	(2957)	

Note 1: Use this wheel motor within the Specification.

Note 2: The Specification is theoretical value. Real torque at 10 rpm (lo) should be approximately 83% of Theoretical Torque.

Real Speed at Hi(P<1493 psi) should be approximate 96% of Theoretical Speed.

The particular performance is shown on page M3.

Note 3: Max. Pressure is 3550 psi. However, the value in () is limited by Max. Output Torque.

Note 4: Max. Output Torque is 1113 Ft. Lbs. However, the value in () is limited by Max. Pressure.

"Intermittent" means less than 7% of operating time.

Note 5: Max. Flow is 5.2 gpm. However, the value in () is limited by Max. Output Speed (wheel motor or hydraulic motor).

Note 6: Max. Output Speed is 80 rpm (wheel motor), 3000 rpm (hydraulic motor).

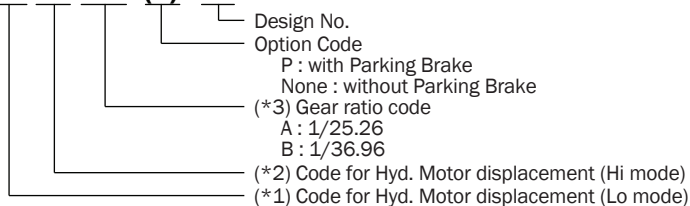
However, the value in () is limited by Max. Flow or Max. Output Speed (wheel motor or hydraulic motor).

Note 7: Parking Brake Torque (hydraulic motor) is 14.5 Ft Lbs.

Therefore, Parking Brake Torque (wheel motor) is different value between Gear Ratio "A(1/25.26)" and "B(1/36.96)".

Understanding Model Numbers

PHV-1B-12 *- (*) - 10**



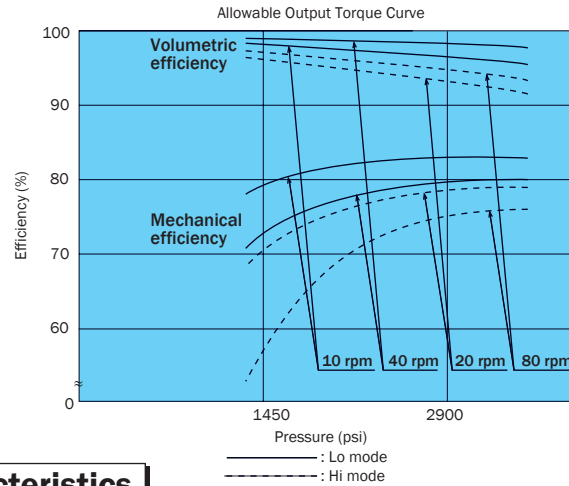
Performance Curves

PHV-1B-12 *** - (P) - 10

Condition:

Hydraulic Fluid: ISO VG46

Oil Temperature: 50±5 °C



Performance Characteristics

PHV-1B-12 *** - (P) - 10

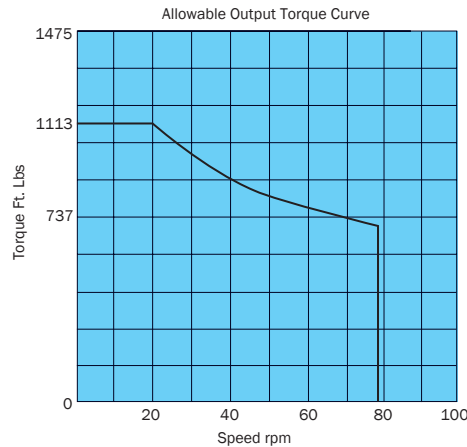
Condition of allowable output torque

Life: 200 hr (driving time)

Clockwise - 100 hr

Counterclockwise - 100 hr

Reduction gear life under your using condition



$$L_h = 200 \frac{20}{N} \left(\frac{T_o}{T} \right)^3$$

Lh: Life (hr)
N: Your using speed (min⁻¹)
To: Torque on curve at N
T: Your using Torque (N • m) (Theoretical)

Note: When the wheel motor is driven only side direction, the life is reduced by half.

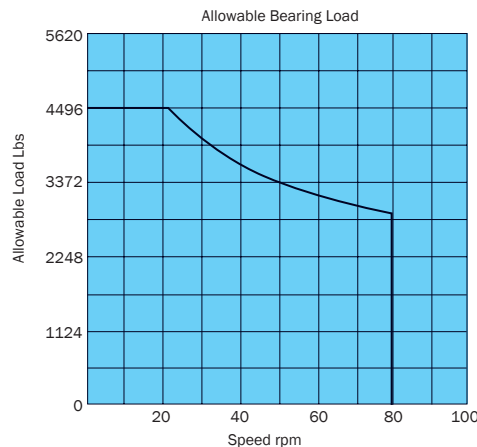
Condition of allowable bearing load

Life: 500 hr

Bearing life under your using condition

$$L_h = 500 \left(\frac{W_o}{W} \right)^3$$

Lh: Life (hr)
Wo: Load on curve at your using speed
W: Your using equivalent load (N) [*1]

