NACHI

CESEHSA
info4@cesehsa.com.mx
cesehsa.com.mx

STANDARD HYDRAULIC POWER UNITS

NV - VERTICAL STYLE POWER UNIT
NH - HORIZONTAL STYLE POWER UNIT
NSP STYLE POWER UNIT

NACHI AMERICA INC.

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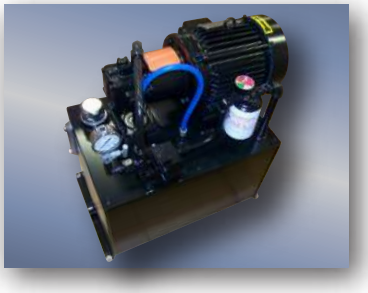
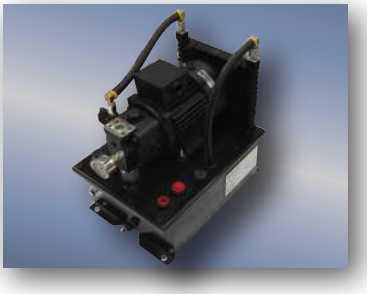
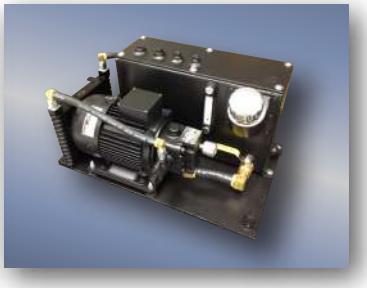

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NACHI Standard Vertical Hydraulic Power Unit

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 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.

OPTIONAL ACCESSORIES INCLUDE:

Aluminum parallel directional control manifolds with cartridge relief valve in "D03" and "D05" sizes with AC or DC voltage.

Return Line Filter w/Dirt Indicator. Pressure blocks with #8SAE & 12SAE connection with relief or compensator control.

Pressure and flow control modular valves in "D03" and "D05" sizes.
Air/Oil cooler for case drain cooling of compensated pumps.

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 (see "How To Order", page 8). 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 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", page 6.

QUALITY:

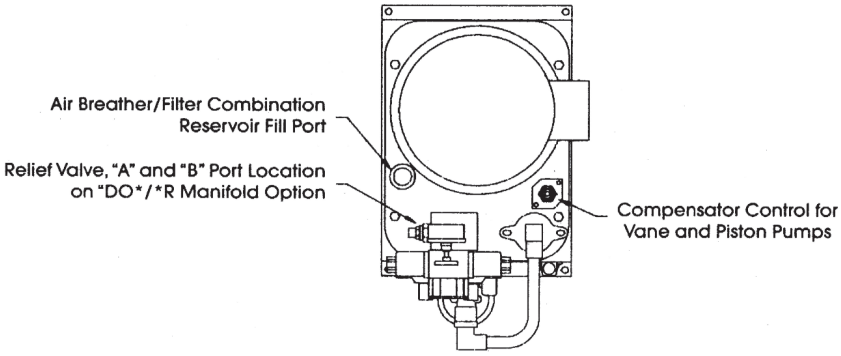
Quality components and high manufacturing standards make these factory assembled units fit virtually any application. The wide variety of pumps, motors, reservoirs, manifolds and choice of options enable you to match your application requirements for optimum productivity and Cost-Effective operation.

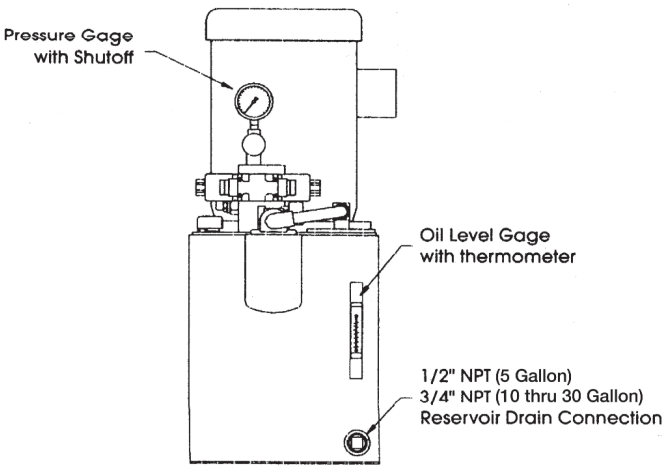
RELIABILITY:

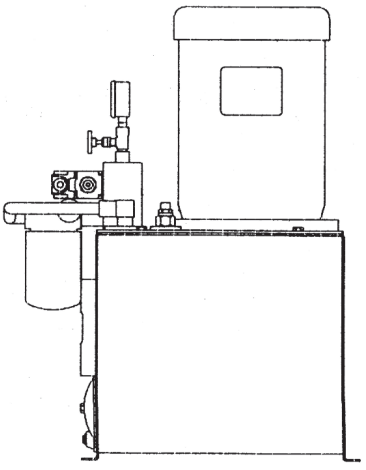
Strict control of accepted hydraulic assembly practices, testing procedures, plus high quality components assure successful operation in a variety of industrial applications.

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 contaminents 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.

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	*

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
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

▲ 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

Reservoir Code

How to Order

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

RESERVOIRS
- NV5 - 5 Gallon
- NV10 - 10 Gallon
- NV20 - 20 Gallon
- NV30 - 30 Gallon

MOTORS
- 1
- 1.5
- 2
- 3
- 5
- 7.5
- 10
- 15

PUMPS
- G/1.6
- G/2.4
- G/3.0
- G/5.2
- G/7.0
- G/9.0
- G/10.4
- G/12.3
- P/3.8
- P/7.8
- P/10.5
- V/7.9
- V/10.5
- V/14.2

PRESSURE RANGE
- P1 1000 psi
- P2 1000-2000 psi
- P3 2000-3000 psi

RETURN FILTER
- IL - Inline, Spin-on (All size Reservoirs)
- IT - Intank, Cover mounted (10 gallon and larger)

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

COOLER

AIR COOLED ATTACHED TO TEFC MOTOR
- C1 4 GPM (Drain)
- C2 15 GPM Rear Mount 145TC MTR
- C3 20 GPM Rear Mount 182-184TC MTR
- C4 24 GPM Rear Mount 213-215TC MTR

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.

MOTOR CODE: 5
Horsepower
(Ref. Table “A”, pg. PU-6)

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)

Manifold Code

How to Order:

STATION #1 STATION #2 STATION #3 STATION #4

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

MANIFOLD

RELIEF VALVE PRESSURE ADJUSTMENT RANGE

PUMP COMPENSATOR CONTROL

DIRECTIONAL AND MODULAR VALVES

VOLTAGE

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.)

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)

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

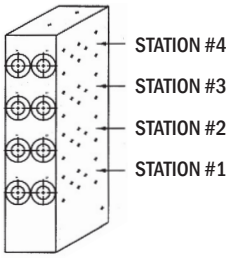
PB3C - Pressure block (#8SAE pressure connection) with compensator control for piston and vane pumps.

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)

N - NONE
15 - 150 - 1500 PSI
30 - 250 - 3000 PSI

STATION #1 IS CLOSEST TO RESERVOIR ON A MULTIPLE STATION MANIFOLD

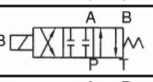


DIRECTIONAL VALVES

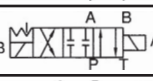
OMIT - NOT REQUIRED

A3Z ▲ -

A3X ▲ -

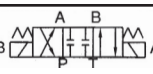


E3X ▲ -

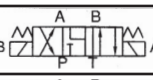


C4 ▲ -

C5 ▲ -



C6 ▲ -



C7Y ▲ -

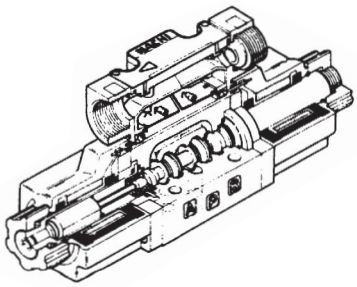
SOLENOID VALVE VOLTAGE

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 connetions.

▲ ADD "F" FOR OPTIONAL HYDRAULIC SHOCKLESS SOLENOID

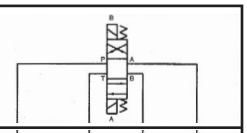
■ "D03" SIZE ONLY



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

Consult factory for additional configurations.

MODULAR VALVES



OG* - Reducing *

OR* - Relief *

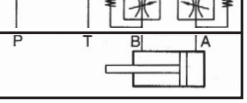
■ OY - Flow Regulator

OC* - Check *

OCP* - Pilot Check *

OCY - Metered Out Flow Regulator

OCF - Flow Control with Metered Out Check



CRACKING PRESSURE
1: 29 PSI
2: 71 PSI

CRACKING PRESSURE
1: 5.7 PSI
2: 50 PSI
3: 71 PSI

PRESSURE ADJUSTING RANGE
1: 0 - 1000 PSI
3: 500 - 3000 PSI

PRESSURE ADJUSTING RANGE
C: 21 - 500 PSI (D03 & D05 ONLY)
1: 114 - 1000 PSI
2: 500 - 2286 PSI

Unit Specification Work Sheet

Customer _____ Nachi W.O.# _____

Customer PO# _____ Date _____

Number of Units Req'd _____ Prepared By

Requested Delivery Time _____ WorkSheet.No.

Nachi Engineer

Reservoir Code Requirements

Required Tank Capacity _____ Gallons

System Flow Requirement _____ GPM

System Pressure Requirement _____ PSI

Pump style ☐ **Gear** ☐ **Vane** ☐ **Piston**

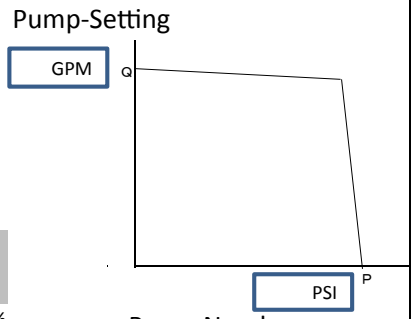
Horsepower Requirement HP = $\frac{\text{GPM x PSI}}{\text{1714 x Std Eff(85\%)}}$ **HP**

Value based on 85% standard efficiency

Cooler Required ☐ **Drain** ☐ **Return**

Return Filter Type ☐ **Inline** ☐ **Intank** ☐ **Special** *Notes:*

Pump-Setting



Pump Number

[ ]

Reservoir Code

Manifold Code Requirements

Manifold Size (Directional) ☐ **D03** ☐ **D05** ☐ **D08**

Relief Valve pressure Range ☐ **150 ~ 1500 psi** ☐ **250 ~ 3000psi** ☐ **Not Required**

Directional & Modular Valves (If Required)

Station #	Spool Type (Valve)	Modular Stack Valves			
#1					
#2					
#3					
#4					
#5					

Note: Station #1 will be closest to pressure inlet on a multiple station manifold.

