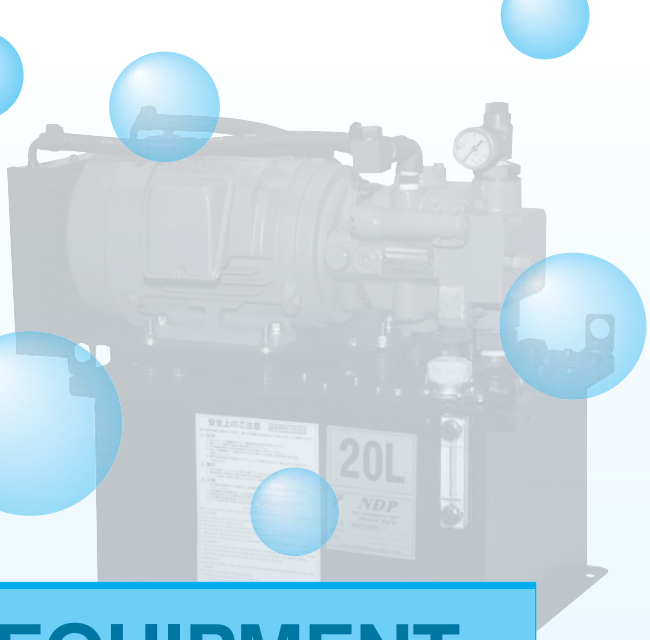
N



UNIT EQUIPMENT

Piston Pack

NDP151N3NN-10 (Not equipped with control system)

(Example configuration with various options)

Features

- **Easy maintenance**
  - Easy cleaning with detachable suction strainer design.
  - A return filter and magnet separator can be retrofitted for protection against fluid contamination. They are of course easily detachable too.
  - A radiator filter can also be retrofitted to prevent clogging of the radiator. The radiator filter incorporates a replaceable element.
  - A parallel thread is adopted for the discharge port plug. Fluid can be changed anytime and anywhere since no sealing tape is required.
  - A yellow cap is fitted to the filler port-cum-air breather.
  - Tank volume sign is affixed as standard.
  - A fluid level gauge guard is equipped as standard.
- **Low noise, low fluid temperature rise**
  - Pump and motors are fitted with vibration-absorbing rubber pads.
  - A drain cooler is equipped as standard. The radiator maintains a low fluid temperature in the tank, contributing to a longer fluid lifetime.
- **A wide variety of optional devices (separately available parts)**
  - Temperature switch, fluid level switch, return filter, magnet separator, radiator filter, thermometer, manifold for control valves.
- **Control valves installable**
  - Up to 3 series of 1/4B solenoid valves and modular stack valves that come in a wide variety of types can be installed.
- **Equipped with best seller V series high efficiency piston pump**

Refer to Page A-8 for details of V series piston pumps incorporated into these units.

Nomenclature

NDP 2 15 1 N 3 N N - 10 - 1 1 1 1

1 2 3 4 5 6 7 8 9 10 11 12 13

Optional part
(no designation when no option is selected)

1 Model No.
NDP: Piston pack
(Compact hydraulic unit equipped with V series piston pump)

2 Tank capacity
2: 20 L

3 Pump capacity
08: V8 pump (8.0 cm^3/rev)
15: V15 pump (14.8 cm^3/rev)
For specifications of pumps themselves, refer to V8A1RX and V15A1R(X).

4 Maximum operating pressure
1: 7 MPa

5 Control valves installation
N: Standard
J: Installable

6 Motor capacity
1: 0.75 kW, 4-pole (V8 pump only)
2: 1.5 kW, 4-pole
3: 2.2 kW, 4-pole (V15 pump only)

7 Motor specifications
N: Standard specifications, Japanese standard voltage
A: Standard specifications, different voltage

8 Manifold installation
N: Manifold not installed
1: 1-series manifold installed
2: 2-series manifold installed
2: 3-series manifold installed

9 Design No.

10 Filters and related parts
0: None
1: With return filter
2: With magnet separator
3: With return filter + magnet separator

11 Radiator filter
0: None
1: With radiator filter

12 Switches and related parts
0: None
1: Fluid level switch (LSN-90L-B-11)
2: Temperature switch (TSF-60X-150-11)
3: Thermometer (RBT-ST-R1/4-100-6X150)
4: Electronic pressure switch (PK6732: PNP output)
5: Fluid level switch + temperature switch
6: Fluid level switch + electronic pressure switch
7: Temperature switch + electronic pressure switch
8: Thermometer + electronic pressure switch
9: Fluid level switch + temperature switch + electronic pressure switch

13 Tank type *
0: Standard tank
1: Water leak test compliant tank
2: Water fill test compliant tank
3: Tank with oil pan
4: Water leak test compliant tank with oil pan
5: Water fill test compliant tank with oil pan
* Tank types
Water leak test compliant tank:
Tank material thickness of 1.6 mm. A water leak test is conducted after coating the tank. The tank comes with the test certificate affixed.
Water fill test compliant tank:
Tank material thickness of 3.2 mm. A water fill test is conducted before coating the tank. The tank comes with the test certificate affixed.

Standard voltage (3 ratings)	Different voltage (6 ratings)	
• AC 200 V (50 Hz)	• AC 380 V (50 Hz)	• AC 415 V (50 Hz)
• AC 200 V (60 Hz)	• AC 400 V (50 Hz)	• AC 440 V (60 Hz)
• AC 220 V (60 Hz)	• AC 400 V (60 Hz)	• AC 460 V (60 Hz)

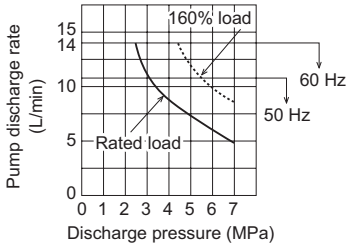
Specifications

Model \ Specifications	Pump capacity cm^3/rev	Pump maximum discharge rate L/min at 50/60 Hz (1.0 MPa) *1	Maximum operating pressure MPa *1	Motor capacity kW (4-pole)	Tank capacity L *2	Manifold installation: Installable	Manifold installation: Number of series *3: None	1	2	3	Mass kg *4
NDP2081N1※N-10	8.0	11/14	7	0.75	20	–	–	–	–	–	38
NDP2081J1※N-10						○	○	□	□	□	
NDP2081N2※N-10				1.5		–	–	–	–	–	45
NDP2081J2※N-10						○	○	□	□	□	
NDP2151N2※N-10	14.8	20/25				–	–	–	–	–	50
NDP2151J2※N-10						○	○	□	□	□	
NDP2151N3※N-10				2.2		–	–	–	–	–	55
NDP2151J3※N-10						○	○	□	□	□	
NDP2081J1※1-10	8.0	11/14		0.75		○	–	○	–	–	51
NDP2081J1※2-10								–	○	-	53
NDP2081J1※3-10								–	–	○	55
NDP2081J2※1-10				1.5				○	–	–	58
NDP2081J2※2-10								–	○	–	60
NDP2081J2※3-10								–	–	○	62
NDP2151J2※1-10	14.8	20/25				○	–	○	–	–	63
NDP2151J2※2-10								–	○	–	65
NDP2151J2※3-10								–	–	○	67
NDP2151J3※1-10				2.2				○	–	–	68
NDP2151J3※2-10								–	○	–	70
NDP2151J3※3-10								–	–	○	72

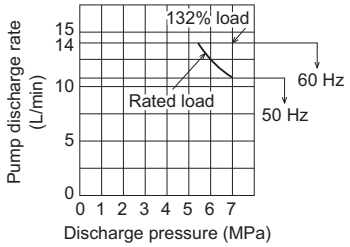
Note: *1 The flow rate is set to the maximum discharge rate and the pressure is set to 3.5 MPa before shipment. Set an appropriate pressure and discharge rate according to the capacity of the motor used.
*2 The tank's coating color is N-1 (JPMA code).
*3 In the number of series field, the ○ symbol indicates the number installed before shipment and the □ symbol indicates the number installable afterwards.
*4 The mass increases by 1 kg for each CE compliant motor.

Pressure - Flow rate characteristics

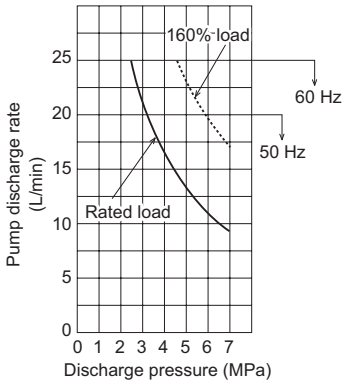
NDP2081※1※※ (M8-0.75 kW)



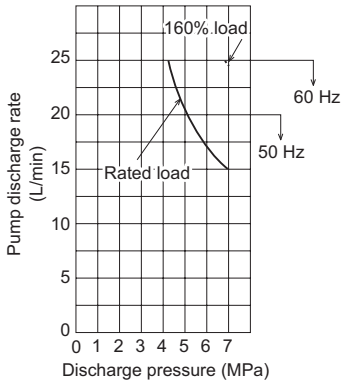
NDP2081※2※※ (M8-1.5 kW)



NDP2151※2※※ (M15-1.5 kW)



NDP2151※3※※ (M15-2.2 kW)



Handling

- **Hydraulic fluid, ambient environment**
  - ○ Use a petroleum-based hydraulic fluid equivalent to ISO VG32 to 46.
    Use of hydraulic fluids other than the petroleum-based type (e.g. hydrous/synthetic) is prohibited.
  - ○ Operate the unit in an environment where both the following conditions are satisfied: viscosity range from 15 to 400 mm^2/s and oil temperature from 0 to 60°C (within 15 to 50°C recommended).
  - ○ Be sure to maintain the water content in the hydraulic fluid at 0.1% maximum by volume.
  - ○ Contamination of the hydraulic fluid causes device trouble and reduces the service life, so ensure that the contamination of the hydraulic fluid goes no higher than NAS contamination class 10.
  - ○ Use the unit indoors under the following conditions.
    Ambient temperature: 0 to 40°C, Ambient humidity: 20 to 90%RH (with no condensation)
    If using the unit where there is a lot of dust or oil mist, clean it periodically by applying compressed air or by other means since the oil cooler is prone to clogging in such environments.
- **At start**
  - ○ Fill the pump case with hydraulic fluid through the filler port before starting trial operation, after replacing the pump, or after stopping the unit for 6 months or longer. Use the same hydraulic fluid as for the hydraulic circuit.

	NDP208※※※※※	NDP215※※※※※
Case capacity cm^3	300	500

  - ○ After checking that all hydraulic circuits and electrical circuits are ready for operation, set the hydraulic circuit at the load side in the no-load status or connect an unloading circuit before starting the pump. When the pump is driven for the first time, turn the power switch to the motor on and off a few times to let the air out of the piping and then run it continuously at full speed. A roaring noise may be observed until the air has been completely removed but this is not abnormal.
  - ○ Check that the pressure rises at the pressure gauge.
- **Electric wiring**
  - ○ Connect the power cable matching the phases at the pump motor and power supply sides as shown to the right.
    Check that the pressure rises at the pressure gauge.
    If the motor would be rotated in the reverse direction, switch the connection between two phases among the three to correct the direction of rotation.
  - ○ Be sure to connect the ground terminal.
  - ○ Install a no-fuse breaker on the main power supply.
    See the electrical rating table of the motor shown to the right for electrical ratings. In addition, install an earth leakage breaker.

