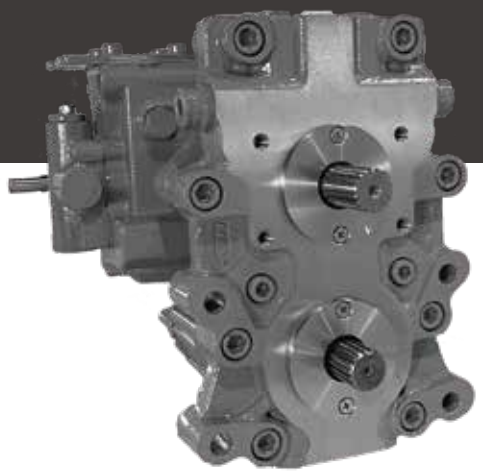
Hydrostatic Transmission Unit
HT S10 Series

HT Series Hydrostatic Transmission Unit is an integrated pump and motor unit developed for agricultural machinery sector,
fully use driving performance of agricultual machinery , in order to meet the application requirement in harsh operating condition such as high speed and high presssure.

Displacement：56 mL/r
Rated pressure：32 MPa
Max pressure：39 MPa



Features

- An integrated pistion unit specially developed for agricultural machinery, enabling the full leverage of the operational performance of agricultural machinery.
- High volumetric efficently,with output volumetric efficently can exceeding 90%.
- Output speed and displcement are proportionally and steplessly variable.
- Output speed increase from zero to maximun with the swash plate angle varies.
- Pump and motor intergarted to one unit can efficently to minimizes the need for piping layout.
- Compared to tradtional split-type hydraulic pump and motor,it freaures lower pressure loss inpipelines.

Contents

Modle Code

	A	B	D	E	H	J	K	M	N	P	R	S	T	W	X
HT				0	10		L	F3						0	

Hydrostatic Transmission

—	Swash plate type variable displacement pump	HT

Displacement

A	Geometric displacement in:mL/r	48	56	

Variable Control Method

		48	56	
B	Mechanical servo control (without hand lever)	○	●	HW1
	Mechanical servo control (with cross handle)	○	●	HW2
	Mechanical servo control (with Z handle)	○	●	HW3
	Electric proportional control, 12V, Connector type：Deutsch DT04-2P	○	○	EP1
	Electric proportional control, 24V , Connector type：Deutsch DT04-2P	○	○	EP2

Brake Valve

		48	56	
D	Without brake value	○	●	0
	With brake valve, 12V, electrically released brake, connector type: Deutsch DT04-2P	○	○	1
	With brake valve, 24V, electrically released brake, connector type: Deutsch DT04-2P	○	○	2
	With brake valve, 12V, electrically held brake, connector type: Deutsch DT04-2P	○	○	3
	With brake valve, 24V, electrically held brake, connector type: Deutsch DT04-2P	○	○	4

Additional Features

		48	56	
E	No additional features	○	●	0

Series

		48	56	
H	Series S10	○	●	10

Direction of Rotation

		48	56	
J	CW	○	●	R
	CCW	○	●	L

Modle Code

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HT				0	10		L	F3						0	

Position of Control Oylinder (Viewed from input shaft end)

		48	56	
K	the pump on top , the control cylinder on the left	○	●	L

Front Cover Type

		48	56	
M	Pump pilot flange ϕ72mm, motor pilot flange ϕ72mm, charge pump inlet port G1/2, pump mounting bolt hole spacing M8 x 92mm x 56mm.	○	●	F3

Pump Shaft Configuration

		48	56	
N	JIS D 2001，20x18x1.25，Shaft extension length50	○	●	J1
	JIS D 2001，20x18x1.25，Shaft extension length59	○	●	J2

Motor Shaft Configuration

		48	56	
P	JIS D 2001，20x18x1.25，Shaft extension length: 37 mm, Snap ring groove location: 5 mm from shaft end face	○	●	J1
	JIS D 2001， 20x18x1.25， Shaft extension length 56mm, Snap ring groove located :5mm from shaft end face.	○	●	J2
	JIS D 2001， 20x18x1.25， Shaft extension length 56mm, Snap ring groove located :2.5mm from shaft end face.	○	●	J3
	JIS D 2001， 20x18x1.25， Shaft extension length 56.5mm, Snap ring groove located: 2.65mm from shaft end face.	○	●	J4