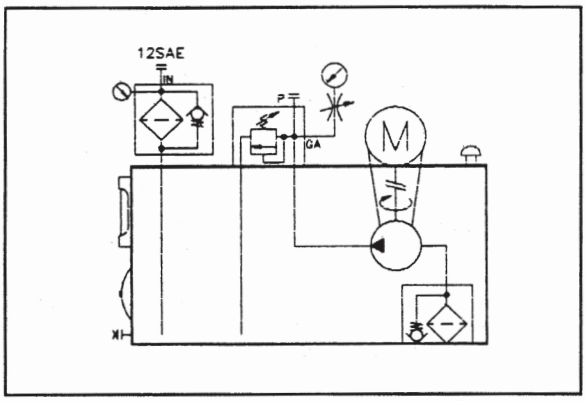
Voltage Requirement ☐ **AC 115V / 60Hz** ☐ **AC 230V / 60Hz** ☐ **DC 12V** ☐ **DC 24V**

Manifold Code

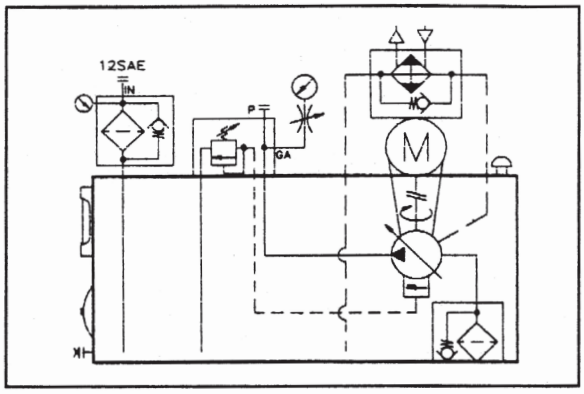
Manufacturing Number	**Approved By (with date)** Nachi Manager		**Checked By (with date)** Nachi Engineer		**Created By (with date)**	
		Date		Date		Date

Comments:

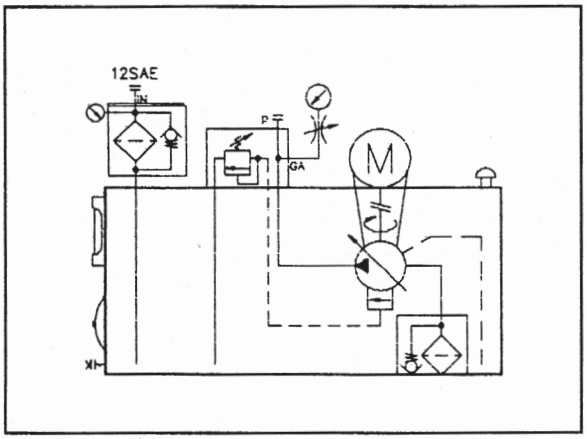
Hydraulic Schematics



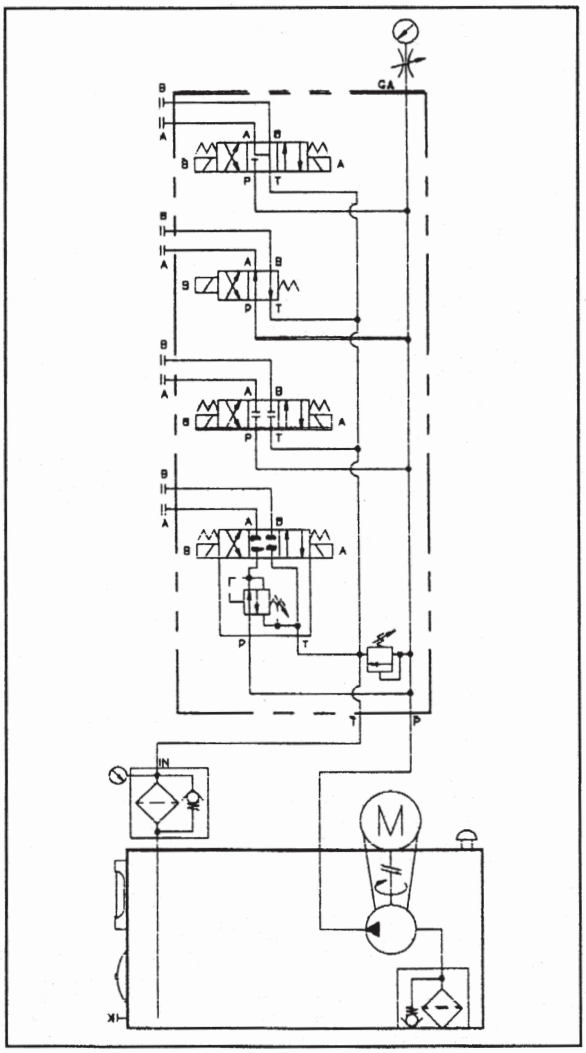
Gear Pump Unit
with Manifold Option "PB3R" (8SAE)
or "PB5R" (12SAE)



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



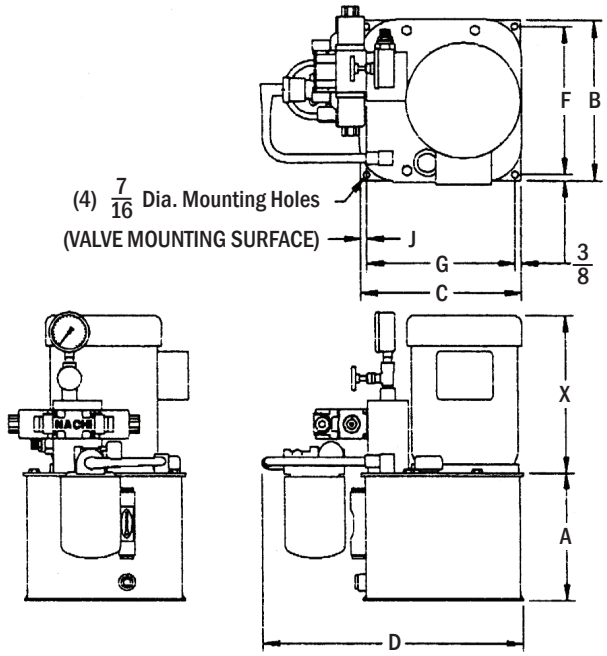
Piston/Vane Pump Unit
with Manifold Option "PB3C" (8SAE)
or "PB5C" (12SAE)



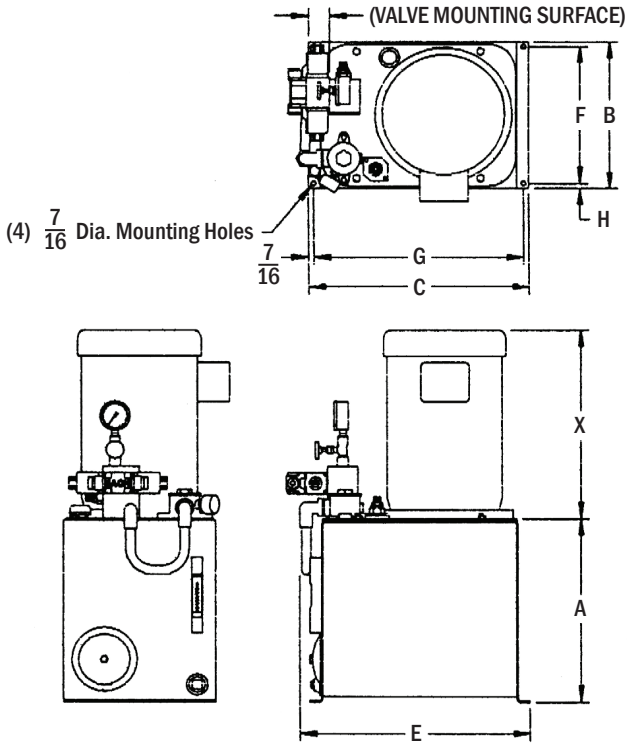
Schematic for "How to Order"
<Example Code>
(Reference page 6)

Standard Unit

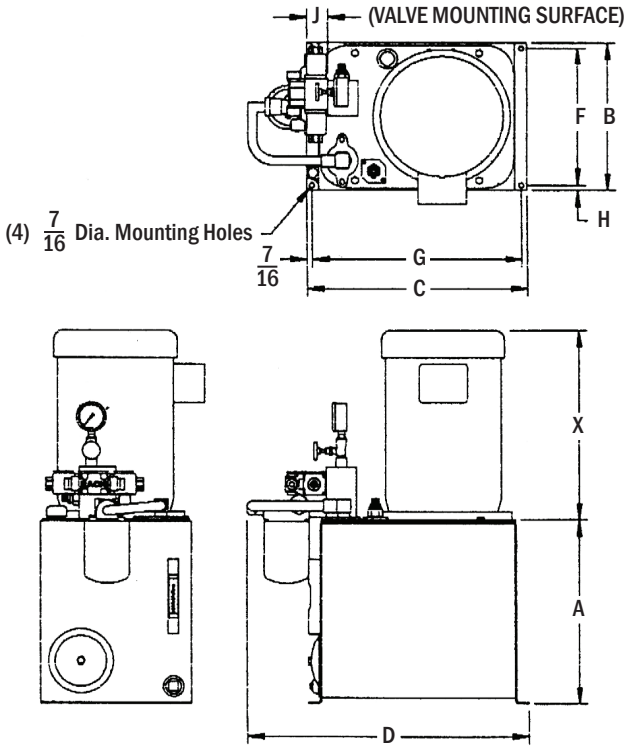
Measurements are approximate. Where dimensions are critical, obtain special quotation.