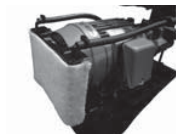
<Motor rating table (rated current)>
Permissible voltage fluctuation: ±10%

Power supply	0.75 kW	1.5 kW	2.2 kW
AC 200 V 50 Hz	3.8 A	6.8 A	9.3 A
AC 200 V 60 Hz	3.4 A	6.2 A	8.8 A
AC 220 V 60 Hz		6.0 A	8.3 A

- **Transportation**
  - ○ Use the hoisting hooks (ϕ20-hole at 4 locations) when transporting or hoisting the unit.
- **Installation**
  - ○ The unit is a stationary type. Fix it on a level location that is free of vibration.
  - ○ Be sure to secure the unit to the floor to prevent it from toppling over.

Options (separately available parts)

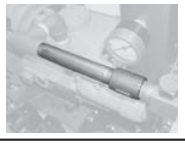
- The table below shows the optional parts that can be incorporated in piston packs.
  Options marked "Possible" in the "Assembly order availability" field will be assembled before shipment if the relevant option code is specified in the model code.

Name	Model	Manufacturer	Assembly order availability	Remarks
Return filter 	RC-06S-10X-A	Yamashin-Filter Corp.	Possible	Filtration accuracy 10 μm (*1)
Magnet separator 	MFB-50B	NEOMAX Co., Ltd.	Possible	(*1)
Radiator filter 	E-DCRFILTER-10B01-10	DAIKIN	Possible	Set of 2 pieces
Fluid level switch 	LSN-90L-B-11	ASK Co., Ltd	Possible	OFF when fluid level drops (*1)
	LSN-90L-A-11		Impossible	ON when fluid level drops (*1)
Temperature switch 	TSF-60X-150-11		Possible	OFF when 60°C exceeded (*1)
	TSF-60Y-150-11		Impossible	ON when 60°C exceeded (*1)
Thermometer 	RBT-ST-R1/4-100-6X150	Nisshin Gauge MFG. Co., Ltd.	Possible	Measurement range: 0 to 100°C Scale mark plate ϕ44.4 (*1)
Electronic pressure switch 	PK6732	efector co., ltd.	Possible	PNP type voltage output Setting range: 10 MPa (*2) With harness (10 m)

*1 When placing an order with Daikin, specify the model code prefixed by "E-".
*2 When placing an order with Daikin, specify E-PSW10PNP-PK6732 as the model code.

Control valve type option parts table

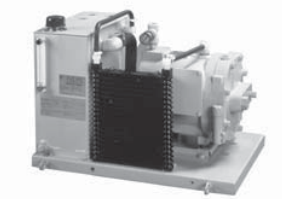
- When installing a manifold on control system installable piston packs without a manifold, the following option parts will be required.

Name	Model		Remarks
Manifold 	BT-102-NDP-10	1-series	These manifolds can be directly mounted on the end cap of the pump. Each series is provided with pressure measurement ports for ports A and B. In addition, a set of P and T piping ports is provided for the external piping. The piping set listed next will also be required to install a manifold.
	BT-202-NDP-10	2-series	
	BT-302-NDP-10	3-series	
Piping set 	E-NDP-PIPESET-10	For 1.5 and 2.2 kW	This is a hose set to connect the manifold listed above to port T of the tank.
	E-NDP-PIPESET-1-10	For 0.75 kW	
Pump filler port set 	E-NDP-OILINLET-10		This is used to relocate the filler port to another location (rear of the unit or port A/B side) in cases where the original filler port is difficult to reach when the control valves are installed, which may happen with some circuit configurations.

NDR Series Rotor Pack


NDR151 (Vertical type)


NDR151 (Horizontal type)


NDR231

Features

- **Low noise**
  Achieves a noise level of no greater than 60 dB (A) and there is no need to worry about hydraulic noise even at factories in residential areas.
- **Compact design**
  Minimum size designs for both the vertical and horizontal models make mounting design easier.
- **High reliability**
  The fully enclosed structure with no shaft protruding from the casing eliminates the possibility of oil leakage without using an oil seal.
- **Low oil temperature rise**
  Temperature rise is restricted to within room temperature +15°C to eliminate thermal distortion of the machine.
- **Possible to install a solenoid valve**
  A solenoid valve can be installed on NDR081 and NDRI51.

Nomenclature

NDR	※※	1	-	※※	※	※	-	30	-	※	※
1	2	3		4	5	6		7		8	9

1 Model No.
NDR: Rotor back

2 Pump capacity
08: 8.0 cm^3/rev
15: 14.8 cm^3/rev
23: 24.4 cm^3/rev
38: 37.7 cm^3/rev

3 Maximum operating pressure
1: 7 MPa {70 kgf/cm^2}

4 Tank capacity
07: 7 L <Applicable only to NDR08>
10: 10 L <Applicable only to NDR15>
20: 20 L <Applicable only to NDR23>
30: 30 L <Applicable only to NDR23 and 38>

Refer to Page C-5 for details of RP series rotor pumps incorporated into these units.

5 Motor capacity
1: 0.75 kW, 4-pole <Applicable only to NDR08>
2: 1.5 kW, 4-pole <Applicable only to NDR15>
3: 2.2 kW, 4-pole <Applicable only to NDR15 and 23>
5: 3.7 kW, 4-pole <Applicable only to NDR23 and 38>

6 Pack configuration
No designation: NDR23, NDR38
H: Vertical type <Applicable to NDR08 and 15>
L: Horizontal type <Applicable to NDR08 and 15>

7 Design No. (The design No. is subject to change.)

8 Option code I
No designation: Standard product
R: With return filter (nominal filtration accuracy: 10 µm) <Applicable to NDR23 and 38>

9 Option code II
No designation: Standard product
E: CE standard compliant

Specifications

Model code	Pump capacity cm^3/rev	Motor capacity Output kW (Number of poles: 4)	Tank capacity L	Maximum operating pressure MPa {kgf/cm^2}	Discharge rate setting at shipment L/min		Pressure at shipment MPa {kgf/cm^2}	Oil cooler motor input W
					50 Hz	60 Hz		
NDR081-071※ -30	8	0.75	7	7 {70}	11	14	3.5 {35}	16 /17.6
NDR151-102※ -30	14.8	1.5	10		20	25		
NDR151-103※ -30		2.2					7 {70}	
NDR231-203 -30	24.4		20		35	42	3.5 {35}	35.5/39.1
NDR231-305 -30		3.7	30				7 {70}	
NDR381-305 -30	37.7				53.5	64	3.5 {35}	

Note: ○ Power supply: AC 3-phase 200 V (50 Hz), 200 V (60 Hz), 220 V (60 Hz)
○ Oil cooler power supply: AC 1-phase 200 V (50 Hz), 200 V (60 Hz), 220 V (60 Hz)

Paint color

White (Munsell code N8.5).

Handling

- **Hydraulic fluid, ambient environment**
  - ○ Use a petroleum-based hydraulic fluid equivalent to ISO VG32 to 46.
    Use of hydraulic fluids other than the petroleum-based type (e.g. hydrous/synthetic) is prohibited.
  - ○ Operate the unit in an environment where both the following conditions are satisfied: viscosity range from 15 to 400 mm^2/s {cSt} and oil temperature from 0 to 60°C.
  - ○ Be sure to maintain the water content in the hydraulic fluid at 0.1% maximum by volume.
  - ○ Contamination of the hydraulic fluid causes device trouble and reduces the service life, so pay due attention to controlling contamination and ensure that it goes no higher than NAS contamination class 10.
  - ○ Use the unit indoors under the following conditions.
    Ambient temperature: 0 to 35°C, Ambient humidity: 20 to 85%RH (with no condensation)

- **At start**
  - ○ Fill the pump case with hydraulic fluid through the filler port before starting trial operation, after replacing the pump, or after stopping the unit for 3 months or longer. Use the same hydraulic fluid as for the hydraulic circuit. When replenishing fluid after the unit has been stopped for a while, check the fluid level in the tank with the level gauge during replenishment since fluid inside the pump may enter the tank and cause overflow.

	NDR081	NDR151	NDR231	NDR381
Pump case filling volume cm^3	1100	2300	4000	

- **Electric wiring**
  - ○ Connect the power cable matching the phases at the pump motor and power supply sides as shown below.
    The positions of U, V, W of the motor are indicated on the back of the terminal box.

Motor side [U — R, V — S, W — T] Power supply side

Check that the pressure at the delivery side rises at the pressure gauge.
If wires are connected with the wrong phase order, the motor and pump rotate in the reverse direction and no fluid is discharged. If fluid is not discharged within 5 minutes after turning the power on, the phase order may be incorrect. In this case, switch the wires for two phases among the three.

  - ○ Be sure to connect the ground terminal.
  - ○ Install a no-fuse breaker on the main power supply. In addition, install an earth leakage breaker.
    The electrical ratings are as shown in the table below. Refer to Page C-11 for the reference current values for selecting the thermal breaker capacity.

Model code	Motor capacity Output kW (Number of poles: 4)	Rated current A		
		AC 200 V (50 Hz)	AC 200 V (60 Hz)	AC 220 V (60 Hz)
NDR081-071※-30	0.75	3.8	3.4	
NDR151-102※-30	1.5	6.8	6	5.8
NDR151-103※-30	2.2	9.6	8.8	8.4
NDR231-203 -30		10	9.2	8.7
NDR231-305 -30	3.7	15.1	14.7	13.4
NDR381-305 -30				

  - ○ The fan motor for the oil cooler uses a 1-phase AC 200 V power supply without polarity. Although the motor is equipped with an impedance protector or thermal protector (see oil cooler DCR※※※-10 on Page N-15), install a 0.5 A circuit breaker to prevent burning out of wires at short-circuiting.

- **Air intake/exhaust**
  Do not place any obstacles to oil cooler air intake and exhaust within a distance of 100 mm from intake and exhaust vent of the oil cooler. Install the unit at a location with good air flow so that heated air can be vented.

- **Transportation**
  Use eye bolts for hoisting to transport the unit.

- **Installation**
  The unit is a stationary type. Fix it with bolts on a level location that is free of vibration.

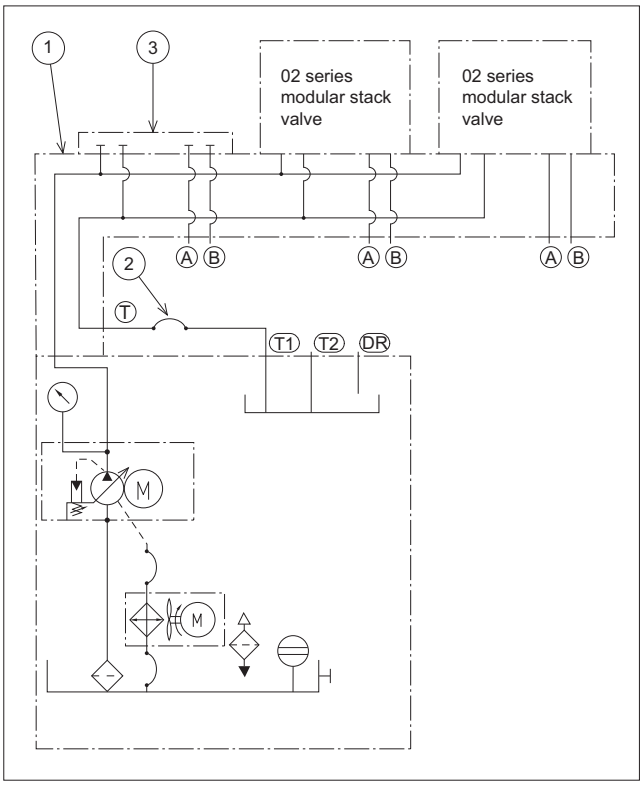
Rotor pack options (separately available parts)

The NDR08/NDR15 series are designed to incorporate 02 series control valves to cover a wide variety of customer requirements.