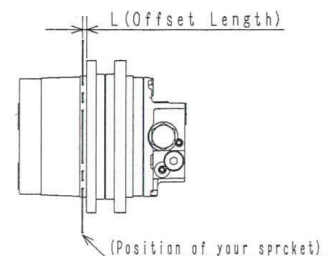


[*1] Figure that W (your using equivalent load) is the following:

$$W = \frac{L+38.7}{74.8} W_r \frac{(D/2)}{74.8} W_{th}$$

L: Offset length [*2] of your sprocket (mm)
D: Pitch circle diameter of your sprocket (mm)
Wr: Your using radial load (N)
Wth: Your using thrust load (N)

[*2] Refer to the figure below



Instructions:

1. Use this wheel motor within 'Specification' shown in DWG. No. AM-2101ME-1.
2. Use an installation mounting with stiffness and clean the mounting before installing this wheel motor to the machine.
3. Install this wheel motor horizontally.
4. Remove the upper side plug of 'Drain ports' (DR1 or DR2: refer to DWG. No. AM-2101ME-1) and then connect to the tank after installing this wheel motor to the machine.
5. Fill the motor case with clean hydraulic fluid through the 'Drain port' before starting.
6. When the 'PP port' (refer to DWG. No. AM-2101ME-1) is connected to the tank, this wheel motor is operated at Lo mode. (permitted back pressure: 0.5 MPa)
7. When the 'PP port' is supplied pressure, this wheel motor is operated at Hi mode. (speed control pressure: min. 1.5 MPa)
8. The parking brake (option) of this wheel motor is negative brake system. Parking brake is working when 'A port' and 'B port' (refer to DWG. No. AM-2101ME-1) are not supplied pressure; is not working when 'A port' or 'B port' is supplied pressure. (parking brake releasing pressure: 1.5 MPa)
9. Change the gear oil to the new one each following period. First: 200 hr or 2 months; Second and after: 1000 hr or 1 year
10. Please refer to the instruction manual for other notes.

PHV Wheel Motors

Features

This product is the 2 speed hydraulic motor with reduction gear for the crawler type machine, which is a mini-excavator or a similar one in the operating condition and the operating rate.

Remove the upper side plug of "DRAIN PORTS" (DR1 or DR2), and then connect directly to the tank after installing this wheel motor to the machine.

Please refer to page M6 and the instruction manual for other notes.

Specifications

Model No.	SPECIFICATION (THEORETICAL)								(Note 3)		(Note 4)		(Note 5)		(Note 6)		(Note 7)			
	Code for Hyd.Motor Displacement				Code for Gear Ratio		Final Displacement		Max. Pressure	Max.Output Torque (Theoretical, Lo mode)		Max. Flow	Max.Output Speed (Theoretical, Hi mode)		Option					
	Lo mode		Hi mode		Lo mode	Hi mode	Intermittent	Continuous		Wheel Motor	Hyd.Motor		Parking Brake torque							
	code:*1	in ³	code:*2	in ³									code:*3	ratio	Wheel Motor	Hyd.Motor				
PHV-2B-2012A-(P)-10	1	.98	2	.55	A	1/31.00	499.1	282.1	3552	Ft. Lbs.	Ft. Lbs.	gpm	rpm	rpm	Ft. Lbs.	Ft. Lbs.				
PHV-2B-2012B-(P)-10					B	1/39.00	627.9	354.9	3509	1784										
PHV-2B-2013A-(P)-10			3	.51	A	1/31.00	499.1	260.4	3552	1435										
PHV-2B-2013B-(P)-10					B	1/39.00	627.9	327.6	3509	1784										
PHV-2B-2022A-(P)-10	2	1.04	2	.57	A	1/31.00	533.2	294.5	3552	1553	892	5.8	75	(2325)	694	22.4				
PHV-2B-2022B-(P)-10					B	1/39.00	670.8	370.5	3277	1784										
PHV-2B-2023A-(P)-10			3	.52	A	1/31.00	533.2	266.6	3552	1533										
PHV-2B-2023B-(P)-10					B	1/39.00	670.8	335.4	3277	1784										

Note 1: Use this wheel motor within the Specification.

Note 2: The Specification is theoretical value. Real torque at 10 rpm (lo) should be approximately 85% of Theoretical Torque.

Real Speed at Hi(P<1493 psi) should be approximate 96% of Theoretical Speed.

The particular performance is shown on page M6.

Note 3: Max. Pressure is 3552 psi. However, the value in () is limited by Max. Output Torque.

Note 4: Max. Output Torque is 1784 Ft. Lbs. However, the value in () is limited by Max. Pressure.

"Intermittent" means less than 7% of operating time.

Note 5: Max. Flow is 5.2 gpm. However, the value in () is limited by Max. Output Speed (wheel motor or hydraulic motor).

Note 6: Max. Output Speed is 70 rpm (wheel motor), 3500 rpm (hydraulic motor).

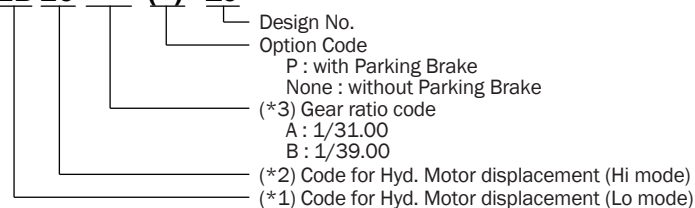
However, the value in () is limited by Max. Flow or Max. Output Speed (wheel motor or hydraulic motor).