NV5 Gallon w/Inline Filter



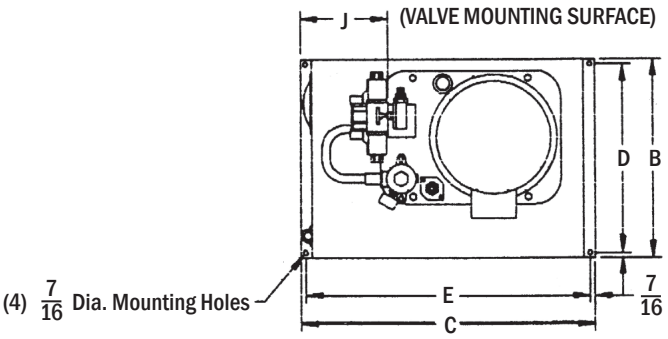
NV10 Gallon w/Intank Filter

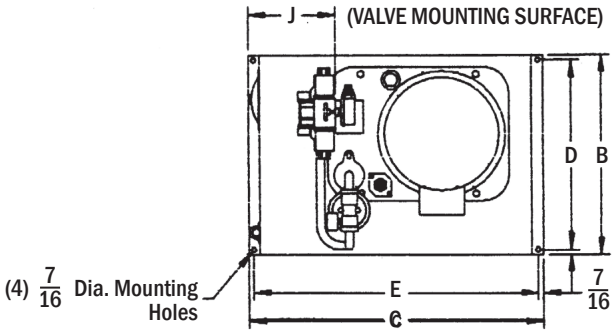


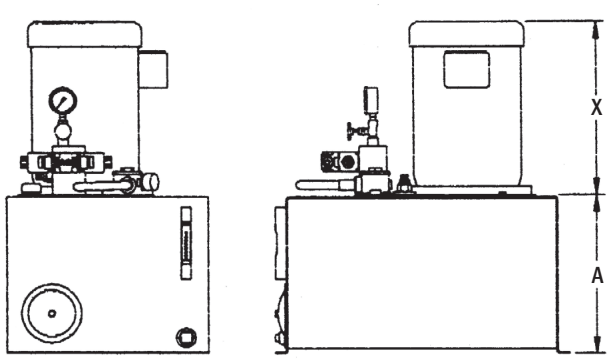
NV10 Gallon w/Inline Filter

Standard Unit

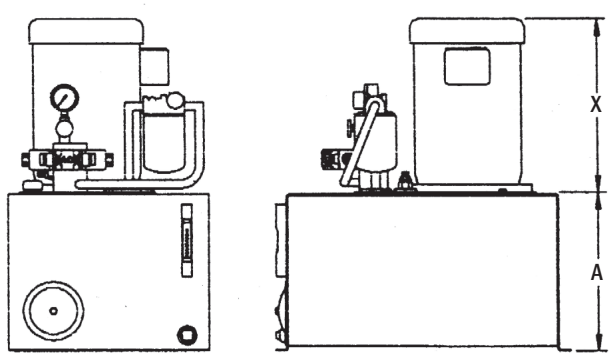
Measurements are approximate. Where dimensions are critical, obtain special quotation.







NV20 Thru NV30 Gallon w/Intank Filter



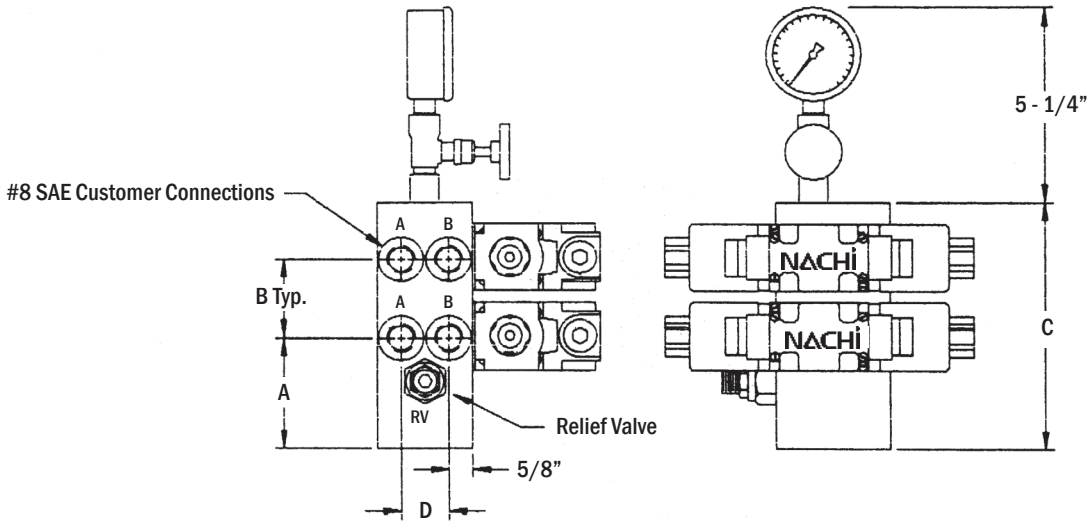
NV20 Thru NV30 Gallon w/Inline Filter

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

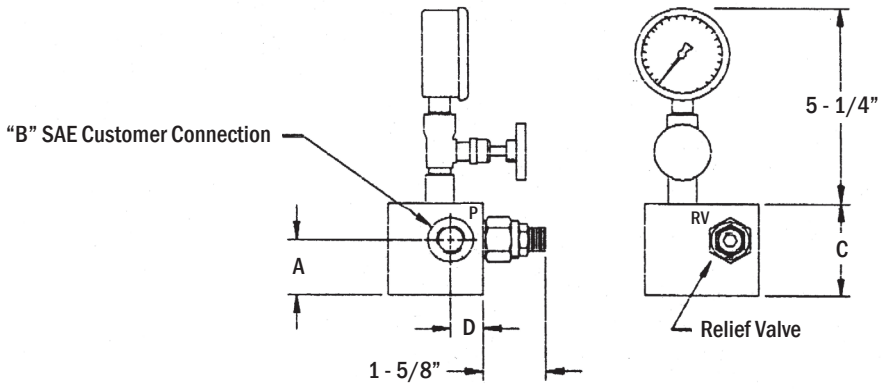
Note: Nachi’s policy of constantly improving its products, specifications are subject to change without notice.

Manifold Dimensions



Manifold Option "DO3/2R" shown

MANIFOLD OPTIONS	MANIFOLD DIMENSION (INCHES)			
	A	B	C	D
DO3/1"	1.06"		2.13"	1.75"
DO3/2"	1.06"	2.13"	4.25"	1.75"
DO3/3"	1.06"	2.13"	6.38"	1.75"
DO3/4"	1.06"	2.13"	8.50"	1.75"
DO5/1"	1.56"	3.25"	3.25"	2.12"
DO5/2"	1.56"	3.25"	6.50"	2.12"
DO5/3"	1.56"	3.25"	9.75"	2.12"
DO5/4"	1.56"	3.25"	13.0"	2.12"

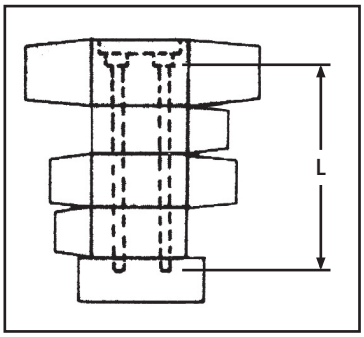


Manifold Option "PB3R" shown

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

Optional Component Information

Bolt Kit Length



Bolt Length for DO3
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 DO5
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 modulars.
2. Bolt kits are furnished with directional valves when no modulars are required.
3. All “DO3” modulars are 40mm thick.
4. “DO5” modulars are 55mm thick.

NACHI Standard Horizontal Hydraulic Power Unit

NACHI standard horizontal hydraulic power units offer standard systems complete with:

Reservoir, Pump, Pump/Motor Adapter, Electric Motor, Motor Channel, Flexible Coupling, Pressure Control Relief Valve For Gear Pumps, Pressure Compensated Piston and Vane Pumps. Pressure gage W/Shut off, Air Breather/Filler Combination, Sight Gage W/ Thermometer, Drain Plug, Pressure and Return Connections, Return Line Filter W/ By-pass and Dirt Indicator, Suction Strainer W/ 3 PSI By-pass.

OPTIONAL ACCESSORIES INCLUDE:

Aluminum parallel directional control manifolds with/without cartridge relief valve in "D03", "D05", Directional Control valves in AC or DC voltage. Pressure and flow control modular valves, air/oil case drain cooler, inline or intank mounted return filter, inline Nachi relief valve. compensated pumps.

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 (see "How To Order", page 16). Custom units can be manufactured using standard unit components.

CAPACITIES:

Reservoir capacities available from 10 gallons 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 horse-power required. Refer to "TABLE A", page 13.

QUALITY:

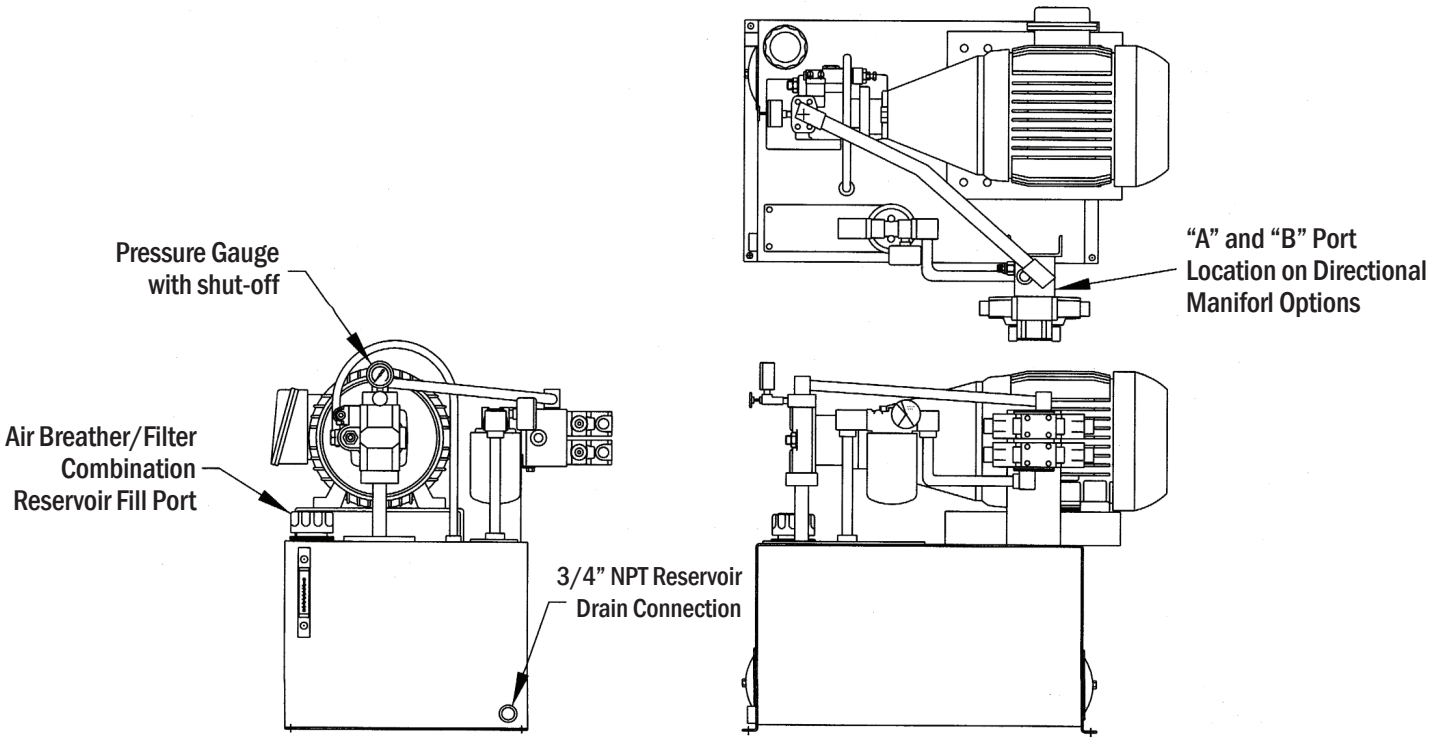
Quality components and high manufacturing standards from such companies as VESCOR, DAMAN, and others make these factory assembled units fit virtually any application. The wide variety of pumps, motors, reservoirs, manifolds, and choice of options enable you to match your application requirements for 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 contaminents 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	*	

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
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/7.9	7.90	1.02
V/10.5	10.50	1.34
V/14.2	14.20	1.83
V/18.4	18.40	2.38

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

Reservoir Code

How to Order

NH40 - 10 - P/10.5 - P1~P3 - N - IL40

RESERVOIRS
- NH10 - 10 Gallon
- NH20 - 20 Gallon
- NH30 - 30 Gallon
- NH40 - 40 Gallon

MOTORS
- 2
- 3
- 5
- 7.5
- 10
- 15
- 20

PUMPS
- G/1.6
- G/2.4
- G/3.0
- G/5.2
- G/7.0
- G/9.0
- G/10.4
- G/12.3
- P/3.8
- P/7.8
- P/10.5
- P/16.6
- P/21.5
- V/4.0
- V/7.9
- V/10.5
- V/14.2
- V/18.4

PRESSURE RANGE
- P1 1000 psi
- P2 1000-2000 psi
- P3 2000-3000 psi

COOLER

CASE DRAIN COOLER FOR PISTON AND VANE PUMPS. ATTACHED TO TEFC MOTOR
- C1 4 GPM (Drain)
- C2 15 GPM Rear Mount 145TC MTR
- C3 20 GPM Rear Mount 182-184TC MTR
- C4 24 GPM Rear Mount 213-215TC MTR

RETURN FILTER ▲
- IL22 -22 GPM Spin-On
- IL40 - 40 GPM Spin-On
- IT25 - 25 GPM In-Tank
- IT40 - 40 GPM In-Tank

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

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.

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)

▲ FILTER CONNECTION SIZE

IL22 - #1" NPT	IT25 - #16 SAE
IL40 - #1" NPT	IT40 - #16 SAE

Manifold Code

How to Order:

STATION #1 STATION #2 STATION #3 STATION #4

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

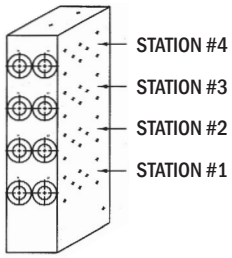
MANIFOLD

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.)
D05/*R - D05 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.)
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)

RELIEF VALVE PRESSURE ADJUSTMENT RANGE

N - NONE
15 - 150 - 1500 PSI
30 - 250 - 3000 PSI

STATION #1 IS CLOSEST TO RESERVOIR ON A MULTIPLE STATION MANIFOLD



▲ ADD "F" FOR OPTIONAL HYDRAULIC SHOCKLESS SOLENOID

■ "D03" SIZE ONLY

○ "D03" & "D05" SIZE ONLY

DIRECTIONAL AND MODULAR VALVES

DIRECTIONAL VALVES
OMIT - NOT REQUIRED
A3Z ▲ -
A3X ▲ -
E3X ▲ -
C4 ▲ -
C5 ▲ -
C6 ▲ -
C7Y ▲ -

MODULAR VALVES

OG* - Reducing	*
OR* - Relief	*
■ OY - Flow Regulator	
OC* - Check	*
OCP* - Pilot Check	*
OCY - Metered Out Flow Regulator	
○ OCF - Flow Control with Metered Out Check	

CRACKING PRESSURE
1: 29 PSI
2: 71 PSI

CRACKING PRESSURE
1: 5.7 PSI
2: 50 PSI
3: 71 PSI

PRESSURE ADJUSTING RANGE
1: 0 - 1000 PSI
3: 500 - 3000 PSI

PRESSURE ADJUSTING RANGE
C: 21 - 500 PSI (D03 & D05 ONLY)
1: 114 - 1000 PSI
2: 500 - 2286 PSI

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 connetions.

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

Consult factory for additional configurations.

Unit Specification Work Sheet

Customer _____ Nachi W.O.# _____

Customer PO# _____ Date _____

Number of Units Req'd _____ Prepared By

Requested Delivery Time _____ WorkSheet.No.

Nachi Engineer

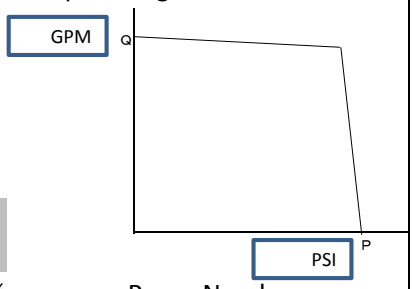
Reservoir Code Requirements

Required Tank Capacity _____ Gallons

System Flow Requirement _____ GPM

System Pressure Requirement _____ PSI

Pump-Setting



Pump style ☐ **Gear** ☐ **Vane** ☐ **Piston**

Horsepower Requirement $HP = \frac{GPM \times PSI}{1714 \times Std\ Eff(85\%)}$ **HP**

Value based on 85% standard efficiency

Cooler Required ☐ **Drain** ☐ **Return**

Pump Number [ ]

Return Filter Type ☐ **Inline** ☐ **Intank** ☐ **Special** *Notes:*

Reservoir Code

Manifold Code Requirements

Manifold Size (Directional) ☐ **D03** ☐ **D05** ☐ **D08**

Relief Valve pressure Range ☐ **150 ~ 1500 psi** ☐ **250 ~ 3000psi** ☐ **Not Required**

Directional & Modular Valves (If Required)

Station #	Spool Type (Valve)	Modular Stack Valves			
#1					
#2					
#3					
#4					
#5					

Note: Station #1 will be closest to pressure inlet on a multiple station manifold.

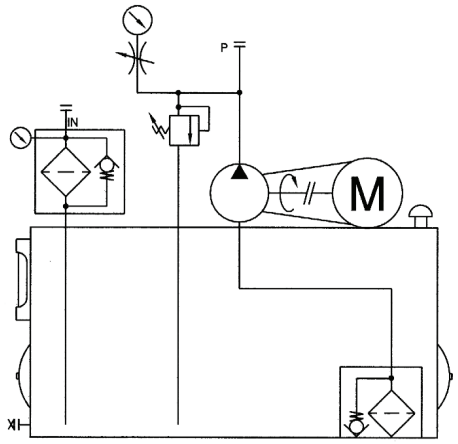
Voltage Requirement ☐ **AC 115V / 60Hz** ☐ **AC 230V / 60Hz** ☐ **DC 12V** ☐ **DC 24V**

Manifold Code

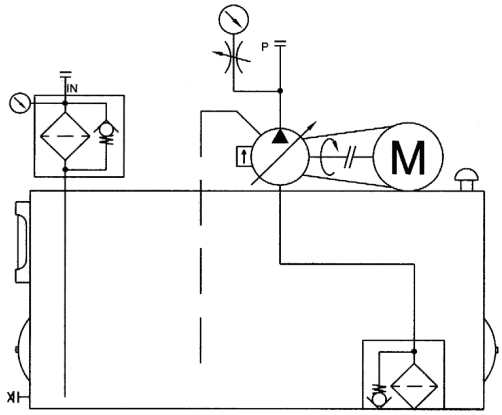
Manufacturing Number	**Approved By (with date)** Nachi Manager		**Checked By (with date)** Nachi Engineer		**Created By (with date)**	
		Date		Date		Date

Comments:

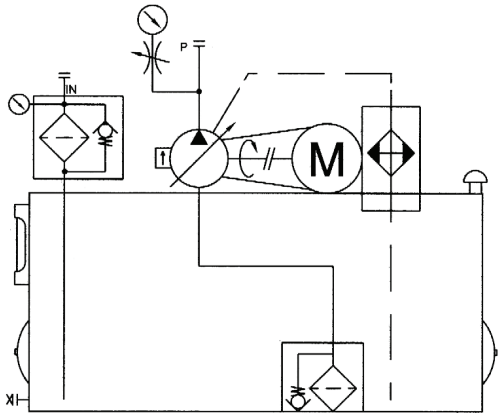
HYDRAULIC SCHEMATICS



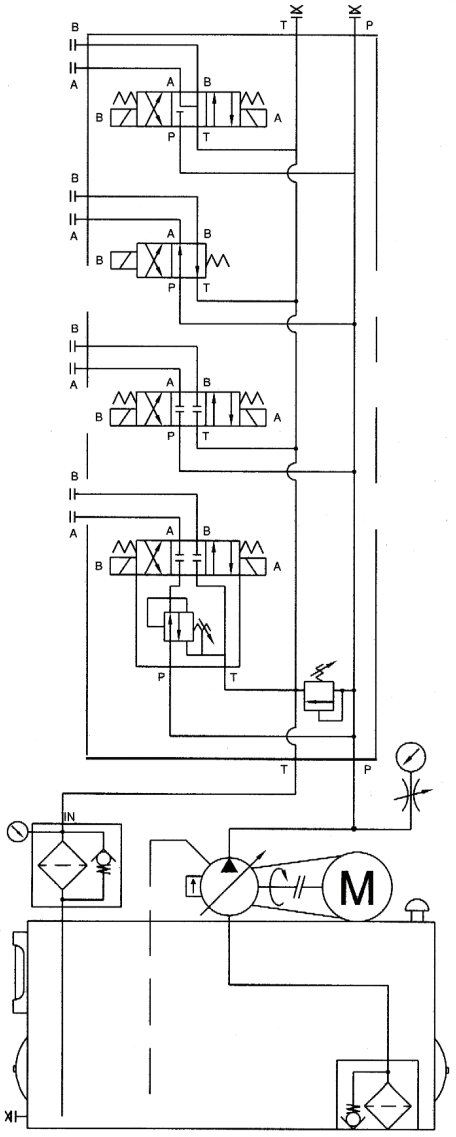
Gear Pump Unit
with Manifold Option "RV*"