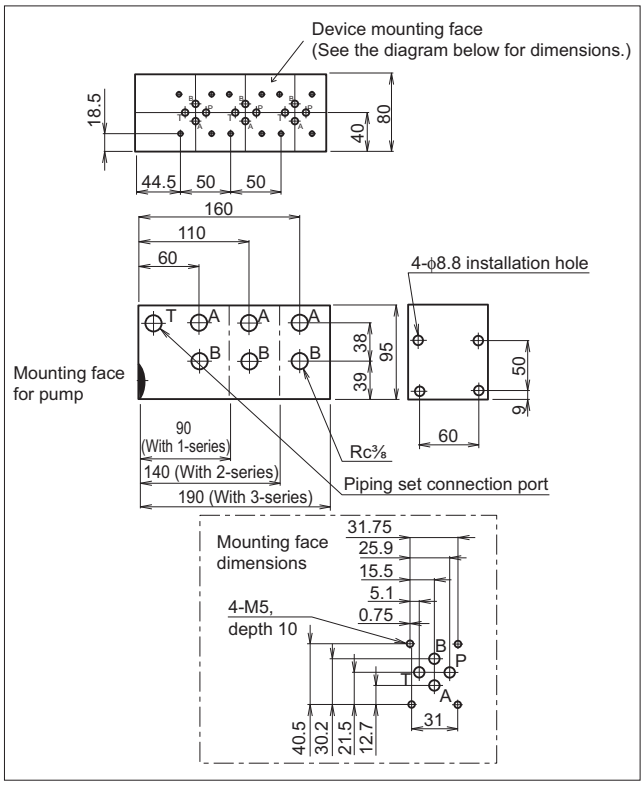
● Option table

Part No.	Name	Detail of accessories		Order code			
		Name	Quantity	For NDR081-071H	For NDR081-071L	For NDR151-10※H	For NDR151-10※L
1	1-series block set	1-series block	1	BTRSET1-10			
		O-ring (JIS B 2401 1B P18)	1				
		O-ring (JIS B 2401 1B P20)	1				
		Mounting bolt (M8 × 100 hexagon socket head cap bolt)	4				
		Installation guide	1				
	2-series block set	2-series block	1	BTRSET2-10			
		O-ring (JIS B 2401 1B P18)	1				
		O-ring (JIS B 2401 1B P20)	1				
		Mounting bolt (M8 × 150 hexagon socket head cap bolt)	4				
		Installation guide	1				
	3-series block set	3-series block	1	BTRSET3-10			
		O-ring (JIS B 2401 1B P18)	1				
		O-ring (JIS B 2401 1B P20)	1				
		Mounting bolt (M8 × 200 hexagon socket head cap bolt)	4				
		Installation guide	1				
2	Piping set	Piping (rubber hose)	1	NDR08H-PIPE-10	NDR08L-PIPE-10	NDR15H-PIPE-10	NDR15L-PIPE-10
		Joint	1 set				
		Piping guide	1				
3	Blocking block	Blocking block	1	P-BS02SET-20			
		O-ring (JIS B 2401 1B P9)	4				
		Mounting bolt (M5 × 25 hexagon socket head cap bolt)	4				

● Hydraulic circuit diagram (for 3-series)

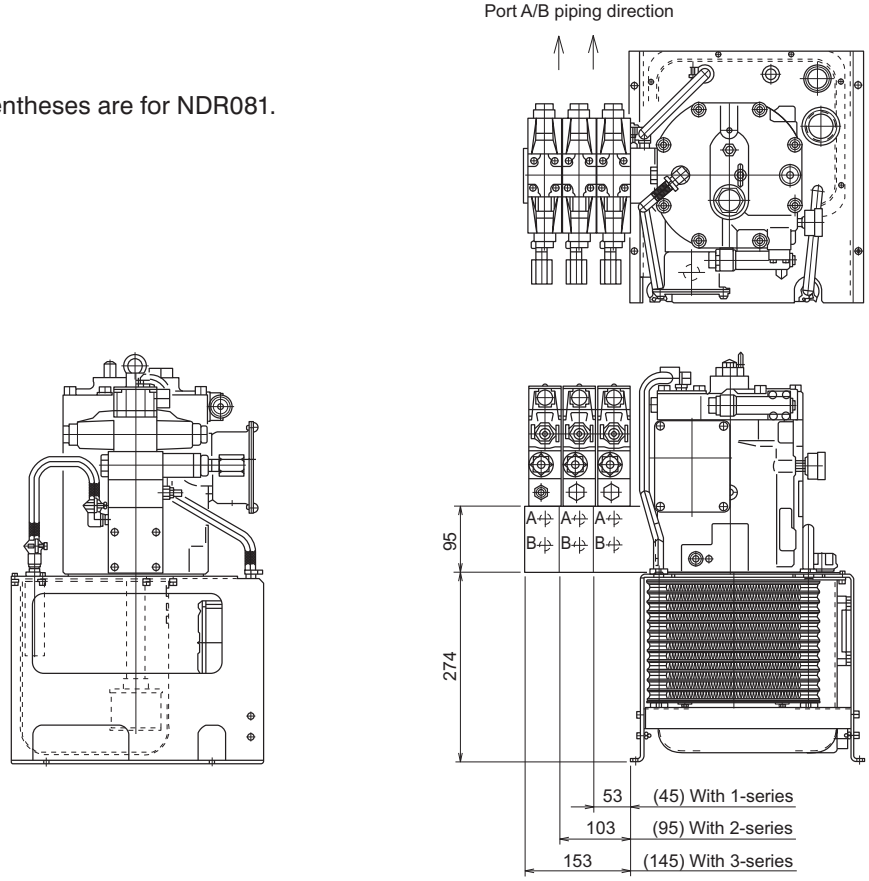


● Block set external diagram

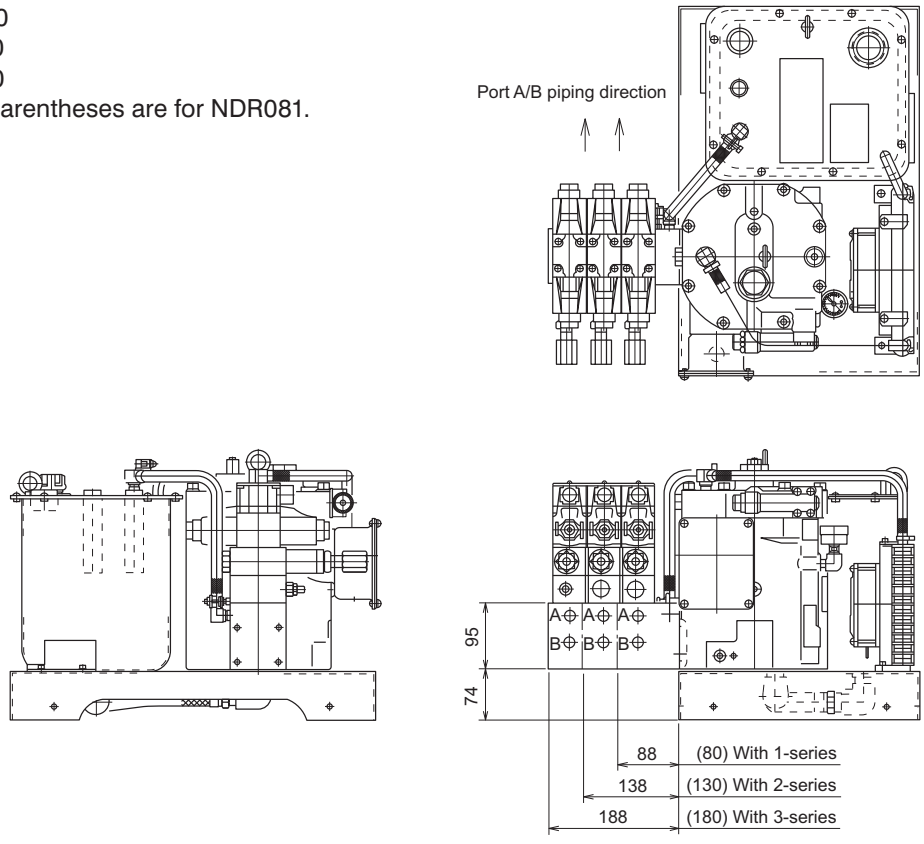


Block set installation diagram

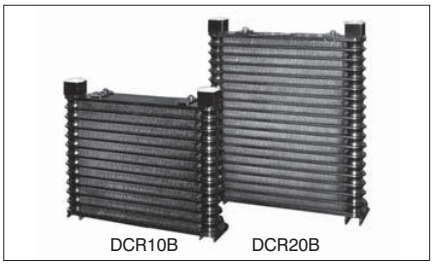
NDR081-071H-30
NDR151-102H-30
NDR151-103H-30
Dimensions in parentheses are for NDR081.



NDR081-071L-30
NDR151-102L-30
NDR151-103L-30
Dimensions in parentheses are for NDR081.



Oil Cooler (for Cooling Pump Drainage)



Nomenclature

DCR ※※ B - 10
1 2 3 4

1 Model No.
DCR: Oil cooler (for cooling pump drainage)

2 Cooler capacity
10: Type 10
20: Type 20

3 Piping port *1
B: connection port Rc⅜

4 Design No. (The design No. is subject to change.)

Note: *1 The NDR08 and NDR15 series rotor packs use dedicated oil coolers which have different piping port shapes from other oil coolers.

Specifications

Oil usable	Petroleum-based hydraulic fluid
Oil temperature	0 to 90°C
Atmosphere	Inside factory
Operating temperature range	0 to 40°C
Operating humidity range	20 to 85%RH (no condensation)
Passing flow rate L/min	4 maximum
Maximum operating pressure MPa {kgf/cm^2}	0.1 {1}
Power supply voltage	1-phase AC 200 V (50 Hz), AC 200 V (60 Hz), AC 220 V (60 Hz)
Permissible voltage fluctuation	90 to 110%

Fan motor electrical rating

Model code	Voltage V	Frequency Hz	Operating current A	Input W	Locked current A	Starting current A	Coil and protection type	Lead wire
DCR10B-10	200	50	0.12	16	0.17	0.17	Shading coil type (with impedance protector)	Heat resisting flat two-core vinyl cable • Length: 1 m • External dimensions: 5.4 × 2.7 mm • Wire diameter: 0.75 mm^2
	200	60	0.11	15	0.15	0.15		
	220	60	0.1	17.6	0.18	0.18		
DCR20B-10	200	50	0.243	35.5	0.315	0.315	Shading coil type (with thermal protector)	• Length: 1 m • Wire diameter: AWG22 (equivalent to 0.3 mm2) • Sheath: PVC tube No. 4
	200	60	0.216	32.4	0.283	0.283		
	220	60	0.239	39.1	0.330	0.330		

Note: Install a 0.5 A circuit breaker to prevent damage at short-circuiting.