Note 7: Parking Brake Torque (hydraulic motor) is 22.4 Ft. Lbs.

Therefore, Parking Brake Torque (wheel motor) is different value between Gear Ratio "A(1/31.00)" and "B(1/39.00)".

Understanding Model Numbers

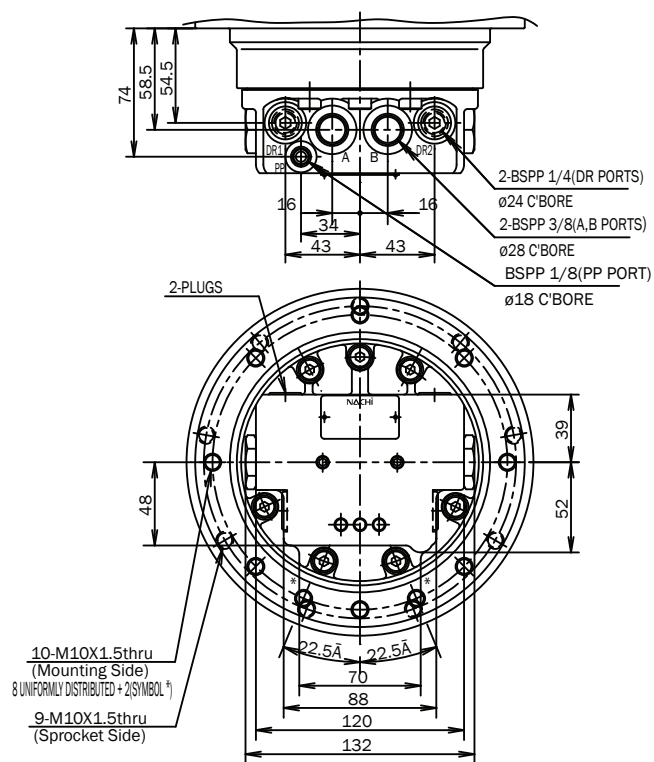
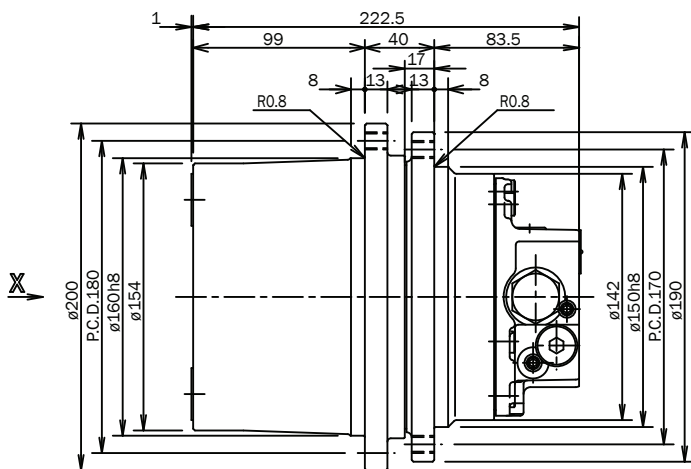
PHV-2B-20 ***- (*) - 10



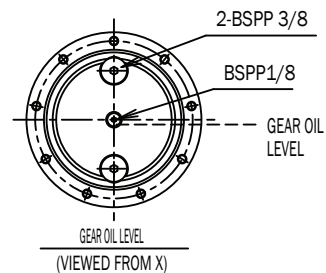
Installation Dimension Drawings

CAUTION

1. Speed Control Pressure: min. 217 psi
2. Hydraulic Fluid: ISO VG46
(Anti-Wear Hydraulic Fluid)
3. Contamination: within NAS Grade 10
4. Oil Temp: -4 ~ 180° F
5. Filter: 10µm
6. Gear Oil: SAE-30-CD (Amount of Oil 20 in³)
7. Mass: 53 lbs
8. Paint Color: Black (Under Coat)



JIS SYMBOL			
MODEL NO.	PHV-2B-20***-10	MODEL NO.	PHV-2B-20***-P-10
NAME	2 speed type WHEEL MOTOR		
DWG. NO.	AM-2201ME-1-A		



ALLOWED DRAIN PRESSURE

RATED	Max. 43 psi
SURGE	Max. 145 psi

ROTATIONAL DIRECTION (VIEWED FROM X)

	INLET	OUTLET
CLOCKWISE	B	A
COUNTER-CLOCKWISE	A	B

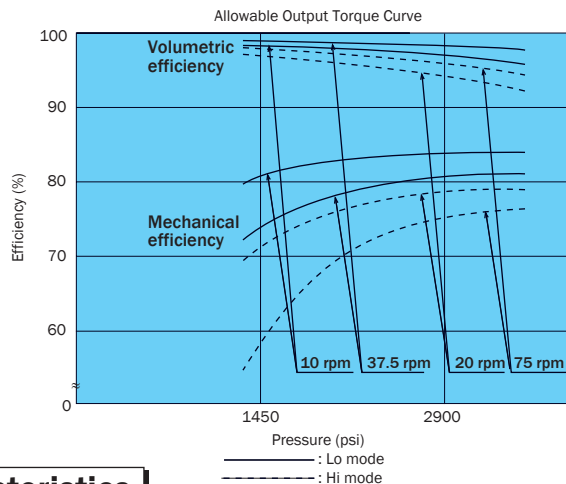
Performance Curves

PHV-2B-20 *** - (P) - 10

Condition:

Hydraulic Fluid: ISO VG46

Oil Temperature: 50±5 °C



Performance Characteristics

PHV-2B-20 *** - (P) - 10

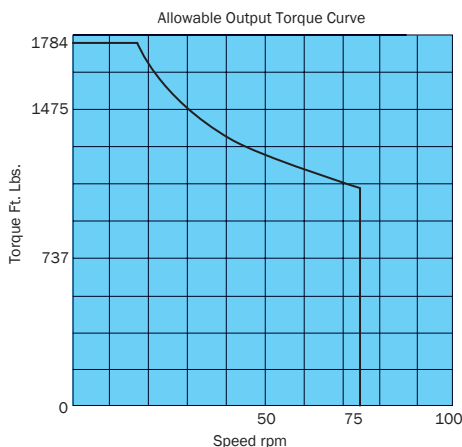
Condition of allowable output torque

Life: 200 hr (driving time)

Clockwise - 100 hr

Counterclockwise - 100 hr

Reduction gear life under your using condition



$$L_h = 200 \frac{20}{N} \left(\frac{T_o}{T} \right)^3$$

Lh: Life (hr)
N: Your using speed (min⁻¹)
To: Torque on curve at N
T: Your using Torque (N • m) (Theoretical)

Note: When the wheel motor is driven only side direction, the life is reduced by half.

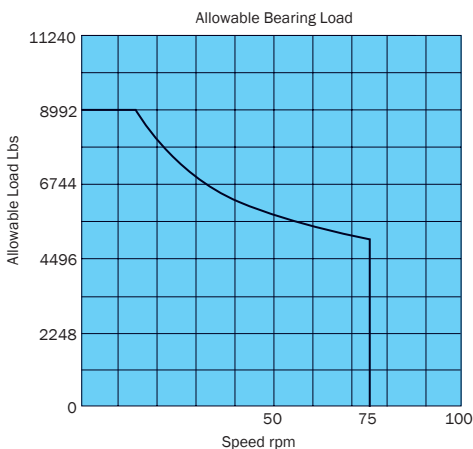
Condition of allowable bearing load

Life: 500 hr

Bearing life under your using condition

$$L_h = 500 \left(\frac{W_o}{W} \right)^3$$

Lh: Life (hr)
Wo: Load on curve at your using speed
W: Your using equivalent load (N) [*1]



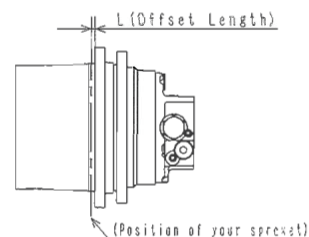
[*1] Figure that W (your using equivalent load) is the following:

$$W = \frac{52.9 \cdot L}{92} W_r \left(\frac{D/2}{92} \right) W_{th} (L \leq 6.9)$$

$$W = \frac{39.1 + L}{92} W \left(\frac{D/2}{92} \right) W_{th} (6.9 \leq L)$$

L: Offset length [*2] of your sprocket (mm)
D: Pitch circle diameter of your sprocket (mm)
Wr: Your using radial load (N)
Wth: Your using thrust load (N)

[*2] Refer to the figure below



Instructions:

1. Use this wheel motor within 'Specification' shown in DWG. No. AM-2201ME-1.
2. Use an installation mounting with stiffness and clean the mounting before installing this wheel motor to the machine.
3. Install this wheel motor horizontally.
4. Remove the upper side plug of 'Drain ports' (DR1 or DR2: refer to DWG. No. AM-2201ME-1) and then connect to the tank after installing this wheel motor to the machine.
5. Fill the motor case with clean hydraulic fluid through the 'Drain port' before starting.
6. When the 'PP port' (refer to DWG. No. AM-2201ME-1) is connected to the tank, this wheel motor is operated at Lo mode. (permitted back pressure: 0.5 MPa)
7. When the 'PP port' is supplied pressure, this wheel motor is operated at Hi mode. (speed control pressure: min. 1.5 MPa)
8. The parking brake (option) of this wheel motor is negative brake system. Parking brake is working when 'A port' and 'B port' (refer to DWG. No. AM-2201ME-1) are not supplied pressure; is not working when 'A port' or 'B port' is supplied pressure. (parking brake releasing pressure: 1.5 MPa)
9. Change the gear oil to the new one each following period. First: 200 hr or 2 months; Second and after: 1000 hr or 1 year
10. Please refer to the instruction manual for other notes.

PHV Wheel Motors

Features

This product is the 2 speed hydraulic motor with reduction gear for the crawler type machine, which is a mini-excavator or a similar one in the operating condition and the operating rate.

Remove the upper side plug of "DRAIN PORTS"(DR1 or DR2), and then connect directly to the tank after installing this wheel motor to the machine.

Please refer to page M9 and the instruction manual for other notes.