Piston/Vane Pump Unit
with Manifold Option "N"



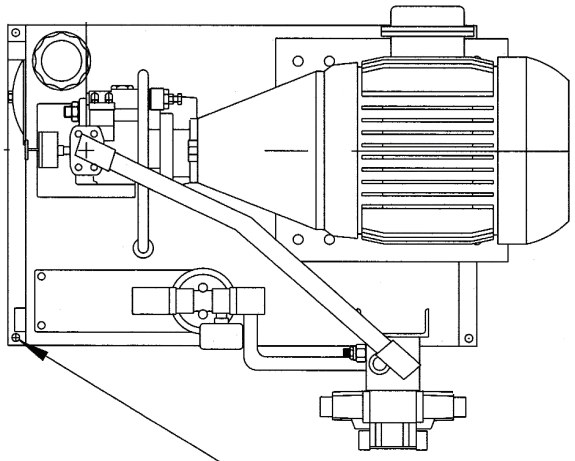
Piston/Vane Pump Unit
with "AO*" Cooler Option

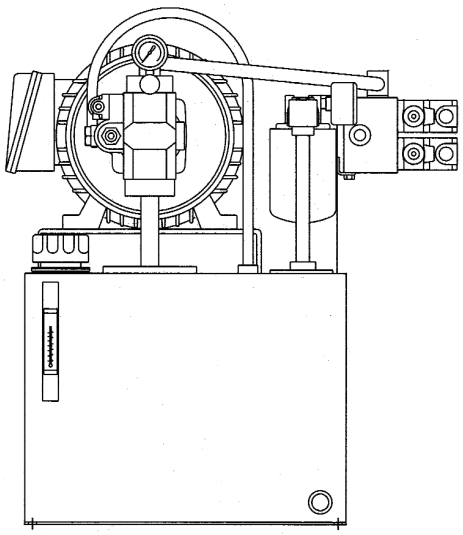


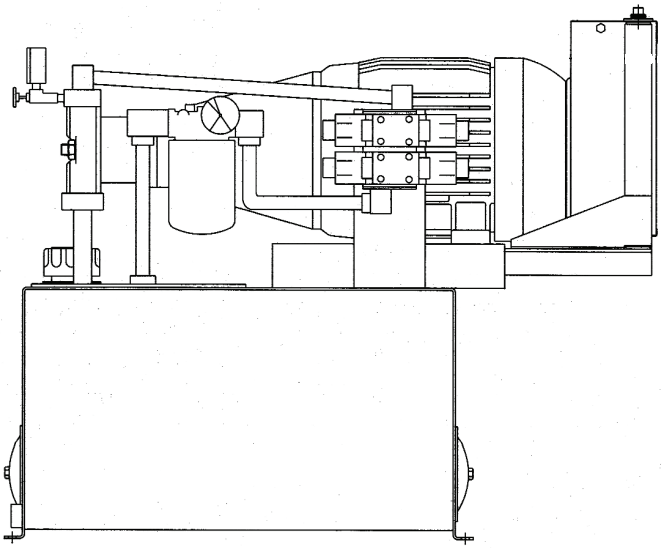
Schematic for "How to Order"
<Example Code>
(Reference pages PU 16)

Standard Unit

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







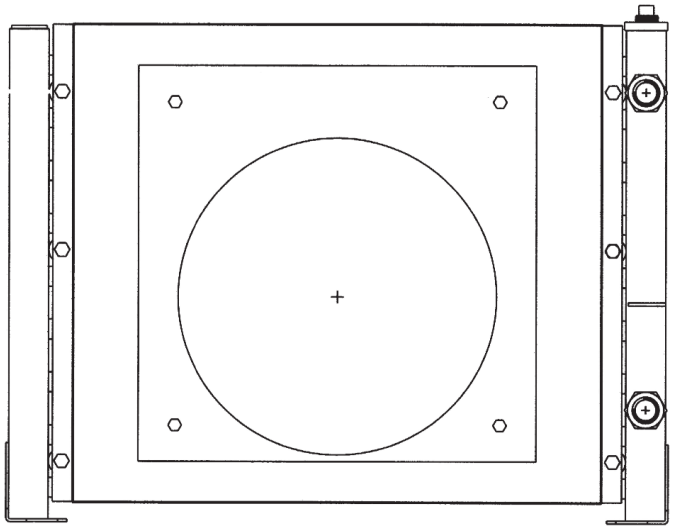
UNIT DIMENSIONAL INFORMATION

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	

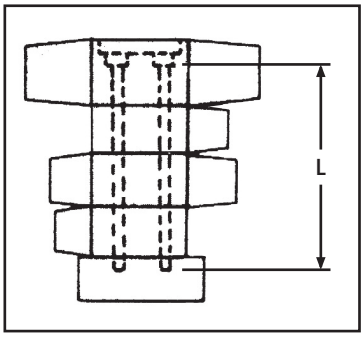


Air/Oil Return Oil Cooler

	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



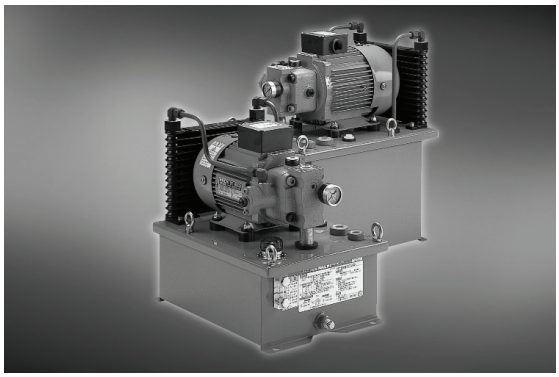
Bolt Length for DO3
Valve - 10 - 24 x 1 3/4
Valve & module - 10 - 24 x 3 1/4
Valve & 2 modules - 10 - 24 x 5

Bolt Length for DO5
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 modulars.
2. Bolt kits are furnished with directional valves when no modulars are required.
3. All “DO3” modulars are 40mm thick.
4. “DO5” modulars are 55mm thick.

Compact Power Unit with Variable Volume Vane Uni-Pump



Compact hydraulic units are widely used as a power source in such machine tool applications as NC lathe chuck opening and closing, tailstock, tool rotation, machining center spindle raise and lower operations, etc. During pressure holding, the new NSP power unit, consisting of our UVN variable volume vane uni-pump, enables machine efficiency that delivers energy savings of approximately 40% when compared with Nachi standard power units.

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

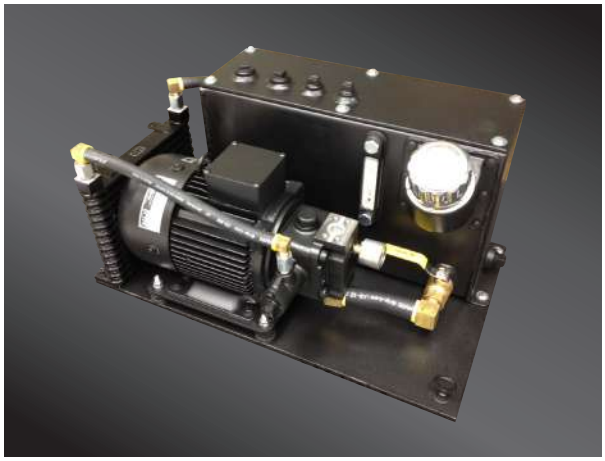
A powerful, energy-efficient built-in cooling system eliminates the need for fan motor wiring and coolant pipes.

SPECIFICATIONS

Item		Model No.	NSP-*-*V0A*	NSP-*-*V1A*	NSP-*-*V2A*
Pump Capacity	cm^3/rev.	{in^3/rev}	8.0 {0.49}	16.0 {0.98}	26.0 {1.59}
Maximum pressure	MPa	{psi}	8.0 {1160} (Full cutoff pressure)		7.0 {1015} (Full cutoff pressure) Allowed peak pressure: 13.0 (1885)
Motor Output	kW	{HP}	0.75 {1}, 1.5 {2}	1.5 {2}, 2.2 {3}	2.2 {3}, 3.7 {5}
Tank Capacity	ℓ	{gallon}	20 {5.28}		30 {7.92}, 40 {10.57}
Installation space	mm	{inch}	300 X 400 {11.81 x 15.75}		340 x 450 {13.39 x 17.72}
Approximate weight	kg	{lbs}	39 {86} (20 ℓ, 1.5kW)		63 {139} (30 ℓ, 2.2kW, excluding options)

NSP-L Power Unit

A more compact, space-saving unit with the same efficiency and power capabilities as the original NSP units.



Note: Nachi's policy of constantly improving its products, specifications are subject to change without notice.