NDJ Series New DAIPACK

Features

- **Low noise**
  The tank contains the pump and motor inside and functions itself as noise insulation panels to trap noise internally.
- **Low oil temperature rise**
  A hollow tank with a large heat exchange area and forced cooling of the tank's internal panels and the pump surfaces with a motor cooling fan suppresses fluid temperature rise.
- **Compact design**
  Reduced installation space with compact design

Nomenclature

NDJ ※※ ※ - ※※ ※ - 20 - ※※

1 2 3 4 5 6 7

1 Model No.
NDJ: New DAIPACK

2 Pump capacity
8: V 8 used (8 cm^3/rev)
15: V15 used (14.8 cm^3/rev)

3 Pressure adjustment range
9: 0.8 to 3.5 MPa {8 to 35 kgf/cm^2}
1: 0.8 to 7 MPa {8 to 70 kgf/cm^2}

4 Tank capacity
10: 10 L
15: 15 L

5 Motor capacity
1: 0.75 kW, 4-pole
2: 1.5 kW, 4-pole

6 Design No. (The design No. is subject to change.)

7 Option code
No designation: Standard (floor mounted type)
LC: Wall mounted type

Refer to Page A-8 for details of V series piston pumps incorporated into these units.

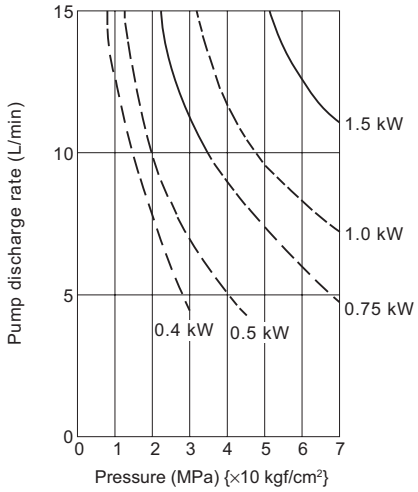
Specifications

Model code	Pump capacity cm^3/rev	Motor capacity Output kW (Number of poles: 4)	Tank capacity L	Maximum operating pressure MPa {kgf/cm^2}	Pressure adjustment range MPa {kgf/cm^2}	Discharge rate L/min *1		Pressure at shipment MPa {kgf/cm^2}	Mass (Fluid excluded) kg
						50 Hz	60 Hz		
NDJ 89-101-20 (-LC)	8	0.75	10	3.5 {35}	0.8 to 3.5 {8 to 35}	6 to 11	7 to 14	3.5 {35}	35
NDJ 81-152-20 (-LC)		1.5	15	7 {70}	0.8 to 7 {8 to 70}			7 {70}	45
NDJ159-152-20 (-LC)	14.8			3.5 {35}	0.8 to 3.5 {8 to 35}	5 to 20	6 to 25	3.5 {35}	50

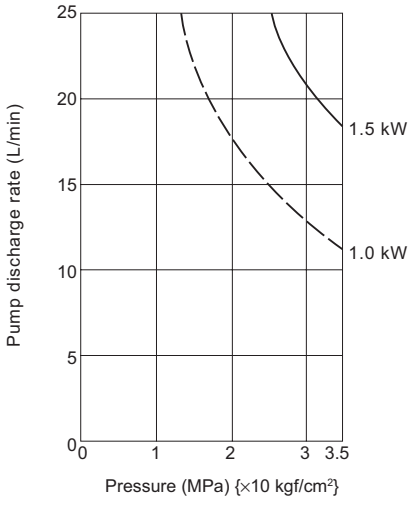
Note: *1. The discharge rate is set to the maximum value before shipment

Pressure - Flow rate characteristics

8 series
NDJ89-101-20 (-LC)
NDJ81-152-20 (-LC)



15 series
NDJ159-152-20 (-LC)



Paint color

Tank: Ivory white (Munsell code 5Y7.5/1)
Pump: Black

Handling

- **Hydraulic fluid, ambient environment**
  - ○ Use a petroleum-based hydraulic fluid equivalent to ISO VG32 to 46.
    Use of hydraulic fluids other than the petroleum-based type (e.g. hydrous/synthetic) is prohibited.
  - ○ Operate the unit in an environment where both the following conditions are satisfied: viscosity range from 15 to 400 mm^2/s {cSt} and oil temperature from 0 to 60°C.
  - ○ Be sure to maintain the water content in the hydraulic fluid at 0.1% maximum by volume.
  - ○ Contamination of the hydraulic fluid causes device trouble and reduces the service life, so pay due attention to controlling contamination and ensure that it goes no higher than NAS contamination class 10.
  - ○ Use the unit indoors under the following conditions.
    Ambient temperature: 0 to 35°C, Ambient humidity: 20 to 90%RH (with no condensation)

- **At start**
  - ○ Fill the pump case with hydraulic fluid through the filler port before starting trial operation, after replacing the pump, or after stopping the unit for 3 months or longer. Use the same hydraulic fluid as for the hydraulic circuit.

	NDJ8※	NDJ159
Pump case filling volume cm^3	300	500

  - ○ After checking that all hydraulic circuits and electrical circuits are ready for operation, set the hydraulic circuit at the load side in the no-load status or connect an unloading circuit before starting the pump.
  - ○ When the pump is driven for the first time, turn the power switch to the motor on and off a few times to let the air out of the piping and then run it continuously at full speed. Noise may be observed until the air has been completely removed but this is not abnormal.

- **Electric wiring**
  - ○ Connect the power cable matching the phases at the pump motor and power supply sides as shown below.

Motor side [U —— R / V —— S / W —— T] Power supply side

Check that the pressure at the delivery side rises at the pressure gauge.
If wires are connected with the wrong phase order, the motor and pump rotate in the reverse direction and no fluid is discharged. If fluid is not discharged within 5 minutes after turning the power on, the phase order may be incorrect. In this case, switch the wires for two phases among the three.

  - ○ Be sure to connect the ground terminal.
  - ○ Install a no-fuse breaker and an earth leakage breaker on the main power supply.
    The electrical ratings are as shown in the table below.

Model code	Motor capacity Output kW (Number of poles: 4)	Rated current (A)		
		AC 200 V (50 Hz)	AC 200 V (60 Hz)	AC 220 V (60 Hz)
NDJ 89-101-20 (-LC)	0.75	3.7	3.4	3.3
NDJ 81-152-20 (-LC)	1.5	6.8	6.2	6.3
NDJ159-152-20 (-LC)				

- **Air intake/exhaust**
  Do not place any obstacles to motor cooling fan air intake and exhaust within a distance of 100 mm from intake and exhaust vent of the motor cooling fan. Install the unit at a location with good air flow so that heated air can be vented.

- **Transportation**
  Use eye bolts for hoisting to transport the unit.

- **Installation**
  The unit is a stationary type. Fix it with bolts on a level location that is free of vibration.

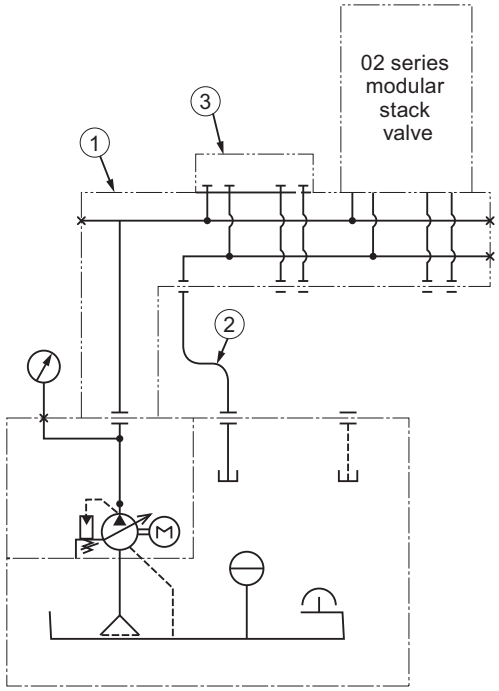
Options (separately available parts)

● Option table

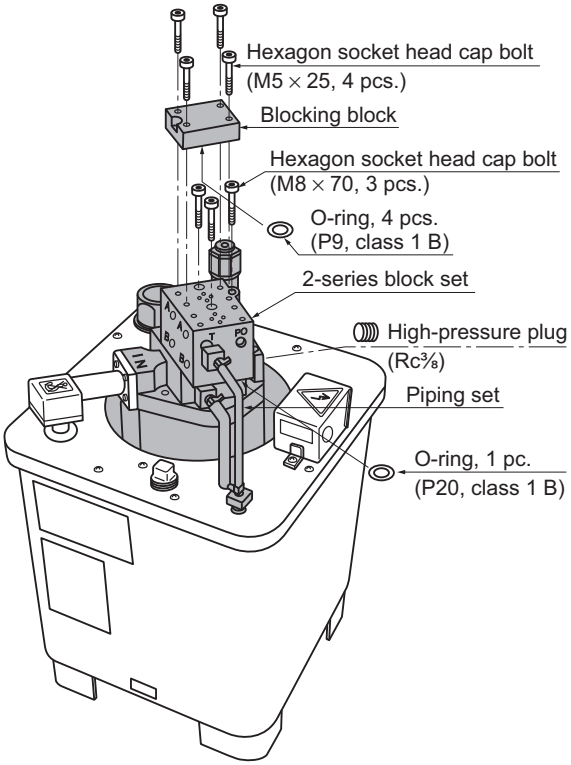
Part No.	Name	Detail of accessories		Order code		
		Model	Quantity	For NDJ89-101	For NDJ81-152	For NDJ159-152
1	2-series block set	2-series block	1	P-BTJSET-20		
		O-ring (P20, class 1 B)	1			
		Hexagon socket head cap bolt: M8 × 70	3			
		Hoisting bolt M8	2			
		High-pressure plug Rc⅜	3			
		Installation guide	1			
2	Piping set	Piping (rubber hose with braid)	1	P-NDJ89PIPE-20	P-NDJ81PIPE-20	P-NDJ159PIPE-20
		Plastic joint/rubber band	2 pcs. each			
		Piping guide	1			
3	Blocking block set	Blocking block	1	P-BS02SET-20		
		O-ring (P9, class 1 B)	4			
		Hexagon socket head cap bolt (M5 × 25)	4			

Each option can be installed using just hex keys, an adjustable wrench, and screw drivers.
For guidance on installation, refer to the installation (piping) guide provided with the option or the instruction manual for the NDJ series.

● Hydraulic circuit



● Option installation guide



ND Series Mini-pack

Features

- Optimum compact sizes achieved (tank capacity: 20, 30, 45 L)
- Quiet operation with unobtrusive sound realized by using a V series piston pump.