Specifications

Model No.	SPECIFICATION (THEORETICAL)								(Note 3)	(Note 4)		(Note 5)	(Note 6)		(Note 7)	
	Code for Hyd.Motor Displacement				Code for Gear Ratio		Final Displacement		Max. Pressure	Max.Output Torque (Theoretical, Lo mode)		Max. Flow	Max.Output Speed (Theoretical, Hi mode)		Option	
	Lo mode		Hi mode							Intermittent	Continuous		Wheel Motor	Hyd.Motor	Wheel Motor	Hyd.Motor
	code*1	in ³	code*2	in ³	code*3	ratio	Lo mode	Hi mode	psi	Ft. Lbs.	Ft. Lbs.	gpm	rpm	rpm	Ft. Lbs	Ft. Lbs
PHV-3B-3513A-(P)-11	1	1.26	3	.66	A	1/36.51	755.8	398.0	3552	2173	1517	7.37	70	(2556)	977	26.7
PHV-3B-3513B-(P)-11					B	1/45.20	935.6	492.7		2690		9.11		(3164)	1210	
PHV-3B-3521A-(P)-11	2	1.30	1	.78	A	1/36.51	781.3	471.0		2247		8.71		(2556)	977	
PHV-3B-3521B-(P)-11					B	1/45.20	967.3	583.1		2781		10.77		(3164)	1210	
PHV-3B-3531A-(P)-11	3	1.44	1	.95	A	1/36.51	861.6	573.2	2478	10.59	(2556)	977				
PHV-3B-3531B-(P)-11					B	1/45.20	1066.7	709.6	3509	3034	11.1	(59.2)	(2675)	1210		
PHV-3B-3532A-(P)-11	3	1.44	2	.78	A	1/36.51	861.6	471.0	3552	2478	8.71	(2446)	977			
PHV-3B-3532B-(P)-11					B	1/45.20	1066.7	583.1	3509	3034	10.77	(3164)	1210			
PHV-3B-3533A-(P)-11	3	1.44	3	.73	A	1/36.51	861.6	438.1	3552	2478	8.11	(2556)	977			
PHV-3B-3533B-(P)-11					B	1/45.20	1066.7	542.4	3509	3034	10.0	(3164)	1210			
PHV-3B-3542A-(P)-11	4	1.53	2	.86	A	1/36.51	916.4	518.4	3552	2635	9.66	(2556)	977			
PHV-3B-3542B-(P)-11					B	1/45.20	1134.5	641.8	3291	3034	11.0	(65.4)	(2958)	1210		

Note 1: Use this wheel motor within the Specification.

Note 2: The Specification is theoretical value. Real torque at 10 rpm (lo) should be approximately 85% of Theoretical Torque.

Real Speed at Hi(P<1493 psi) should be approximate 96% of Theoretical Speed.

The particular performance is shown on page M9.

Note 3: Max. Pressure is 3552 psi. However, the value in () is limited by Max. Output Torque.

Note 4: Max. Output Torque is 3034 Ft. Lbs. However, the value in () is limited by Max. Pressure.

"Intermittent" means less than 7% of operating time.

Note 5: Max. Flow is 11 gpm. However, the value in () is limited by Max. Output Speed (wheel motor or hydraulic motor).

Note 6: Max. Output Speed is 70 rpm (wheel motor), 3500 rpm (hydraulic motor).

However, the value in () is limited by Max. Flow or Max. Output Speed (wheel motor or hydraulic motor).

Note 7: Parking Brake Torque (hydraulic motor) is 26.7 Ft. Lbs.

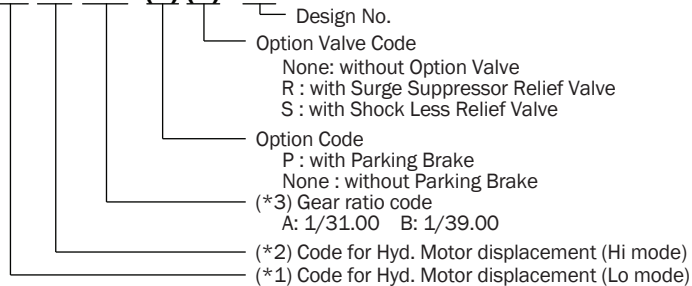
Therefore, Parking Brake Torque (wheel motor) is different value between Gear Ratio "A(1/36.51)" and "B(1/45.20)".

Note 8: You can select "Option Valve". This drawing is showing the wheel motor without Option Valve.

Other options available are Surge Suppressor Relief Valve and Shock Less Relief Valve.