Model Code

How to Order

NSP – 10 – 07 V 0 A2 – 2TF – E13

- **NSP** — NSP Series compact variable pump unit
- **10** — Tank volume: 10, 20, 30, 40 ℓ
- **07** — Motor capacity: 07: 0.75 kW (1 HP); 15: 1.5 kW (2 HP); 22: 2.2 kW (3 HP); 37: 3.7 kW (5 HP)
- **V** — Pump type: Variable vane pump
- **0** — Flow rate adjustment range (Maximum capacity)
  0: 8 cm^3/ rev (.49 cu in)
  1: 16 cm^3/ rev (.98 cu in)
  2: 26 cm^3/ rev (1.59 cu in)
  Note: 2. Factory defaults are maximum values shown above.
- **A2** — Pressure adjustment range (A: constant discharge type)
  A2: 1.5 to 4.0 MPa (507 psi) Pressure gauge scale 16 MPa
  A3: 3.5 to 6.0 MPa (725 psi) Pressure gauge scale 25 MPa
  A4: 5.5 to 8.0 MPa (1015 psi) Pressure gauge scale 25 MPa
  Note: 1. Figures in parentheses show factory default full cutoff set values.
- **2TF** — Option (Indicate in alphabetic sequence.)
  F*: Built-in block*=1~3
- **E13** — Design number
  E13 220 Volt 60 Hz
  E13G 460 Volt 60 Hz
  E13M 230 Volt 60 Hz

Note: 1. Note that there are certain restrictions on pump capacity and motor capacity combinations.
2. Design numbers are subject to change without notice.

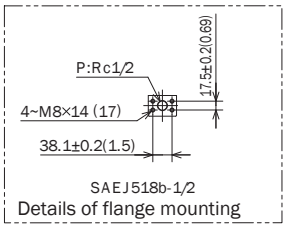
NSP – 20L – 07 V 0 A2 – F – 13

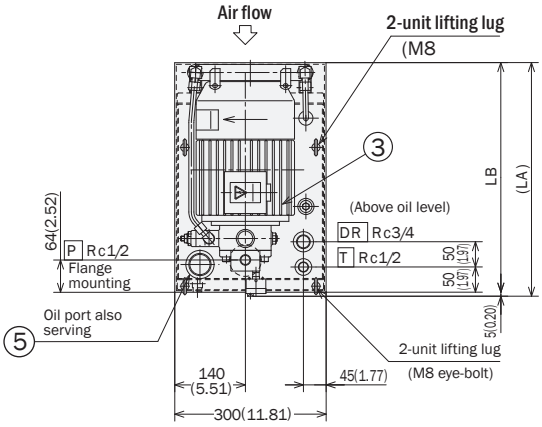
- **NSP** — NSP-20L Series compact variable pump unit
- **20L** — Tank volume: 20 ℓ (5 gal)
- **07** — Motor capacity: 0.75 kW (1 HP); 1.5 kW (2 HP)
- **V** — Pump type: Variable vane pump
- **0** — Flow rate adjustment range (Maximum capacity)
  0: 8 cm^3 / rev (.49 cu in)
  1:16cm^3/ rev (.98 cu in)
- **A2** — 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.
- **F** — Option (Indicate in alphabetic sequence.)
  F*: Built-in block*=1~2 Temp gauge standard
- **13** — Design number
  13 220 Volt 60 Hz
  13G 460 Volt 60 Hz
  13M 230 Volt 60 Hz

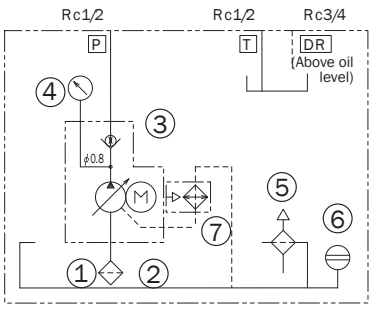
Dimensional Drawings

8.0, 16.0 cm³/ rev Series

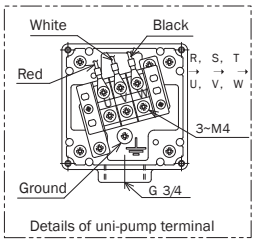
NSP-*-**V*A*-13

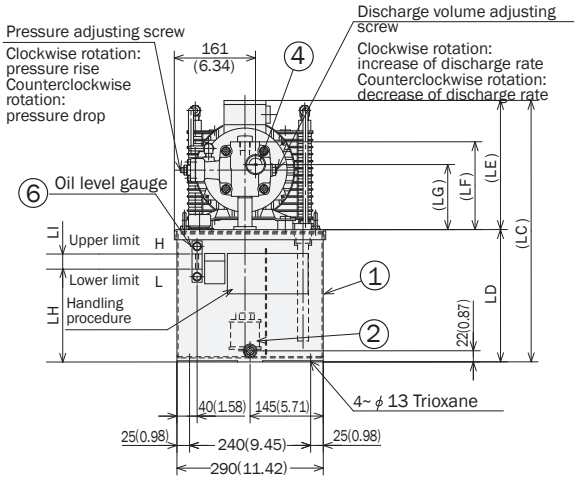


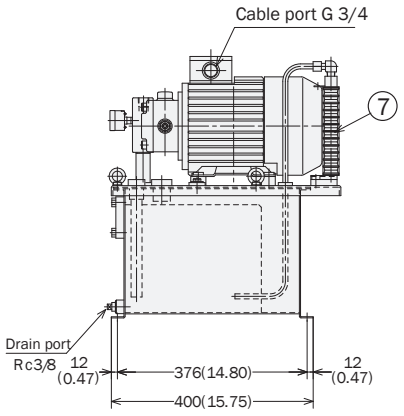




Note: The unit lifting lug (eye-bolt and eye-nut) also serves as a screw for assembling the tank. If it is removed, the tank upper plate will be removed.







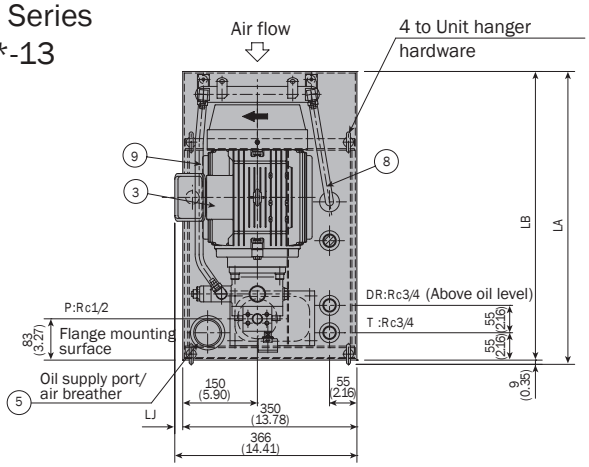
PART NO.	PART NAME
1	Oil tank
2	Suction strainer
3	Uni-pump
4	Pressure gauge
5	Fluid supply port/ air breather
6	Fluid level gauge
7	Radiator
8	Flexible hose
9	Flexible hose

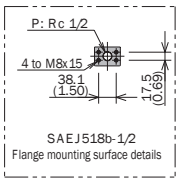
8.0, 16.0 cm³ / rev Series

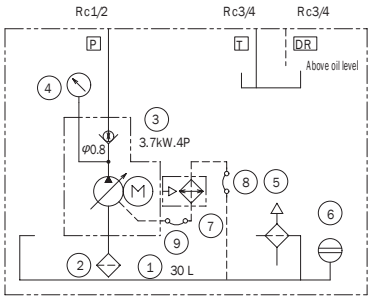
MODEL NO.	Motor (kW-P)	DIMENSIONS											Approximate Weight (kg)
		LA	LB	LC	LD	LE	LF	LG	LH	LI	H	L	
NSP-10-07V*A*-*-13	0.75 - 4	405	400	394		234	154	109					33
NSP-10-15V*A*-*-13	1.5 - 4	430	425	396	160	236	164	119	102	10	10L	9L	37
NSP-10-22V*A*-*-13	2.2 - 4	460	455	422		262	174	129					42
NSP-20-07V*A*-*-13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

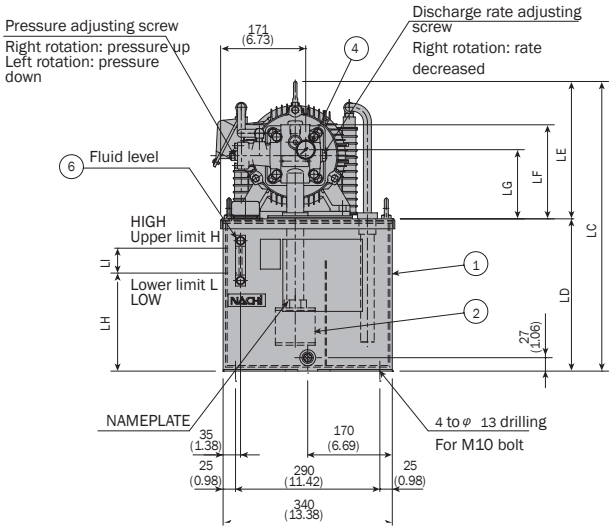
(Excluding operating fluid)

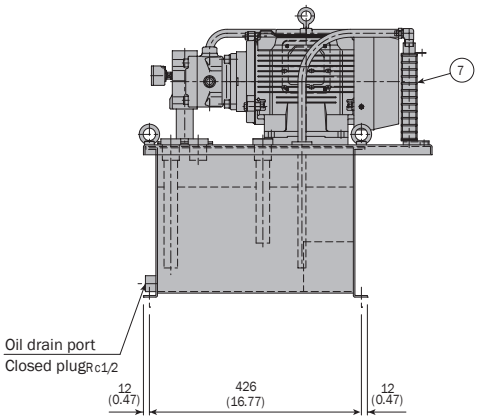
26.0 cm³/ rev Series
NSP-*-**V2A*-13











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

26.0 cm³ / rev Series

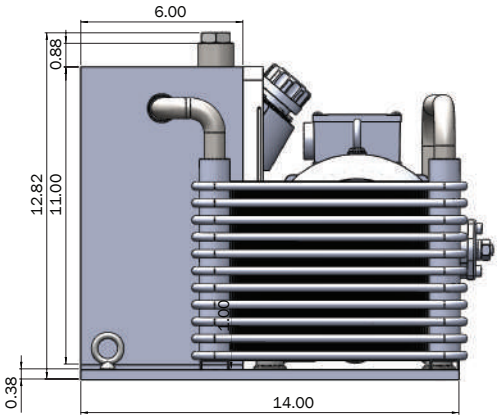
MODEL NO.	Motor (kW-P)	DIMENSIONS												Approximate Weight (kg)
		LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ	H	L	
NSP-30-22V2*A*-*-13	2.2 - 4	564	555	619	306	234	177	127	197	50	9	30L	23L	63
NSP-30-37V2*A*-*-13	3.7 - 4	589	580	661		276	189	139			15			73
NSP-40-22V2*A*-*-13	2.2 - 4	564	555	619	385	234	177	127	256	70	9	40L	31L	67
NSP-40-37V2*A*-*-13	3.7 - 4	589	580	661		276	189	139			15			77