Charge Pump

		48	56	
R	Charge pump: counterclockwise rotation (CCW), displacement： 13.6 mL/r, inlet port： G3/4, outlet port： G1/2.	○	●	L1
	Charge pump: counterclockwise rotation (CCW), displacement： 13.6 mL/r, inlet port： G3/4, outlet port： G3/4.	○	○	L2
	Charge pump: clockwise rotation (CW), displacement： 13.6 mL/r, inlet port： G3/4, outlet port： G1/2.	○	●	R1
	Charge pump: clockwise rotation (CW), displacement： 13.6 mL/r, inlet port： G3/4, outlet port： G3/4.	○	●	R2

Modle Code

	A	B	D	E	H	J	K	M	N	P	R	S	T	W	X
HT				0	10		L	F3						0	

High-pressure Relief Valve, left side (With the pump on top and viewed from the input shaft end, the relief valve is located on the left side)

		48	56	
S	Non-orificed high-pressure relief valve (opens at the set pressure to relieve flow).			**A
	High-pressure relief valve setting pressure: 39 MPa.	○	●	39A
	Orificed high-pressure relief valve.			**B
	High-pressure relief valve setting pressure: 39 MPa.	○	●	39B

High-pressure Relief Valve, right side (With the pump on top and viewed from the input shaft end, the relief valve is located on the right side)

		48	56	
T	Non-orificed high-pressure relief valve (opens at the set pressure to relieve flow).			**A
	High-pressure relief valve setting pressure: 39 MPa.	○	●	39A
	Orificed high-pressure relief valve.			**B
	High-pressure relief valve setting pressure: 39 MPa.	○	●	39B

Special Hardware Features

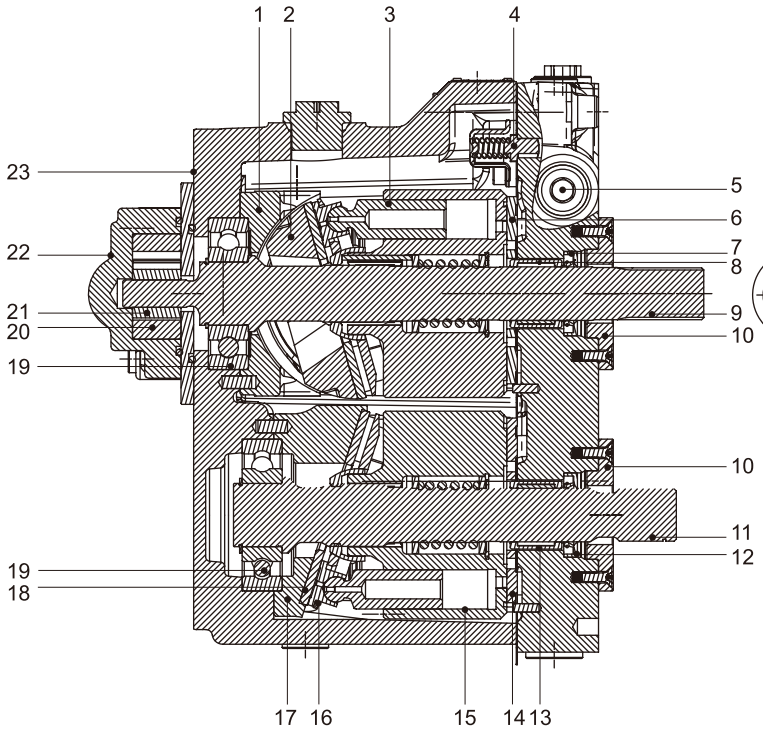
		48	56	
W	No special hardware features	○	●	0