Nomenclature

ND	※※	※	※	-	※	※※	-	40
1	2	3	4		5	6		7

1 Model No.
ND: mini-pack

2 Pump capacity
8: V 8 used (8 cm^3/rev)
15: V15 used (14.8 cm^3/rev)

3 Pressure adjustment range
9: 0.8 to 3.5 MPa {8 to 35 kgf/cm^2}
1: 0.8 to 7 MPa {8 to 70 kgf/cm^2}

4 Pump model
No designation: V8A1RX
Y: V15A1Y

5 Tank capacity
2: 20 L
3: 30 L
4: 45 L

6 Motor capacity
00: 0.4 kW, 4-pole
01: 0.75 kW, 4-pole
02: 1.5 kW, 4-pole
03: 2.2 kW, 4-pole

7 Design No. (The design No. is subject to change.)

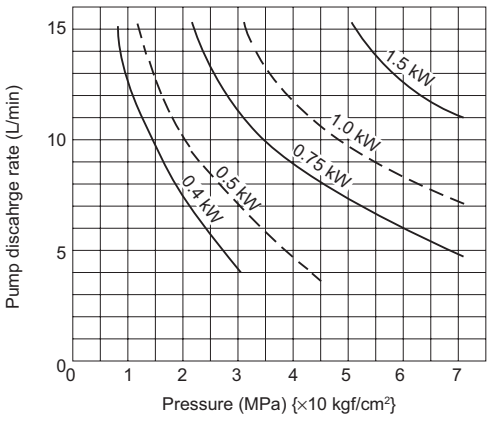
Refer to Page A-8 for details of V series piston pumps incorporated into these units.

Specifications

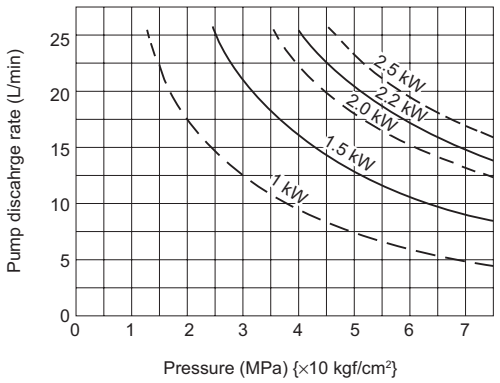
Model code	Pump capacity cm^3/rev	Motor capacity Output kW (Number of poles: 4)	Tank capacity L	Maximum operating pressure MPa {kgf/cm^2}	Pressure adjustment range MPa {kgf/cm^2}	Discharge rate setting at shipment L/min		Pressure at shipment MPa {kgf/cm^2}	Mass (Fluid excluded) kg
						50 Hz	60 Hz		
ND 89 -200-40	8	0.4	20	3.5 {35}	0.8 to 3.5 {8 to 35}	6	7	3.5 {35}	45
ND 89 -201-40		0.75				11	14		50
ND 81 -301-40			30	7 {70}	0.8 to 7 {8 to 70}	6	7	7 {70}	53
ND 81 -302-40		1.5				11	14		57
ND159Y-302-40	14.8			3.5 {35}	0.8 to 3.5 {8 to 35}	21	25	3.5 {35}	60
ND151Y-403-40		2.2	45	7 {35}	0.8 to 7 {8 to 70}	16.6	20	7 {70}	73

Pressure - Flow rate characteristics

8 series



15 series



Paint color

Munsell code 7.5BG4.5/2

Handling

- **Hydraulic fluid, ambient environment**
  - ○ Use a petroleum-based hydraulic fluid equivalent to ISO VG32 to 46.
    Use of hydraulic fluids other than the petroleum-based type (e.g. hydrous/synthetic) is prohibited.
  - ○ Operate the unit in an environment where both the following conditions are satisfied: viscosity range from 15 to 400 mm^2/s {cSt} and oil temperature from 0 to 60°C.
  - ○ Be sure to maintain the water content in the hydraulic fluid at 0.1% maximum by volume.
  - ○ Contamination of the hydraulic fluid causes device trouble and reduces the service life, so pay due attention to controlling contamination and ensure that it goes no higher than NAS contamination class 10.
  - ○ Use the unit indoors under the following conditions.
    Ambient temperature: 0 to 35°C, Ambient humidity: 20 to 90%RH (with no condensation)

- **At start**
  - ○ Fill the pump case with hydraulic fluid through the filler port before starting trial operation, after replacing the pump, or after stopping the unit for 6 months or longer. Use the same hydraulic fluid as for the hydraulic circuit.

	ND 8※	ND15※
Pump case filling volume cm^3	300	500

  - ○ After checking that all hydraulic circuits and electrical circuits are ready for operation, set the hydraulic circuit at the load side in the no-load status or connect an unloading circuit before starting the pump.
  - ○ When the pump is driven for the first time, turn the power switch to the motor on and off a few times to let the air out of the piping and then run it continuously at full speed. Noise may be observed until the air has been completely removed but this is not abnormal.
  - ○ Check that the pump rotates in the direction of the arrow showing the direction of rotation.

- **Electric wiring**
  - ○ Connect the power cable matching the phases at the pump motor and power supply sides as shown below.

Motor side [U —— R / V —— S / W —— T] Power supply side

Check the direction of rotation of the motor. If the motor would be rotated in the reverse direction, switch the connection between two phases among the three to correct the direction of rotation.

  - ○ Be sure to connect the ground terminal.
  - ○ Install a no-fuse breaker and an earth leakage breaker on the main power supply.

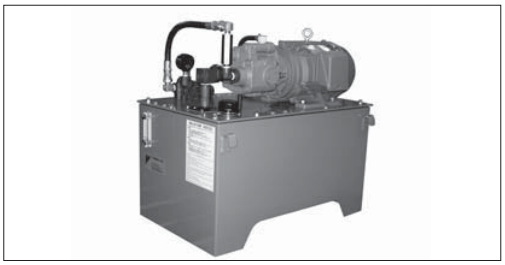
Model code	Motor capacity Output kW (Number of poles: 4)	Rated current A		
		AC 200 V (50 Hz)	AC 200 V (60 Hz)	AC 220 V (60 Hz)
ND 89 -200-40	0.4	2.2		
ND 89 -201-40	0.75	3.8	3.4	
ND 81 -301-40				
ND 81 -302-40	1.5	6.8	6.2	6.0
ND159Y-302-40				
ND151Y-403-40	2.2	9.3	8.8	8.3

- **Transportation**
  Use eye bolts for hoisting to transport the unit.

- **Installation**
  The unit is a stationary type. Fix it on a level location that is free of vibration.

- **Auxiliary parts**
  Contact the Contact Center to procure parts other than the pump itself.

ND Series New DAIPACK



Features

- Optimum compact sizes achieved (tank capacity: 60 L)
- Quiet operation with unobtrusive sound realized by using a V series piston pump.
- The ability to mount 02 size stack valves enables easy integration of control valves (2- to 6-series).

Nomenclature

ND	15	1	-	1	※※	-	40
1	2	3		4	5		6

1 Model No.
ND: New DAIPACK

2 Pump capacity
15: V15 used (14.8 cm^3/rev)

3 Pressure adjustment range
1: 0.8 to 7.0 MPa {8 to 70 kgf/cm^2}

4 Tank capacity
1: 60 L

5 Motor capacity
02: 1.5 kW, 4-pole
03: 2.2 kW, 4-pole

6 Design No. (The design No. is subject to change.)

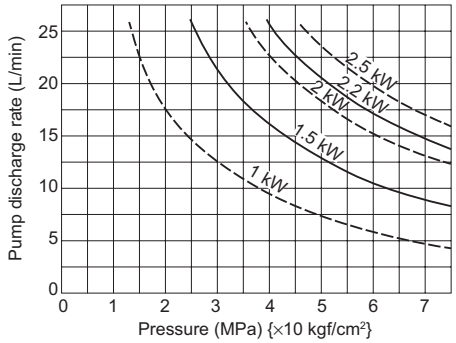
Refer to Page A-8 for details of V series piston pumps incorporated into these units.

Specifications

Model code	Pump capacity cm^3/rev	Motor capacity Output kW (Number of poles: 4)	Tank capacity L	Maximum operating pressure MPa {kgf/cm^2}	Pressure adjustment range MPa {kgf/cm^2}	Discharge rate L/min *1		Pressure at shipment MPa {kgf/cm^2}	Mass (Fluid excluded) kg
						50 Hz	60 Hz		
ND151–102–40	14.8	1.5	60	7 {70}	0.8 to 7 {8 to 70}	5 to 20	6 to 25	3.5 {35}	110
ND151–103–40		2.2						5.5 {55}	120

Note: *1 The discharge rate is set to the maximum value before shipment

Pump shaft input curves



Paint color

Munsell code 7.5BG4.5/2

Handling

- **Hydraulic fluid, ambient environment**
  - ○ Use a petroleum-based hydraulic fluid equivalent to ISO VG32 to 46. Use of hydraulic fluids other than the petroleum-based type (e.g. hydrous/synthetic) is prohibited.
  - ○ Operate the unit in an environment where both the following conditions are satisfied: viscosity range from 15 to 400 mm^2/s {cSt} and oil temperature from 0 to 60°C.
  - ○ Be sure to maintain the water content in the hydraulic fluid at 0.1% maximum by volume.
  - ○ Contamination of the hydraulic fluid causes device trouble and reduces the service life, so pay due attention to controlling contamination and ensure that it goes no higher than NAS contamination class 10.
  - ○ Use the unit indoors under the following conditions.
    Ambient temperature: 0 to 35°C, Ambient humidity: 20 to 90%RH (with no condensation)

Handling

- **At start**
  - ○ Fill the pump case with hydraulic fluid through the filler port before starting trial operation, after replacing the pump, or after stopping the unit for 6 months or longer. Use the same hydraulic fluid as for the hydraulic circuit.
    Pump case filling volume: 500 cm^3
  - ○ After checking that all hydraulic circuits and electrical circuits are ready for operation, set the hydraulic circuit at the load side in the no-load status or connect an unloading circuit before starting the pump.
  - ○ When the pump is driven for the first time, turn the power switch to the motor on and off a few times to let the air out of the piping and then run it continuously at full speed. Noise may be observed until the air has been completely removed but this is not abnormal.
  - ○ Check that the pump rotates in the direction of the arrow showing the direction of rotation.

- **Electric wiring**
  - ○ Connect the power cable matching the phases at the pump motor and power supply sides as shown below.

Motor side [U —— R / V —— S / W —— T] Power supply side

Check the direction of rotation of the motor. If the motor would be rotated in the reverse direction, switch the connection between two phases among the three to correct the direction of rotation.

  - ○ Be sure to connect the ground terminal.
  - ○ Install a no-fuse breaker and an earth leakage breaker on the main power supply.
    The electrical ratings are as shown in the table below.

Model code	Motor capacity Output kW (Number of poles: 4)	Rated current A		
		AC 200 V (50 Hz)	AC 200 V (60 Hz)	AC 220 V (60 Hz)
ND151-102-40	1.5	6.8	6.2	6.0
ND151-103-40	2.2	9.3	8.8	8.3

- **Transportation**
  Use eye bolts for hoisting to transport the unit.

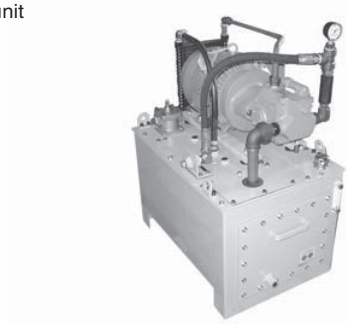
- **Installation**
  The unit is a stationary type. Fix it on a level location that is free of vibration.