Understanding Model Numbers

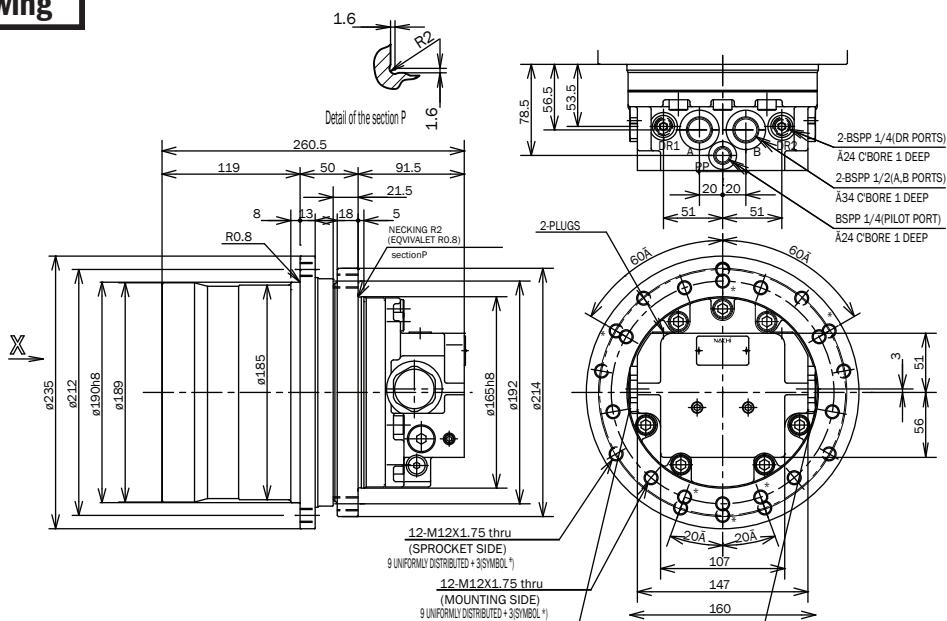
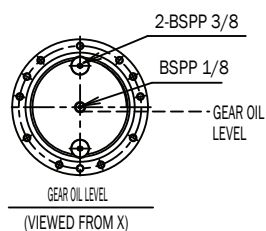
PHV-3B-35 *- (*) (*) - 11**



Installation Dimensional Drawing

CAUTION

1. Speed Control Pressure: min. 217 psi
2. Hydraulic Fluid: ISO VG46
(Anti-Wear Hydraulic Fluid)
3. Contamination: within NAS Grade 10
4. Oil Temp: -4 ~ 180° F
5. Filter: 10µm
6. Gear Oil: SAE 30-CD (Amount of Oil 20 in³)
7. Mass: 79 lbs
8. Paint Color: Ebony Gray (Under Coat)



JIS SYMBOL			
MODEL NO.	PHV-3B-35***-11	MODEL NO.	PHV-3B-35***-P-11
NAME	2 speed type WHEEL MOTOR		
DWG. NO.	AM-2301ME-1-0A		

ROTATIONAL DIRECTION (VIEWED FROM X)

	INLET	OUTLET
CLOCKWISE	B	A
COUNTER-CLOCKWISE	A	B

ALLOWED DRAIN PRESSURE

RATED	Max. 43 psi
SURGE	Max. 145 psi

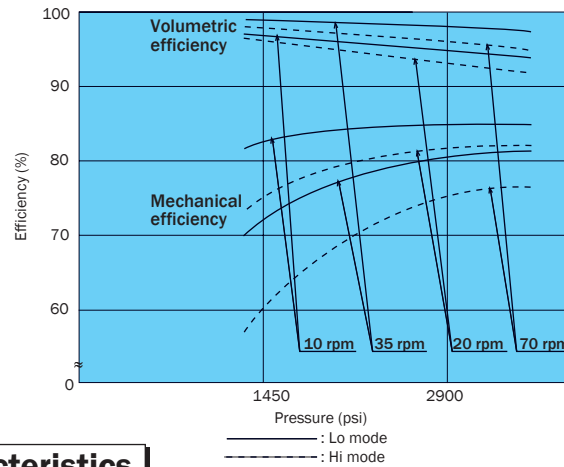
Performance Curves

PHV-3B-35 *** - (*) (*) - 11

Condition:

Hydraulic Fluid: ISO VG46

Oil Temperature: 50±5 °C



Performance Characteristics

PHV-3B-35 *** - (*) (*) - 11

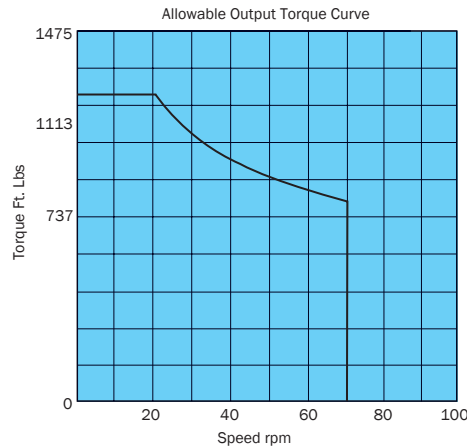
Condition of allowable output torque

Life: 200 hr (driving time)

Clockwise - 100 hr

Counterclockwise - 100 hr

Reduction gear life under your using condition



$$L_h = 200 \frac{20}{N} \left(\frac{T_o}{T} \right)^3$$

Lh: Life (hr)
N: Your using speed (min⁻¹)
To: Torque on curve at N
T: Your using Torque (N • m) (Theoretical)

Note: When the wheel motor is driven only side direction, the life is reduced by half.