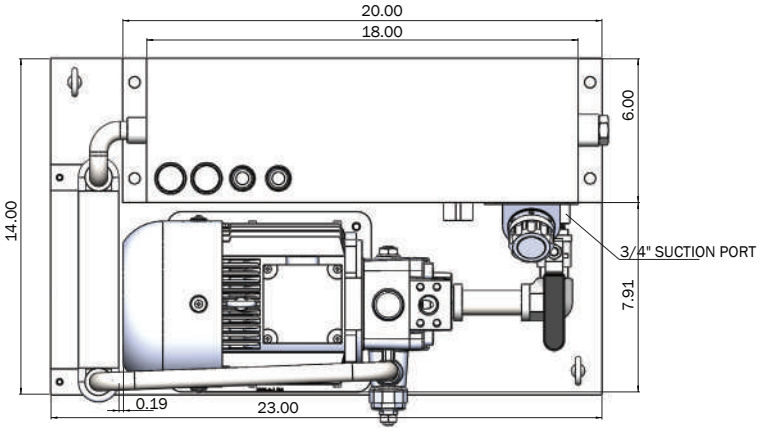
(Excluding operating fluid)

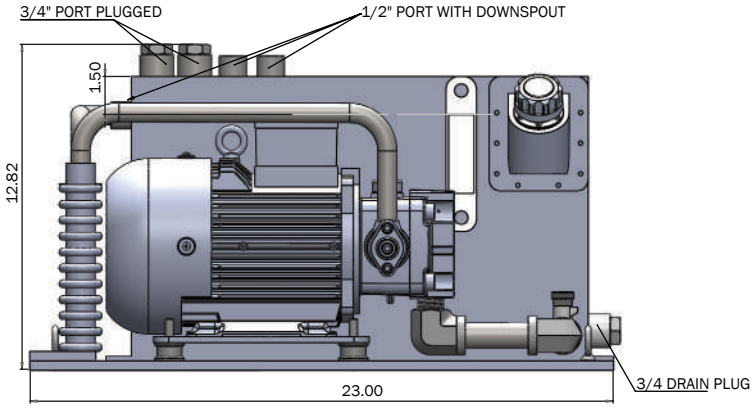
Note: Nachi's policy of constantly improving its products, specifications are subject to change without notice.

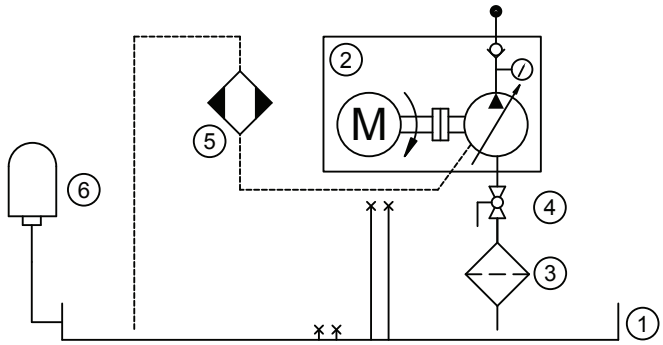
Dimensional Drawings

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







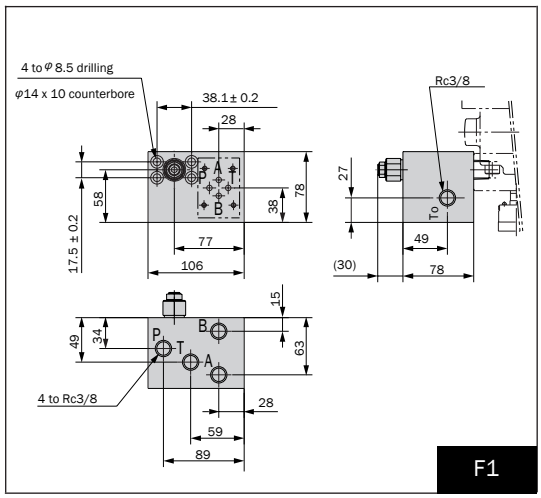


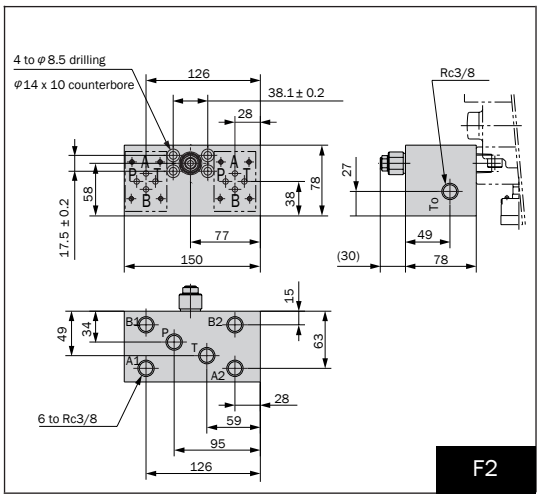
PART NO.	PART NAME
1	NL-4 L Shape Reservoir
2	UVN-1A-1A4-1.5-4-11 Pump Motor
3	SUS-A088-068-N16F Strainer
4	948-173 3/4' Ball Valve
5	3A92-001-1050 Cooler
6	SM57XL-10 Filler/Breather

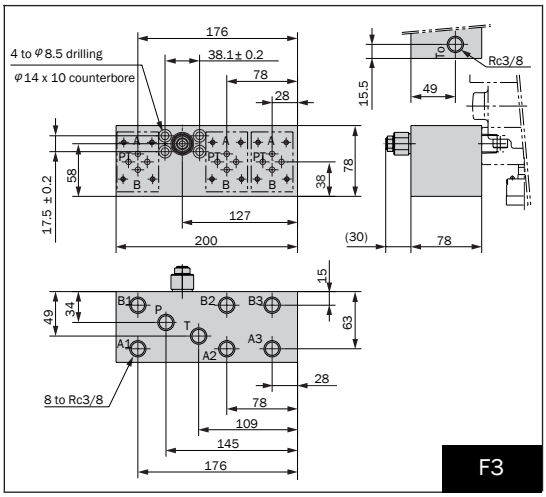
NSP-20L-07V0A*-(*)-E13
NSP-20L-15V0A*-(*)-E13
NSP-20L-15V1A*-(*)-E13

( ) 220V 60 Hz
(G) 460V 60 Hz
(M) 230V 60 Hz

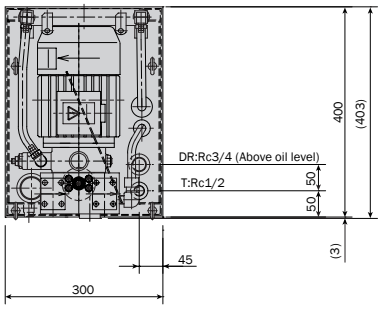
Option Details

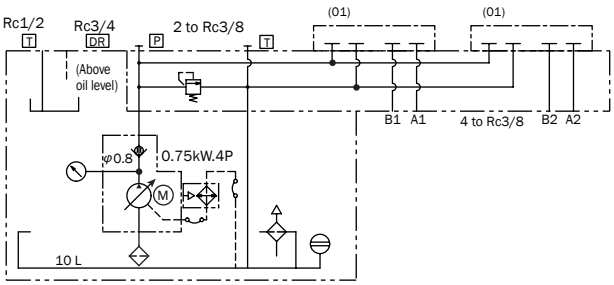


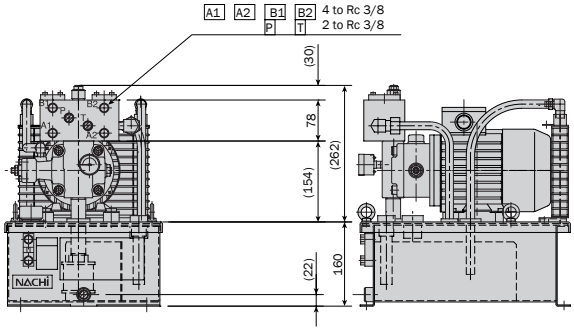




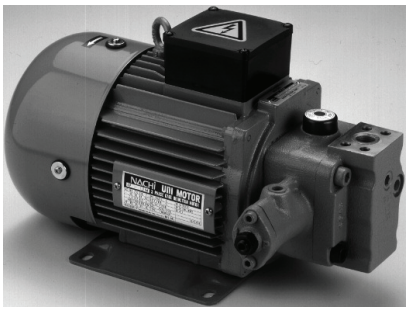
NSP-10-07V0A2-F2-E13

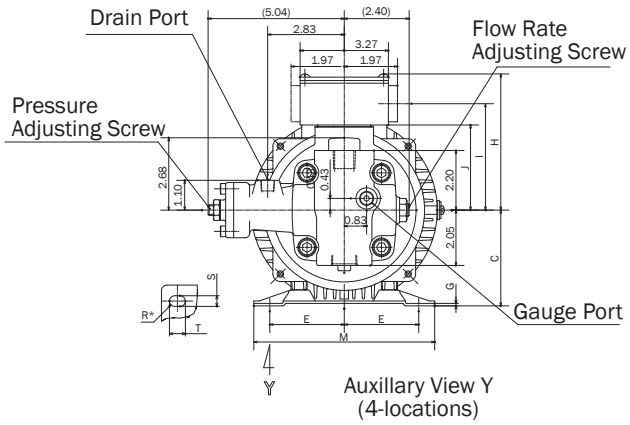


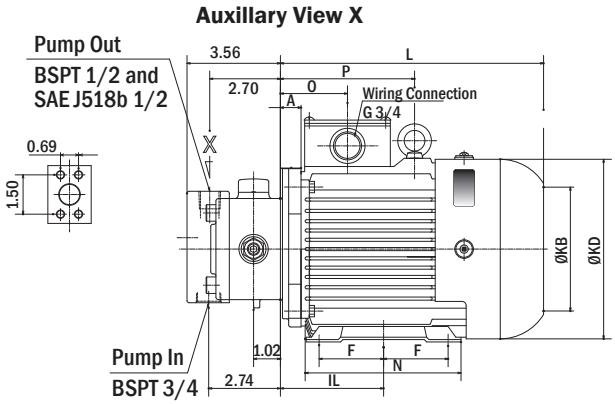




UVN Uni-Pump







MODEL NO.	DIMENSIONS INCH																		Approximate Weight (kg)
	A	IL	C	KD	E	F	G	H	J	L	M	N	TXS	R*	KB	O	P	I	
UVN-1A-*A*-0.7E-4( )-11	0.79	3.54	3.15	6.18	2.46	1.97	0.09	4.72	2.80	9.06	6.10	4.72	0.59X0.39	0.20	4.33	2.56	5.12	3.62	37.5
UVN-1A-*A*-1.5E-4(M)-11	0.79	3.94	3.54	6.89	2.76	2.46	0.13	5.04	3.07	10.04	6.69	5.91	0.59X0.39	0.20	4.72	2.56	5.12	3.94	46.2
UVN-1A-*A*-2.2E-4(G)-11	0.79	4.33	3.94	7.68	3.15	2.76	0.13	5.43	3.46	11.22	7.87	6.50	0.67X0.47	0.24	5.28	2.56	5.31	4.33	57.3