How to integrate a control system

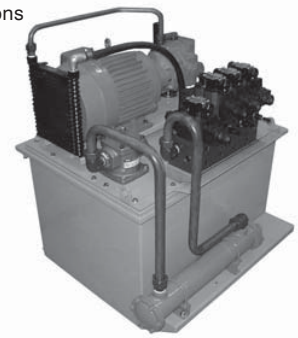
In addition to the usage as a hydraulic pump unit, the New DIAPACK can be used in a wide range of applications as a hydraulic unit by its ability to mount 02 size stack valves easily.
First, remove the piping block (part No. 7 in the external dimension diagram) of the New DIAPACK. Remove the return line pipe that is screwed into the bottom face of the piping block.
Next, select a manifold block (BT202 to 602) according to the circuit to be integrated. Screw the pipe removed from the piping block into the return line port on the bottom face of the manifold block and mount the manifold block on the top plate of the oil tank using the threads machined in the top plate of the oil tank for this purpose. Mount 02 size stack valves and 02 size solenoid valves on the manifold block using dedicated mounting bolts.

NT Series SSS MARK-II

Base unit



Unit with all options



Features

- **Extensive variations**
  A wide range of control functions and other options such as fluid level switches, temperature switches and water coolers, is available in an easy-to-install modular format.
  The energy-saving performance of the V series pump can be further enhanced by adding the optional feathering pump control.
- **Low oil temperature rise**
  All models are equipped with an oil cooler as standard. Maintaining the fluid at a low temperature gives it a long service life.
- **Space saving**
  The compact design has reduced the footprint to 70 to 74% of the conventional models.
  The design of the mounting holes has allowance in all directions and the tank top plate can be mounted in the 180° opposite direction.
- **Low noise**
  All models are equipped with vibration-absorbing rubber pads as standard.
- **Control valves installable**
  Options enabling installation of a control valves are available (-ABT※※※).

Nomenclature

NT	※※	M	※※	N	※※	-	11	-	ABT	※	※※
1	2	3	4	5	6		7		8	9	10

1 Model No.
NT: SSS MARK-II

2 Tank capacity
06: 60 L
10: 100 L
16: 160 L

3 Pump type
M: Motor pump (V pump)

4 Pump capacity
15: 14.8 cm^3/rev
23: 23.0 cm^3/rev
38: 37.7 cm^3/rev

5 Unit type
N: Tank top plate type

Refer to Page A-8 for details of V series piston pumps incorporated into these units.

6 Motor capacity
15: 1.5 kW, 4-pole
22: 2.2 kW, 4-pole
37: 3.7 kW, 4-pole
55: 5.5 kW, 4-pole
75: 7.5 kW, 4-pole

7 Design No.

8 Manifold block
No designation: Without manifold block
ABT: With manifold block

9 Number of series
No designation: None (not installed)
2: 2-series
4: 4-series

10 Solenoid valve size
No designation: None (not installed)
02: 02 size
03: 03 size

Series table

	Pump capacity	15 (14.8 cm^3/rev)			23 (23.0 cm^3/rev)		38 (37.7 cm^3/rev)	
	Motor capacity	1.5 kW	2.2 kW	3.7 kW	3.7 kW	5.5 kW	5.5 kW	7.5 kW
Tank capacity	60 L	✓	✓	✓				
	100 L		✓	✓	✓	✓		
	160 L				✓	✓	✓	✓

Specifications

	Pump discharge rate L/min at 50/60 Hz (1.0 MPa)	Tank capacity L	Motor capacity Output kW (Number of poles: 4)	Mass kg	Rated pressure MPa {kgf/cm²}	Maximum operating pressure MPa {kgf/cm²}
NT06M15N15-11	20/25	60	1.5	110	14.0 {140}	21.0 {210}
NT06M15N22-11			2.2	118		
NT06M15N37-11			3.7	130		
NT10M15N22-11		100	2.2	128		
NT10M15N37-11			3.7	140		
NT10M23N37-11	33/40			150		
NT10M23N55-11			5.5	170		
NT16M23N37-11		160	3.7	175		
NT16M23N55-11			5.5	195		
NT16M38N55-11	55/66			200		
NT16M38N75-11			7.5	210		

Note: Rated pressure:
Pressure at which the maximum load does not exceed 175% of the rated capacity of the motor with the pump discharge rate set to minimum
Maintain the average shaft input of the motor at no greater than 100%.
Maximum operating pressure:
Pressure at which the motor can be started with the pump discharge rate set to minimum
Maintain the maximum load at no greater than 160% (15 seconds) and average shaft input at no greater than 100%.
With the standard specifications, the pressure is set to 3.5 MPa and the flow rate is set to the maximum discharge rate at shipment.
Standard power supply is AC 200/220 V at 50/60 Hz for motors.
Consult Daikin for different voltages [380 V (50 Hz), 400 V (50/60 Hz), 415 V (50 Hz), 440 V (60 Hz), 460 V (60 Hz)]

- The models with the following model codes that incorporate a manifold are available as a product series.
Since a manifold block is preinstalled, solenoid valves and modular stack valves can be mounted easily.
The manifold blocks are fitted with blocking blocks (BS-※※). Remove them when mounting solenoid valves and modular stack valves.

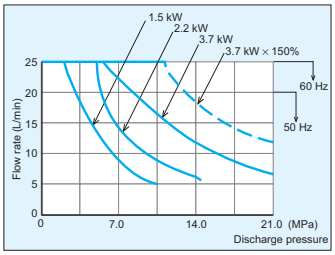
Standard model code	Option code	Number of series	Solenoid valve size	Option code	Number of series	Solenoid valve size	Option code	Number of series	Solenoid valve size	Option code	Number of series	Solenoid valve size
NT06M15N15-11	-ABT202	2	02	-ABT402	4	02	—			—		
NT06M15N22-11	-ABT202	2	02	-ABT402	4	02	—			—		
NT06M15N37-11	-ABT202	2	02	-ABT402	4	02	—			—		
NT10M15N22-11	-ABT202	2	02	-ABT402	4	02	—			—		
NT10M15N37-11	-ABT202	2	02	-ABT402	4	02	—			—		
NT10M23N37-11	-ABT202	2	02	-ABT402	4	02	-ABT203	2	03	-ABT403	4	03
NT10M23N55-11	-ABT202	2	02	-ABT402	4	02	-ABT203	2	03	-ABT403	4	03
NT16M23N37-11	-ABT202	2	02	-ABT402	4	02	-ABT203	2	03	-ABT403	4	03
NT16M23N55-11	-ABT202	2	02	-ABT402	4	02	-ABT203	2	03	-ABT403	4	03
NT16M38N55-11	-ABT202	2	02	-ABT402	4	02	-ABT203	2	03	-ABT403	4	03
NT16M38N75-11	-ABT202	2	02	-ABT402	4	02	-ABT203	2	03	-ABT403	4	03

Paint color

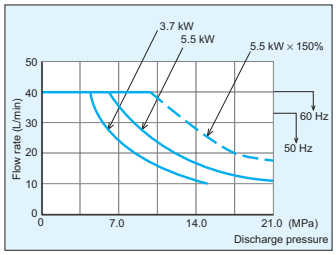
JMPA code Y59-60H (Munsell code 10BG6/4) Blue-green colors Motors, pumps, and purchased parts are in the standard colors of the manufacturers.
Tank: Baking finish

Quick-reference charts for motor selection

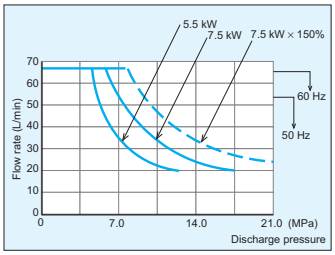
Motor capacity (M15-1.5/2.2/3.7 kW)



Motor capacity (M23-3.7/5.5 kW)



Motor capacity (M38-5.5/7.5 kW)



Handling

● Hydraulic fluid, ambient environment

○ Use a petroleum-based hydraulic fluid equivalent to ISO VG32 to 68.
For pressures higher than 7 MPa use wear-resistant hydraulic fluid.
Use of hydraulic fluids other than the petroleum-based type (e.g. hydrous/synthetic) is prohibited.

○ Operate the unit in an environment where both the following conditions are satisfied: viscosity range from 15 to 400 mm^2/s and oil temperature from 0 to 60°C.

○ Be sure to maintain the water content in the hydraulic fluid at 0.1% maximum by volume.

○ Contamination of the hydraulic fluid causes device trouble and reduces the service life, so pay due attention to controlling contamination and ensure that it goes no higher than NAS contamination class 9. (NAS contamination class 10 is permitted for operating pressures of 7 MPa or lower.)

○ Use the unit indoors under the following conditions.
Ambient temperature: 0 to 35°C, Ambient humidity: 20 to 90%RH (with no condensation)
If using the unit where there is a lot of dust or oil mist, clean it periodically by applying compressed air or by other means since the oil cooler is prone to clogging in such environments.

● At start

○ Fill the pump case with hydraulic fluid through the filler port before starting trial operation, after replacing the pump, or after stopping the unit for 6 months or longer. Use the same hydraulic fluid as for the hydraulic circuit.

	NT××M15	NT××M23	NT××M38
Pump case capacity cm^3	500	500	900

○ After checking that all hydraulic circuits and electrical circuits are ready for operation, set the hydraulic circuit at the load side in the no-load status or connect an unloading circuit before starting the pump.
When the pump is driven for the first time, turn the power switch to the motor on and off a few times to let the air out of the piping and then run it continuously at full speed. A roaring noise may be observed until the air has been completely removed but this is not abnormal.

○ Check that the pressure rises at the pressure gauge.

● Electric wiring

○ Connect the power cable matching the phases at the pump motor and power supply sides as shown below.

Motor side [U —— R / V —— S / W —— T] Power supply side

Check that the pressure rises at the pressure gauge.
If the motor rotates in the reverse direction, switch the connection between two phases among the three to correct the direction of rotation.

○ Be sure to connect the ground terminal.

○ Install a no-fuse breaker on the main power supply. See the motor electrical rating table below for electrical ratings.
In addition, install an earth leakage breaker.

<Motor rating table (rated current)>　　Permissible voltage fluctuation: ±10%

Power supply	1.5 kW	2.2 kW	3.7 kW	5.5 kW	7.5 kW
AC 200 V 50 Hz	6.8 A	9.3 A	15.0 A	22.4 A	28.8 A
AC 200 V 60 Hz	6.2 A	8.8 A	14.0 A	21.0 A	27.6 A
AC 220 V 60 Hz	6.0 A	8.3 A	13.2 A	19.6 A	25.6 A

● Transportation

○ When transporting or hoisting the unit, use the hoisting hooks (ϕ25 holes at 4 locations) or a fork lift truck.

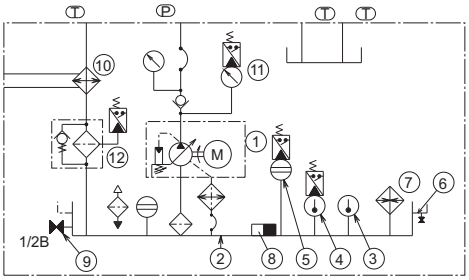
○ When using a fork lift truck, take due care to ensure that it will not topple over because an appropriate fork span cannot be secured.

● Installation

○ The unit is a stationary type. Fix it on a level location that is free of vibration.