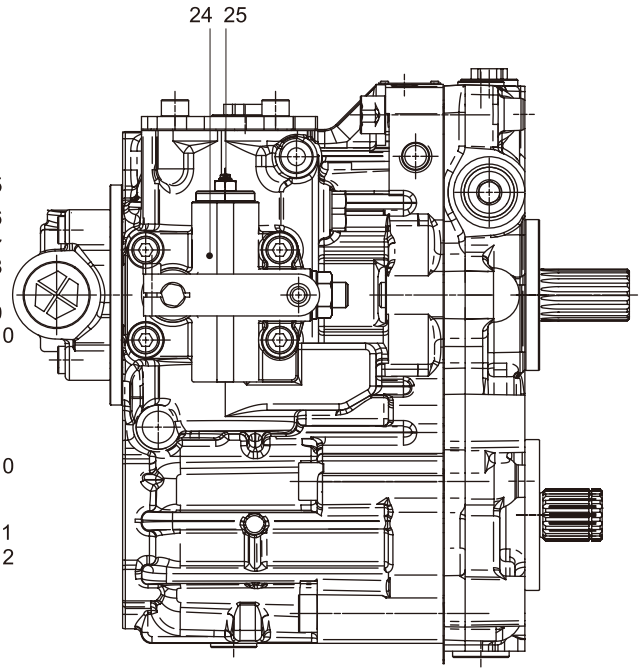
Accessories

		48	56	
X	No accessories	○	●	0
	With external filte	○	○	A

● Available ○ On request — Not available ▭ Recommended modle

Structure





1.Yoke Housing
2.Yoke
3.Piston and Slipper Assembly
4.Charge Relief Valve
5.High-Pressure Relief Valve
6.Pump Port Plate
7.Oil Seal
8.Needle Roller Bearing
9.Pump Shaft
10.Pilot Flange
11.Motor Shaft
12.Oil Seal
13.Needle Roller Bearing
14.Motor Port Plate
15.Cylinder
16.Retainer Plate
17.Swash Plate
18.Thrust Plate
19.Rolling Bearing
20.Internal Gear
21.External Gear
22.Charge Pump Housing
23.Housing
24.Control valve
25.Neutral adjustment cam rod

Hydraulic Oil

Mineral oil

Operating Viscosity Range

For optimal efficiency and service life, it is recommended that the operating viscosity (at operating temperature) be selected within the following range:

v_{opt}=Optimum operating viscosity16…36mm /s^2

Depends on the circuit temperature (closed circuit).

Viscosity Limits

Viscosity limits are as follows:

v_{min} =5mm^2/s

Short-term(t＜3$_{min}$)

Permissible maximum temperature t_{max}=+115˚C

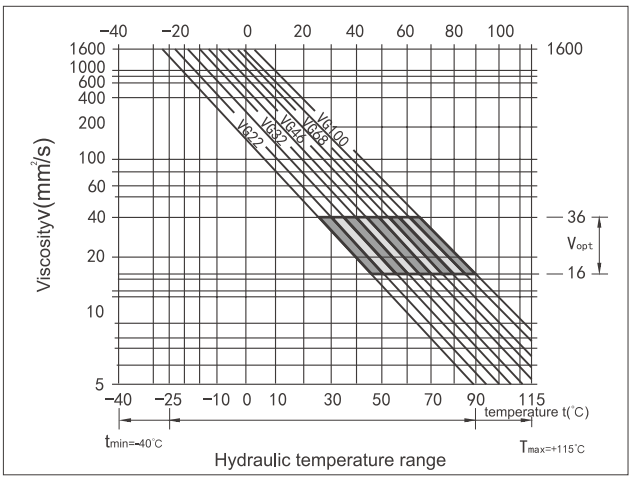
v_{max} =1600mm^2/s

Short-term(t＜3min)

During cold start(p≤3Mpa，n≤1000rpm，t_{min}=-40˚C)

This applies only to no-load starts; the optimum operating viscosity must be reached within 15 minutes.

Selection Diagram



Hydraulic Fluid Selection Instructions

To select the correct hydraulic fluid, the operating temperature in relation to the ambient temperature must be known. For a closed circuit, this refers to the circuit temperature.

The hydraulic fluid should be selected so that its viscosity, within the operating range(v_{opt}), lies in the optimum zone (see the shaded area of the selection diagram).
We recommend choosing a higher viscosity grade under identical conditions.

Example: At an ambient temperature of X °C, the operating temperature in the circuit is 60 °C. Within the optimum operating viscosity range (corresponding to the shaded area), both viscosity grades VG46 and VG68 are suitable.
In this case, VG68 should be selected.

Important note: The case drain temperature, influenced by pressure and speed, is always higher than the circuit temperature. The temperature at any point in the system must not exceed 115 °C.

Filtration

The finer the oil filtration, the higher the oil cleanliness, and the longer the service life of the axial piston components. To ensure proper functioning of the axial piston components, the minimum required oil cleanliness level is:

Class 20/18/15 according to ISO 4406.

Depending on the system and application,
we recommend:Filter with β20 ≥ 100.
The beta (β) value must not decrease when the filter element's differential pressure increases.

At elevated fluid temperatures (90 °C up to a maximum of 115 °C), the minimum cleanliness level should be:
Class 19/17/14 according to ISO 4406.