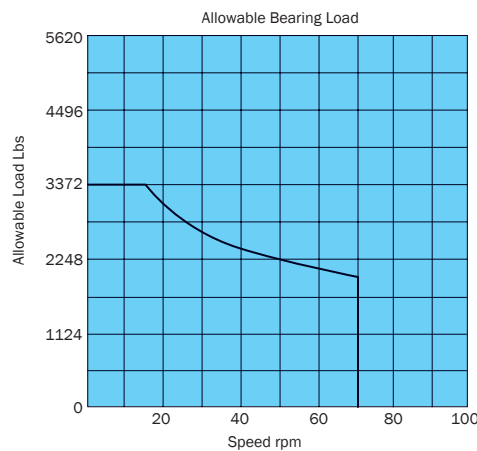
Condition of allowable bearing load

Life: 500 hr

Bearing life under your using condition

$$L_h = 500 \left(\frac{W_o}{W} \right)^3$$

Lh: Life (hr)
Wo: Load on curve at your using speed
W: Your using equivalent load (N) [*1]



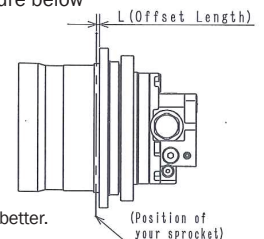
[*1] Figure that W (your using equivalent load) is the following:

$$W = \frac{64.1 \cdot L}{106.4} W_r \frac{(D/2)}{106.4} W_{th} (L \leq 10.9)$$

$$W = \frac{42.3 + L}{106.4} W \frac{(D/2)}{106.4} W_{th} (10.9 \leq L)$$

L: Offset length [*2] of your sprocket (mm)
D: Pitch circle diameter of your sprocket (mm)
Wr: Your using radial load (N)
Wth: Your using thrust load (N)

[*2] Refer to the figure below



Instructions:

1. Use this wheel motor within 'Specification' shown in DWG. No. AM-2301ME-1, -2, -3.
2. A machining process is necessary on the wheel motor installation face of the track frame. Flatness of the installation face should be 0.1 mm or better.
3. Use an installation mounting with stiffness and clean the mounting before installing this wheel motor to the machine.
4. Install this wheel motor horizontally.
5. The sprocket should be a flat type - see drawing:
6. Remove the upper side plug of 'Drain ports' (DR1 or DR2: refer to DWG. No. AM-2301ME-1, -2, -3) and then connect to the tank after installing this wheel motor to the machine.
7. Fill the motor case with clean hydraulic fluid through the 'Drain port' before starting.
8. When the 'PP port' (refer to DWG. No. AM-2101ME-1, -2, -3) is connected to the tank, this wheel motor is operated at Lo mode. (permitted back pressure: 0.5 MPa)
9. When the 'PP port' is supplied pressure, this wheel motor is operated at Hi mode. (speed control pressure: min. 1.5 MPa)
10. The parking brake (option) of this wheel motor is negative brake system. Parking brake is working when 'A port' and 'B port' (refer to DWG. No. AM-2101ME-1, -2, -3) are not supplied pressure; is not working when 'A port' or 'B port' is supplied pressure. (parking brake releasing pressure: 1.5 MPa)
11. Change the gear oil to the new one each following period. First: 200 hr or 2 months; Second and after: 1000 hr or 1 year
12. Please refer to the instruction manual for other notes.

Example of the flat type sprocket



PHV Wheel Motors

Features

This product is the 2 speed hydraulic motor with reduction gear for the crawler type machine, which is a mini-excavator or a similar one in the operating condition and the operating rate.

Remove the upper side plug of "DRAIN PORTS"(DR1 or DR2), and then connect directly to the tank after installing this wheel motor to the machine.
Following drawings show the models

"PHV-4B-60***-10" and "PHV-4B-60***-P-10" Other models not shown.

Specifications

Model No.	SPECIFICATION (THEORETICAL)								(Note 3)	(Note 4)	(Note 5)	(Note 6)		(Note 7)			
	Code for Hyd.Motor Displacement				Code for Gear Ratio		Final Displacement		Max. Pressure	Max.Output Torque (Theoretical, Lo mode)		Max. Flow	Max.Output Speed (Theoretical, Hi mode)		Option		
	Lo mode		Hi mode		code:*3	ratio	Lo mode	Hi mode		Intermittent	Continuous		Wheel Motor	Hyd.Motor	Parking Brake Torque		
	code:*1	in³	code:*2	in³											Ft. Lbs.	Ft. Lbs.	gpm
PHV-4B-6011A-(P)-10	1	1.74	1	1.06	A	1/36.80	1052.5	640.3	3552	3026	2542	10.9	65	(2392)	2342	63.6	
PHV-4B-6011B-(P)-10					B	1/47.53	1359.4	827.0		3909				(3089)	3025		
PHV-4B-6021A-(P)-10	2	1.81	1	1.11	A	1/36.80	1093.0	673.4		3143				11.5	(2392)		2342
PHV-4B-6021B-(P)-10					B	1/47.53	1411.6	869.8		4059				14.9	(3089)		3025
PHV-4B-6032A-(P)-10	3	2.08	2	1.16	A	1/36.80	1258.6	702.9		3619		12.0		(2392)	2342		
PHV-4B-6032B-(P)-10					B	1/47.53	1652.5	907.8		4672		15.5		(3089)	3025		
PHV-4B-6041A-(P)-10	4	2.15	1	1.29	A	1/36.80	1299.0	783.8		3735		13.4		(2392)	2342		
PHV-4B-6041B-(P)-10					B	1/47.53	1677.8	1012.4		4824		15.8		(59.3)	(2817)		3025

Note 1: Use this wheel motor within the Specification.

Note 2: The Specification is theoretical value. Real torque at 10 rpm (lo) should be approximately 85% of Theoretical Torque.