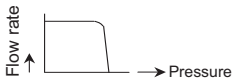
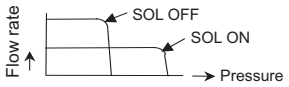
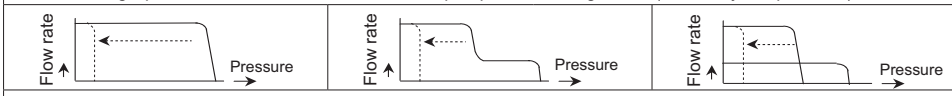
○ Mount the foundation plates (4 pcs.) provided as accessories at appropriate positions according to the installation conditions. (8 mounting positions provided)

Power unit options



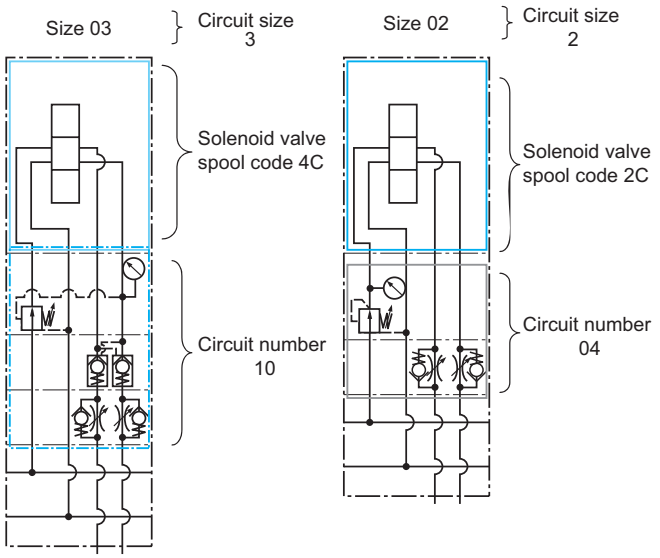
※When selecting an option, enter a circle or the required quantity in the option selection table and submit it when placing the order.
※The codes in the circuit diagram correspond to those in the table below.

Overview of options

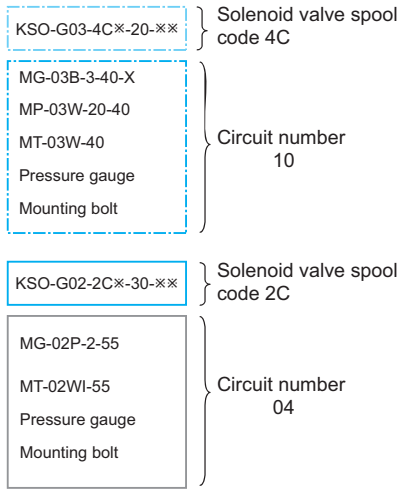
Code	Item	Description
① (1)	Pressure compensator control pump	● Sharp cutoff characteristics are achieved. ● The pressure and flow rate can be adjusted as necessary. 
① (2)	Pressure feedback method combination control	● The operation mode can be switched between high-pressure low-quantity and low-pressure high-quantity with a single pump by pressure feedback method. 
① (3)	Solenoid operated method combination control	● The control shown to the right can be performed by switching the solenoid value mounted on the pump. 
① (4)	Feathering pump control	● Sets the high-pressure cutoff characteristics of the pump to feathering status (extremely low pressure).  This function is effective for saving energy while the machine is at stand-by.
②	Tank specifications	Manufacture water fill test can be performed as an option. Consult Daikin if it is necessary to comply with the Fire Service Act since the parts to be used will differ.
③	Thermometer	Enables visual monitoring of the fluid temperature. (0 to 100°C, ϕ40)
④	Temperature switch	For fluid temperature upper limit alarm: Outputs an alarm when 65°C is exceeded. For heater control: Stops the heater when 20°C is exceeded.
⑤	Fluid level switch	For fluid level lower limit detection: Detects insufficient level of fluid. For fluid level upper limit detection: Detects excessive level of fluid to prevent overflow.
⑥	Oil pan	Accumulates fluid so that it will not spill over the floor. Environmentally friendly option.
⑦	Electric heater	● Used in an environment where the unit may be started at a low temperature (0°C or lower) such as in cold regions. The heater is equipped with a dry operation prevention sensor. ● Warm-up operation of the unit increases the temperature by approximately 5°C/hr, and it is advisable to stop the heater when the temperature reaches a certain level using the heater control temperature switch. (Heater capacity: 1 kW)
⑧	Magnet contaminant separetor	● Used to remove fine metal chips and contaminant contained in hydraulic fluid when hydraulic fluid contamination level needs to be controlled. (To be mounted/removed through the cleaning port) ● Installing 1 pc for 60 to 100 L tank and 2 pcs for 160 L
⑨	Tank drain valve	Used to facilitate oil replacement by arranging a ball valve (JIS 1/2B) at the drain port of the fluid tank. The port is plugged as standard.
⑩	Water cooler	Used to cool fluid when the fluid in the tank reaches a high temperature. ● To determine whether a cooler is necessary or not, see the quick-reference chart provided in the SSS MARK-II brochure. ● For details of cooling capacities, see the brochure of LT coolers. ● Fluid temperature can be controlled using the optional temperature control water valve.
⑪	Pressure switch	● Used for detecting a main pressure drop. ● Standard setting at shipment: Open at 2.0 MPa or lower. There are two types of switches, mechanical and electronic.
⑫	Return filter electric alarm switch	● Used for the filter clogging alarm. Provided with C type contact.
13	Unit orientation	● Only the tank top plate can be mounted in the 180° reversed orientation (even after the delivery of the unit).
14	Terminal box	● A terminal box that can be mounted on the unit, with a size of 300 mm × 200 mm × 105 mm (W × H × D). ● No terminal block is supplied with the terminal box. One DIN rail is attached.
15	Electric wiring	● Wiring from electrical control devices to the terminal box. ● Up to 30 pins supported. A rail type terminal block with TDT touch-down structure is used. A 2-row type terminal block is used when more than 15 pins are required. ● VCT cables are used with M3 round crimp-style terminals. Note that the wiring for the motor and electric heater needs to be directly connected to their terminal boxes. ● No wiring port is provided for wiring by the user. ● Note that the terminal numbers are predetermined.
16	Specified color	● Recoating with epoxy-based paint. The pressure gauge and hoses are masked, and also the cables, if there are any. ● Standard color: JMPA code Y59-60H (Munsell code 10BG6/4) When using specified colors, specify the JMPA code.

List of control circuits/solenoid valves

● Control circuit expressions

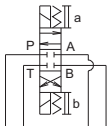
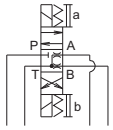
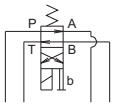
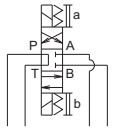
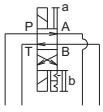
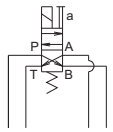
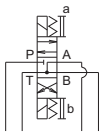


● Component parts



Select the solenoid valve spool code and circuit code by referring to the solenoid valve table and the control circuit selection manual.

● Solenoid valve table

Category	Solenoid valve spool code	Graphic symbol	Model	Category	Solenoid valve spool code	Graphic symbol	Model
All ports blocked at center position (closed center)	2C※		KSO-G02-2C※-30-EN KSO-G03-2C※-20-EN	Ports A/B/T open (port P blocked) at center position Ports A/B throttled at center position	44C※		KSO-G02-44C※-30-EN KSO-G03-44C※-20-EN
Spring offset (P → A, B → T)	2B※		KSO-G02-2B※-30-EN KSO-G03-2B※-20-EN	Ports P/T open at center position (tandem center)	66C※		KSO-G02-66C※-30-EN KSO-G03-66C※-20-EN
No-spring type (with detent)	2D※		KSO-G02-2D※-30-EN KSO-G03-2D※-20-EN	Spring offset (P → B, A → T)	2A※		KSO-G02-2A※-30-EN KSO-G03-2A※-20-EN
Ports A/B/T open (port P blocked) at center position	4C※		KSO-G02-4C※-30-EN KSO-G03-4C※-20-EN				

● General solenoid valve model code

KSO - G※※ - ※※※ - ※※ - EN

1 2 3 4

1 **Solenoid valve size** 02: size 02, 03: size 03

2 **Voltage code** A: AC 100 V, B: AC 200 V, P: DC 24 V

3 **Design No.**

4 **CE specifications, with surge killer**

Note that AC 200 V specifications do not comply with CE specifications.

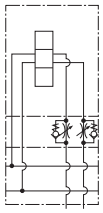
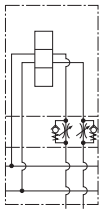
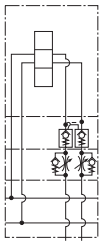
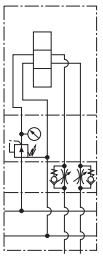
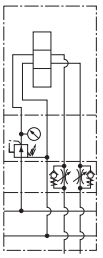
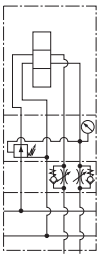
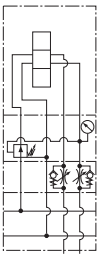
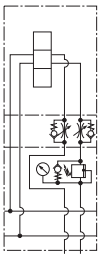
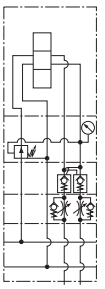
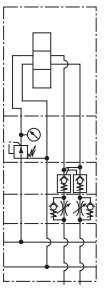
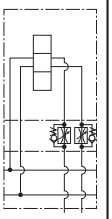
Option selection table