**( ) - 200V; (M) - 230V; (G) - 460V*

NSP Power Unit Combinations

POWER UNIT	PUMP MODEL		GPM RANGE	PRESSURE RANGE
NSP-10-07V0A2-13	PUMP/MOTOR	UVN-1A-0A2-07E-4M-11	1.4 GPM TO 3.8 GPM	217 PSI TO 580 PSI
NSP-10-07V0A3-13		UVN-1A-0A3-07E-4M-11	1.4 GPM TO 3.8 GPM	507 PSI TO 870 PSI
NSP-10-15V0A4-13		UVN-1A-0A4-15E-4M-11	1.4 GPM TO 3.8 GPM	797 PSI TO 1160 PSI
NSP-20-15V1A2-13	PUMP/MOTOR	UVN-1A-1A2-15E-4M-11	3.7 GPM TP 7.6 GPM	217 PSI TO 580 PSI
NSP-20-22V1A3-13		UVN-1A-1A3-22E-4M-11	3.7 GPM TP 7.6 GPM	507 PSI TO 870 PSI
NSP-20-22V1A4-13		UVN-1A-1A4-22E-4M-11	3.7 GPM TP 7.6 GPM	797 PSI TO 1160 PSI
NSP-30-22V2A3-13	PUMP/MOTOR	UVN-1A-2A3-22E-4M-11	3.7 GPM TO 12 GPM	507 PSI TO 870 PSI
NSP-30-22V2A4-13		UVN-1A-2A4-22E-4M-11	3.7 GPM TO 12 GPM	797 PSI TP 1160 PSI
NSP-30-37V2A3-13		UVN-1A-2A3-37E-4M-11	3.7 GPM TO 12 GPM	507 PSI TO 870 PSI
NSP-30-37V2A4-13		UVN-1A-2A4-37E-4M-11	3.7 GPM TO 12 GPM	797 PSI TP 1160 PSI
NSP-40-22V2A3-13	PUMP/MOTOR	UVN-1A-2A3-22E-4M-11	3.7 GPM TO 12 GPM	507 PSI TO 870 PSI
NSP-40-37V2A4-13		UVN-1A-2A4-37E-4M-11	3.7 GPM TO 12 GPM	797 PSI TP 1160 PSI

10 LITERS = 2.6 GALLONS	0.7 KW = 1 HP
20 LITERS = 5 GALLONS	1.5 KW = 2 HP
30 LITERS = 8 GALLONS	2.2 KW = 3 HP
40 LITERS = 10 GALLONS	3.7 KW = 5 HP

Motor Selection Method

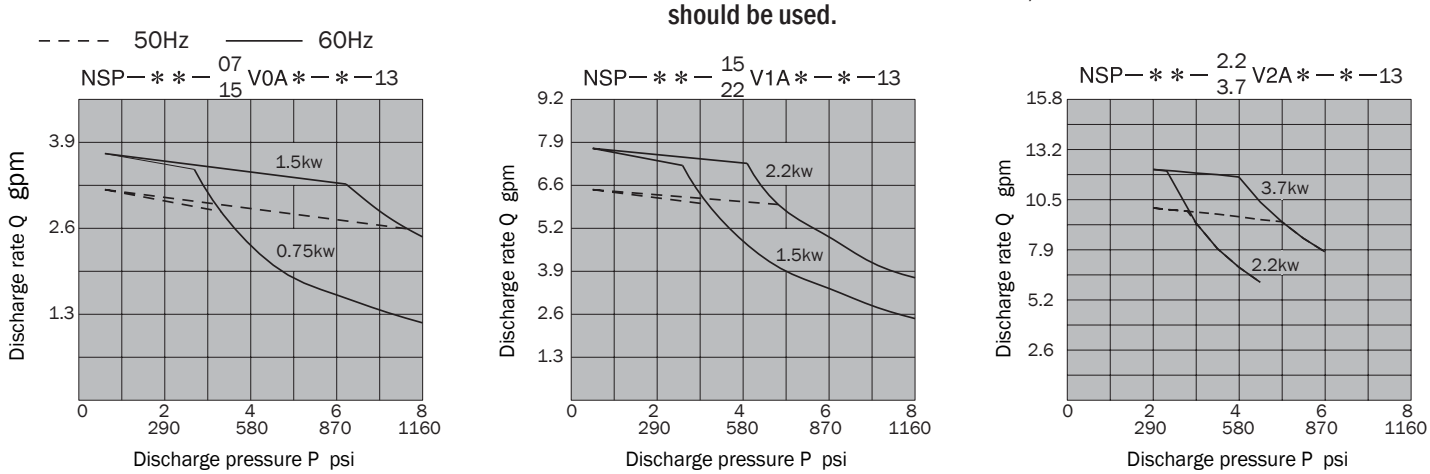
The area under a motor output curve in the graphs below is the operating range for the motor under the rated output for the motor.

Example

Find the motor to be used at a pressure of 3.5MPa {508psi} and discharge rate of 12ℓ/min {3.2gpm}.

Solution

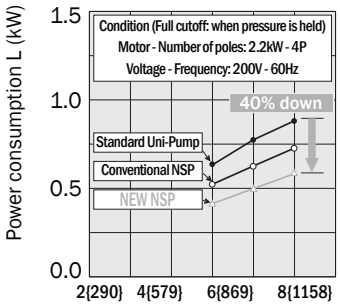
Since the intersection of the two broken lines from a pressure of 3.5MPa {508psi} and discharge rate of 12ℓ/min {3.2gpm} intersect in the area under the 1.5kW curve, it means that a 1.5kW motor should be used.



Performance Characteristics

Power Consumption

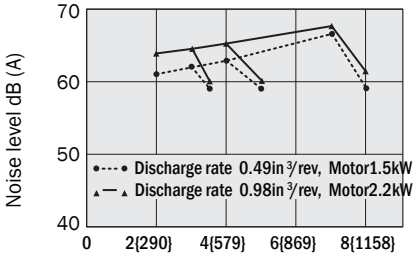
Type: NSP-**-22V*A4-12



Set pressure at the time of FC P MPa {psi}

Noise Characteristics

Type: NSP-20-*V*A4-12



Discharge pressure P MPa {psi}

Conditions

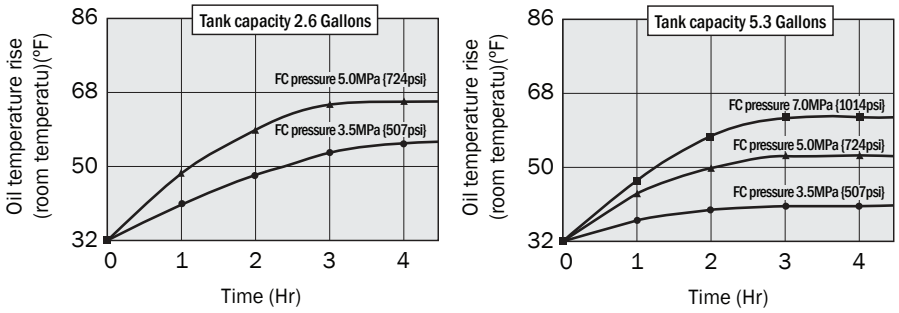
The value in the left-hand drawing represents typical characteristics under the following conditions:
Oil used: ISO VG32 or its equivalent
Oil temperature: 104 +/- 41°F
Measuring distance: 3.3 feet around the unit

Note:

The noise characteristics depend on the installation floor base conditions and the presence of the surrounding substance reflecting the sound, and so may be different from the above description in some cases.

Oil Temperature Characteristics

Type: NSP-**-*V1A*-12



Conditions

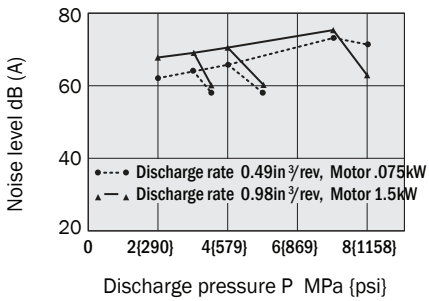
The value on the left-hand drawing represents typical characteristics
under the following conditions:
Oil used: ISO VG32 or its equivalent
Speed: 1800 min-1
Room temperature: 84°F
Motor: 0.75~2.2kW

Notes:

1. For 5.0MPa (724 psi) of a 2.6 gallon tank. It should be noted that there is a big rise in oil temperature under continuous operation. In this case, we recommend use of a 5.3 gallon tank.
2. Rise of oil temperature depends on the conditions of using an actual machine, and so may be different from the above description in some cases.

Noise Characteristics

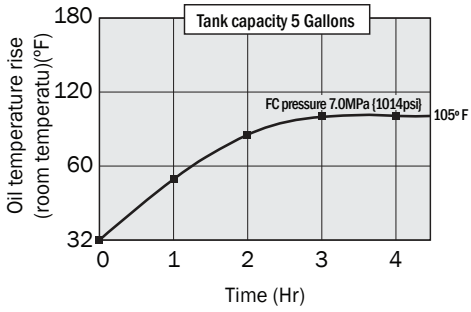
Type: NSP-L



Discharge pressure P MPa {psi}

Oil Temperature Characteristics

Type: NSP-L



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

NACHI

Nachi America Inc.

715 Pushville Rd, Greenwood, IN 46143
Tel. (800) 622-4410 Fax. (317) 530-1015
Email: hydraulics@nachiamerica.com
www.nachiamerica.com

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