Operating Pressure Range

input

Variable displacement pump
Charge pressure(n=2000rpm)P_{sp} _____ 2.3Mpa

Charge pump
Inlet pressure P_{smin}(V≤30mm /S) _____ ≥0.08Mpa

Shaft Seal

Permissible Pressure Load

The service life of the shaft seal is influenced by the pump speed and the case drain pressure.
The average sustained case drain pressure at recommended operating temperature must not exceed 0.3 MPa (with a maximum case drain pressure of 0.6 MPa at reduced speeds).
Short-term (t < 0.1 s) absolute peak pressures up to 1 MPa are permissible. The higher the frequency of pressure peaks, the shorter the service life of the shaft seal.
The pressure inside the casing must be equal to or greater than the external pressure on the shaft seal.

Temperature Range

FKM (fluorocarbon rubber) shaft seals are suitable for a case temperature range of -25 °C to +115 °C.

Technical Data Sheet (Theoretical Data)

Scale			Unit	56
Displacement	Variable displacement pump	V_{gmax}	mL/r	56
	Fixed displacement motor	V_{gmax}	mL/r	56
	Charge pump(P=2.3MPa)	V_{gmax}	mL/r	13. 6
Speed	Input speed	n_{max}	rpm	3000
		n_{min}	rpm	800
	Output speed	n_{max}	rpm	3000
		n_{min}	rpm	0
Flow	At $n_{o\ max\ continuous}$ and $V_{g\ max}$		L/min	168
Relief pressure			MPa	39
Weight			KG	32

Specification Calculation

Flow $q_v = \frac{V_g \cdot n \cdot \eta_v}{1000}$ [L/min]

Torque $T = \frac{V_g \cdot \Delta P}{20 \cdot \pi \cdot \eta_{mh}}$ [Nm]

Power $P = \frac{2\pi \cdot T \cdot n}{60000} = \frac{q \cdot \Delta P}{600 \cdot \eta_t}$ [KW]

V_g = Displacement per revolution mL/r

ΔP = Pressure differential bar

n = Speed rpm

η_v = Volumetric efficiency

η_{mh} = Mechanical-hydraulic efficiency

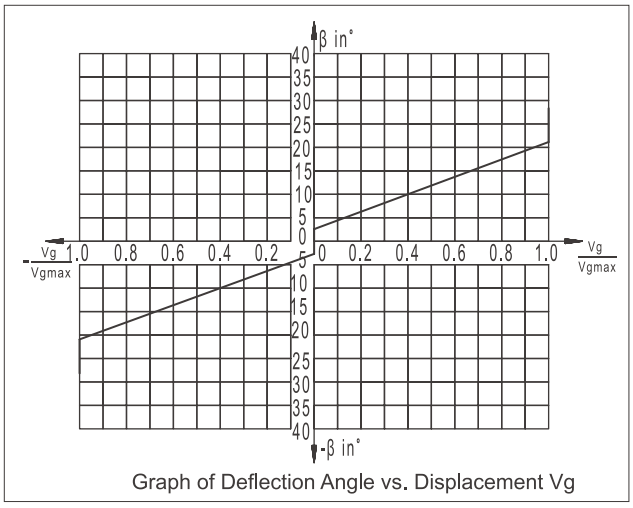
η_t = Total efficiency

Displacement Control Method - Mechanical servo control, HW

Depending on the operating direction (a or b) of the control lever, the pump control cylinder receives pilot pressure via the HW control unit. This allows the swash plate, and thus the displacement, to be adjusted steplessly. Each operating direction of the control lever corresponds to a flow direction.

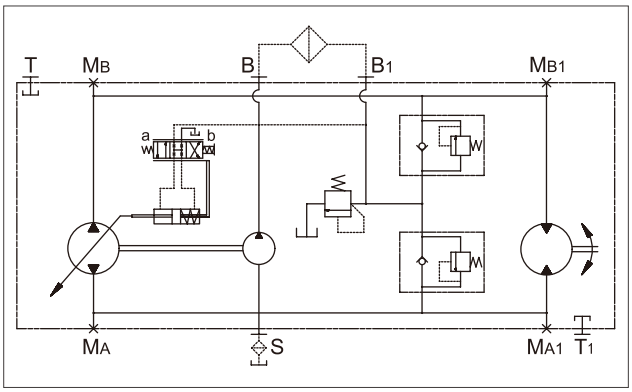
Deflection angle β of the control lever during pivoting:
Control start: β = ±2.5°
Control end: β = ±21° (at maximum displacement $V_{g\ max}$)
Mechanical stop: ±31°
The pivoting of the HW control lever must be limited by an external position sensor (setpoint device).