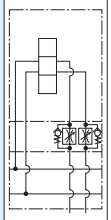
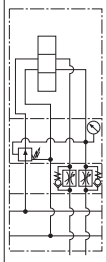
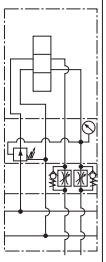
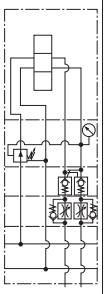
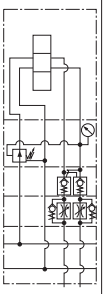
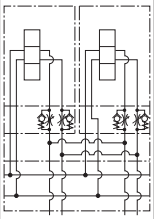
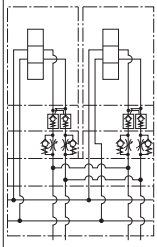
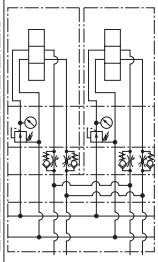
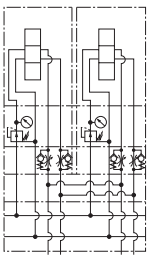
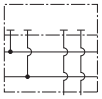
Item	Description						
Pump control	Pressure compensator control	Pressure feedback method combination control		Solenoid operated method combination control	With feathering: Pressure compensator control	With feathering: Pressure feedback method combination control	With feathering: Solenoid operated method combination control
	A	B		C	D	E	F
Pressure at 50/60 Hz	[ ] MPa	High-pressure side [ ] MPa Low-pressure side [ ] MPa			[ ] MPa	High-pressure side [ ] MPa Low-pressure side [ ] MPa	
Standard Setting	[3.5] MPa	High-pressure side [7.0] MPa Low-pressure side [3.5] MPa			[3.5] MPa	High-pressure side [7.0] MPa Low-pressure side [3.5] MPa	
Flow rate at 50/60 Hz	[/] L/min	High-quantity side [/] L/min Low-quantity side [/] L/min			[/] L/min	High-quantity side [/] L/min Low-quantity side [/] L/min	
Standard Setting		High-quantity side: Same as for pressure compensator				High-quantity side: Same as for pressure compensator	
		Low-quantity side	※M15※ 3 L/min at 60 Hz			Low-quantity side	※M15※ 3 L/min at 60 Hz
			※M23※ 6 L/min at 60 Hz				※M23※ 6 L/min at 60 Hz
			※M38※ 10 L/min at 60 Hz				※M38※ 10 L/min at 60 Hz
Motor power supply	N: Standard AC 200/220 V				380 V (50 Hz), 400 V (50/60 Hz), 415 V (50 Hz), 440 V (60 Hz), 460 V (60 Hz)		
Tank specifications	N: Standard (3.2 mm wall thickness, top plate construction)				A: Autonomous water fill test tank		
Thermometer	N: Not featured				A: Featured (0 to 100°C, ϕ40)		
Temperature switch (Up to 3 including fluid level switches)	N: Not featured	A: Open at 65°C or higher (for alarm)			E: A + C		
		B: Closed at 65°C or higher (for alarm)			F: A + D		
		C: Open at 20°C or higher (for heater control)			G: B + C		
		D: Closed at 20°C or higher (for heater control)			H: B + D		
		Note: Differential: 5 to 8°C for A/C, 3 to 6°C for B/D					
Fluid level switch (Up to 3 including temperature switches)	N: Not featured	A: Open at lower limit or lower (for alarm)			E: A + C		
		B: Closed at lower limit or lower (for alarm)			F: A + D		
		C: Open at upper limit or higher (for alarm)			G: B + C		
		D: Closed at upper limit or higher (for alarm)			H: B + D		
Oil pan	N: Not featured	A: Featured					
Electric heater 1 kW	N: Not featured	A: For AC 200 V	B: For AC 220 V		C: For AC 400 V	D: For AC 440 V	
		Note: Not possible to install together with a temperature actuated water regulating valve					
Magnet contaminant separator	N: Not featured	A: Featured (Installing 1 unit for a 60/100 L tank and 2 units for 160 L)					
Tank drain valve	N: Not featured	A: Featured (1/2B globe valve)					
Water cooler	N: Not featured	60 L tank	A: LT0403A-10	B: LT0504A-10			
		100/160 L tank	C: LT0504A-10	D: LT0707A-10			
Water cooler piping	N: Not featured	A: Featured	When installed with control valves, this option covers the piping between the manifold and water cooler and between the water cooler and return filter. When not installed with control valves, the piping between the water cooler and return filter is covered by this option but the return piping from the machine needs to be directly connected to the water cooler by the customer.				
Temperature actuated water regulating valve	N: Not featured	A: Featured	60 L tank: OWR-5004G	Manufacturer: Saginomiya Seisakusho, Inc. Valve starts opening at 40°C.			
			100/160 L tank: OWR-5006G				
Return filter clog detection switch	N: Not featured	A: Featured (Open when clogged)					
		B: Featured (Closed when clogged)					
Unit orientation	N: Standard	A: Reverse assembly					
Pressure switch	N: Not featured	A: Open at 2 MPa or lower		● Mechanical switch Manufacturer: ACT Electric Industry Co., Ltd. CE16			
		B: Closed at 2 MPa or lower		● Electronic switch Manufacturer: efector PK6731 (PNP), PK8731 (NPN)			
Terminal box	N: Not featured	A: Featured	A terminal box that can be mounted on the unit, with a size of 300 mm × 200 mm × 105 mm (W × H × D). No terminal block is supplied with the terminal box. One DIN rail row is attached. When selecting the wiring option, select "N: Not featured" for this option.				
Electric wiring	N: Not featured	A: Featured	This option covers the wiring from electrical control devices to the terminal box. The wiring of the motor is not covered. Note that the terminal numbers are predetermined. Connections are made on the terminal block with M3 terminals (with 2 spare pins) using VCT cables. No wiring port is provided for wiring by the user because the port is a part of the work to be carried out by the user.				
Specified color	N: Standard	A: Special color	(Only recoating possible: with epoxy-based paint) Only the pressure gauge, hoses, and parts purchased are masked. JMPA code [ ] or Munsell code [ ] Baking finish is applied to the standard tank. Paint color: JMPA code Y59-60H (Munsell code 10BG6/4)				

Other requests will be handled as design-to-order cases.

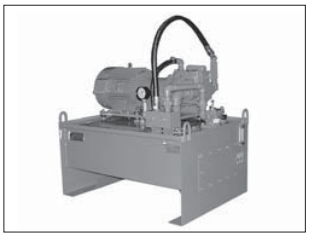
Control circuit selection table

※ Series order	6th series	5th series	4th series	3rd series	2nd series	1st series
Size	02 –	02 03	02 03	02 03	02 03	02 03
Solenoid valve spool code	Select one from the solenoid valve table.					
Circuit code	Select one from the circuit codes given in the table below.					
Solenoid valve voltage	AC 100/100/110 V, 50/60/60 Hz AC 200/200/220 V, 50/60/60 Hz DC 24 V Note: With ground terminal and surge killer (CE compliant models) Note that only the models with voltage codes A and P are CE compliant.					

Name	Meter-in throttle	Meter-out throttle	Meter-out position holding	Meter-in port P pressure reducing	Meter-out port P pressure reducing	Meter-in port B pressure reducing	Meter-out port B pressure reducing	Meter-in back pressure	Meter-out position holding port B pressure reducing	Meter-out position holding port P pressure reducing	Meter-in PC flow control
Circuit code	01	02	03	04	05	06	07	08	09	10	11
Standard control circuit											
Notes on circuit operation	• Applicable only to positive load • Not applicable to negative load or inertial load. • Not applicable to very low speed (no slower than 1 m/min) • Leakage at directional control valve at the center position.	• Applicable to both positive and negative load • Care required about boost pressure with negative load. • Leakage at directional control valve at the center position. • Brake valves, etc. to be considered with inertial load.	• Used when the position needs to be held. • Care required about boost pressure with negative load.	• Used to lower the pressure in the series. • Not applicable to negative load.	• Used to lower the pressure in the series.	• Used to achieve variable thrust, such as for clamping pressure. • Not applicable to negative load. • To be meter-out control with negative load.	• Used to achieve variable thrust with negative load while adjusting roll-separating force, etc. • Not applicable when the position needs to be held.	• Used when boost occurs in the meter-out circuit with negative load. • Not applicable when the position needs to be held.	• Used when the position needs to be held in circuit 07.	• Used when the position needs to be held in circuit 05.	• Used when precise speed control is required in circuit 01.

Name	Meter-out PC flow control	Meter-in port B pressure reducing PC flow control	Meter-out port B pressure reducing PC flow control	Meter-in port B pressure reducing position retention PC flow control	Meter-out port B pressure reducing position retention PC flow control	Meter-out 2-speed	Meter-out 2-speed position hold	Meter-in 2-pressure 2-speed	Meter-out 2-pressure 2-speed	Blocking
Circuit code	12	13	14	15	16	17	18	19	20	00
Standard control circuit										
Notes on circuit operation	• Used when precise speed control is required in circuit 02. • Brake valves, etc. to be considered with inertial load. • Care required about boost pressure with negative load.	• Used when precise speed control is required in circuit 06.	• Used when precise speed control is required in circuit 07.	• Used when the position needs to be held in circuit 13.	• Used when the position needs to be held in circuit 14.	• Used when high-/low-speed control is required. • Care required about boost pressure with negative inertial load.	• Used when the position needs to be held in circuit 17.	• Applicable to positive load. • Used when high-/low-pressure control is required. • High-/low-speed control possible	• Used when high-/low-pressure control is required. • High-/low-speed control possible	• When the circuit is not used

<OH PACK> Hydraulic Unit



Features

- High energy efficient hydraulic system with an easy control feature for pressure and flow rate achieved by the V series piston pump in the unit.
- Applicable up to a pressure of 21 MPa.
- The base block is ready for construction of a control circuit and allows quick determination of the system configuration and the piping outlet position and also minimizes the unit size.
- Please consult us about other options.

Nomenclature

OH	※※※	※	※※	※※	kW
1	2	3	4	5	

1 Model No.
OH: <OH PACK> hydraulic unit

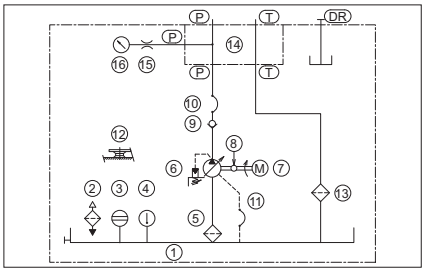
2 Tank capacity
060: 60 L 250: 250 L
100: 100 L 400: 400 L
160: 160 L 630: 630 L

3 Pump/motor connection method
M: Motor pump (without couplins)
V: Coupling

4 Pump capacity
15: V15 38: V38
23: V23 70: V70

5 Motor capacity
1.5: 1.5 kW, 4-pole 15: 15 kW, 4-pole
2.2: 2.2 kW, 4-pole 18.5: 18.5 kW, 4-pole
3.7: 3.7 kW, 4-pole 22: 22 kW, 4-pole
5.5: 5.5 kW, 4-pole 30: 30 kW, 4-pole
7.5: 7.5 kW, 4-pole 37: 37 kW, 4-pole
11: 11 kW, 4-pole

Basic circuit diagram



Part No.	Device name
1	Oil tank
2	Oil filler port-cum-air breather
3	Oil level gauge
4	Thermo label
5	Suction strainer
6	Piston pump
7	Motor
8	Coupling

Part No.	Device name
9	Inline check valve
10	High-pressure hose
11	Low-pressure hose
12	Vibration-absorbing rubber
13	Return filter
14	Outlet block
15	Gauge damper
16	Pressure gauge

Nomenclature

2 Tank capacity	3 Connection method	4 Pump capacity	5 Motor capacity (Unit: kW, Number of poles: 4)										
			1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37
60 L	M	15	✓	✓	✓								
	V	15	✓	✓	✓								
100 L	M	15	✓	✓	✓								
	M	23		✓	✓	✓							
	M	38		✓	✓	✓	✓						
	V	15		✓	✓	✓	✓						
	V	23		✓	✓	✓							
	V	38		✓	✓	✓							
160 L	M	15	✓	✓	✓								
	M	23		✓	✓	✓							
	M	38		✓	✓	✓	✓						
	V	15		✓	✓	✓	✓						
	V	23		✓	✓	✓	✓						
	V	38		✓	✓	✓	✓						
250 L	M	15	✓	✓	✓								
	M	23		✓	✓	✓							
	M	38		✓	✓	✓	✓						
	V	15		✓	✓	✓	✓						
	V	23			✓	✓	✓	✓	✓				
	V	38			✓	✓	✓	✓	✓				
	V	70				✓	✓						
400 L	M	38				✓	✓						
	V	38						✓	✓				
	V	70				✓	✓	✓	✓	✓	✓		
630 L	M	38				✓	✓						
	V	38						✓	✓				
	V	70				✓	✓	✓	✓	✓	✓	✓	✓

These products are distributed by Daikin Hydraulic Engineering Co., Ltd. Please consult the Sales Counter (see Page U-2) for detailed information.

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