Real Speed at Hi(P<1493 psi) should be approximate 96% of Theoretical Speed.

The particular performance is shown in "DWG.NO. AM-2301ME-4".

Note 3: Max. Pressure is 3552 psi. However, the value in () is limited by Max. Output Torque.

Note 4: Max. Output Torque is 4824 Ft. Lbs. However, the value in () is limited by Max. Pressure.

"Intermittent" means less than 7% of operating time.

Note 5: Max. Flow is 15.8 gpm. However, the value in () is limited by Max. Output Speed (wheel motor or hydraulic motor).

Note 6: Max. Output Speed is 70 rpm (wheel motor), 3500 rpm (hydraulic motor).

However, the value in () is limited by Max. Flow or Max. Output Speed (wheel motor or hydraulic motor).

Note 7: Parking Brake Torque (hydraulic motor) is 63.6 Ft. Lbs.

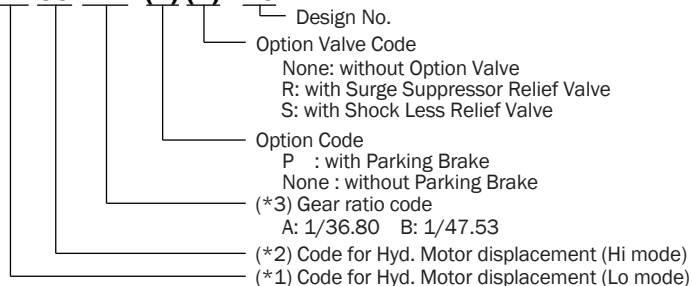
Therefore, Parking Brake Torque (wheel motor) is different value between Gear Ratio "A(1/36.80)" and "B(1/47.53)".

Note 8: You can select "Option Valve". This drawing is showing the wheel motor without Option Valve.

Other options available are Surge Suppressor Relief Valve and Shock Less Relief Valve.

Understanding Model Numbers

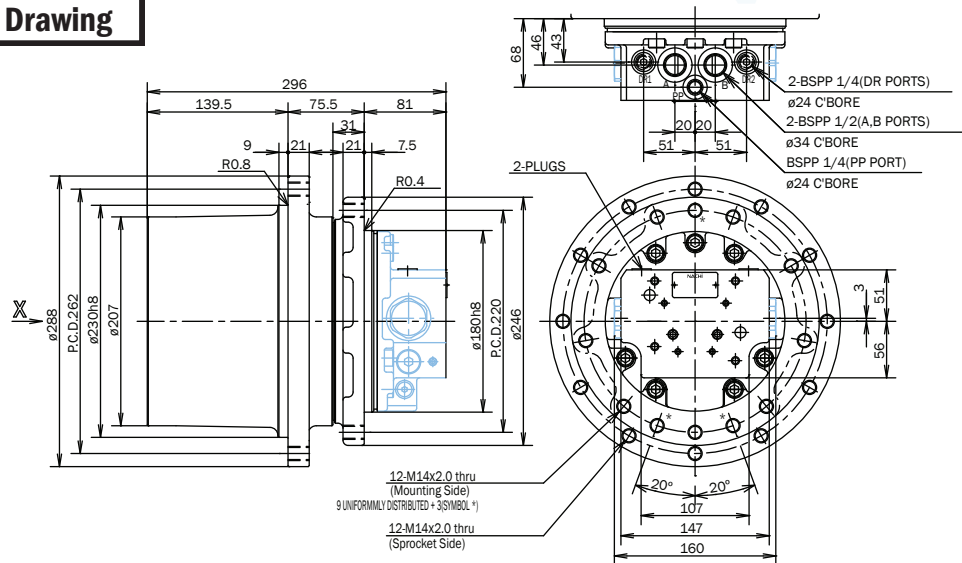
PHV-4B-60 *- (*) (*) - 10**



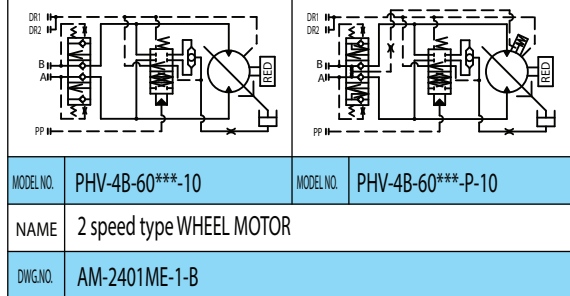
Installation Dimensional Drawing

CAUTION

1. Speed Control Pressure: min. 217 psi
2. Hydraulic Fluid: ISO VG46
(Anti-Wear Hydraulic Fluid)
3. Contamination: within NAS Grade 10
4. Oil Temp: -4 ~ 180° F
5. Filter: 10µm
6. Gear Oil: SAE-30-CD
(Amount of Oil 20 in³)
7. Mass: 124 lbs.
8. Paint Color: Red (Under Coat),
Black (Top Coat)



HYDRAULIC SYMBOL



ROTATIONAL DIRECTION (VIEWED FROM X)

	INLET	OUTLET
CLOCKWISE	B	A
COUNTER-CLOCKWISE	A	B

ALLOWED DRAIN PRESSURE

RATED	Max. 43 psi
SURGE	Max. 145 psi