Note: When no torque is applied to the lever of the HW control unit, the spring-centering function automatically returns the pump to the neutral position (V_g=0), regardless of the lever's deflection angle.



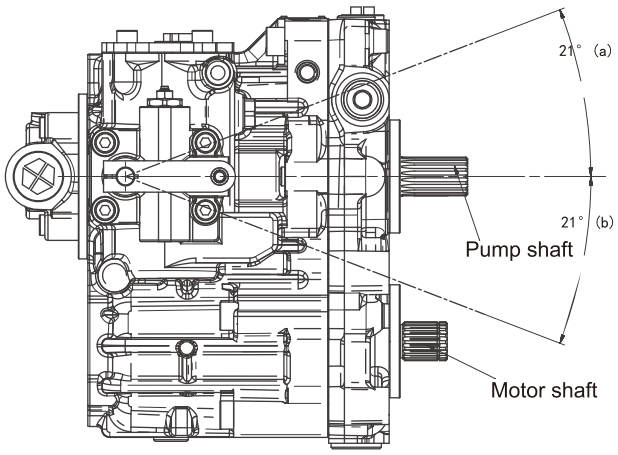
Graph of Deflection Angle vs. Displacement Vg

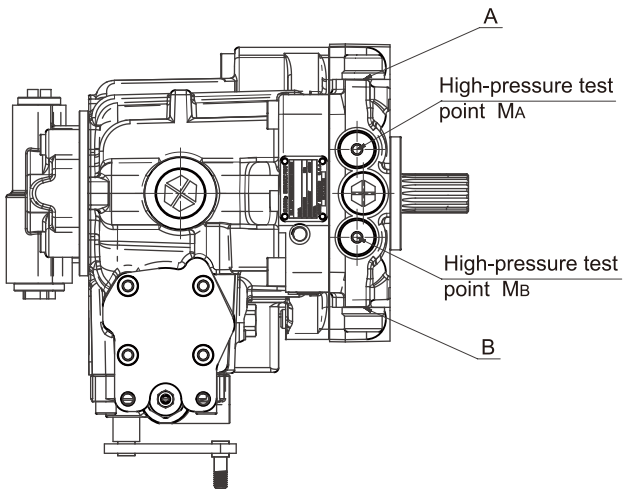
Hydraulic Schematic Diagram



Relationship between Rotation Direction-Control Input-and Flow Direction

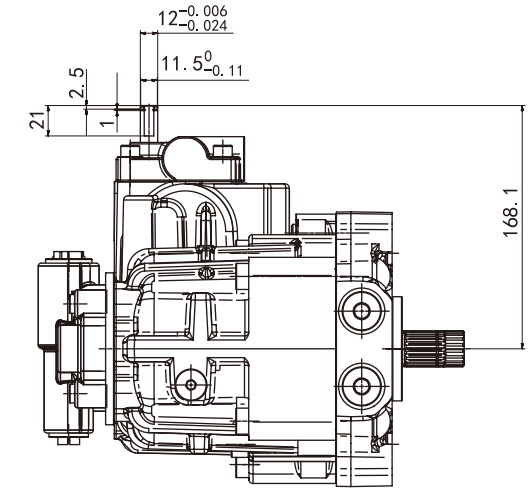
Input rotation direction	Operating position	High-pressure line
CW	a	B
	b	A
CCW	a	A
	b	B

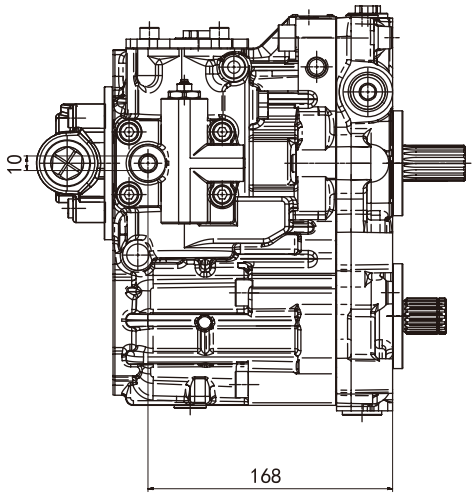




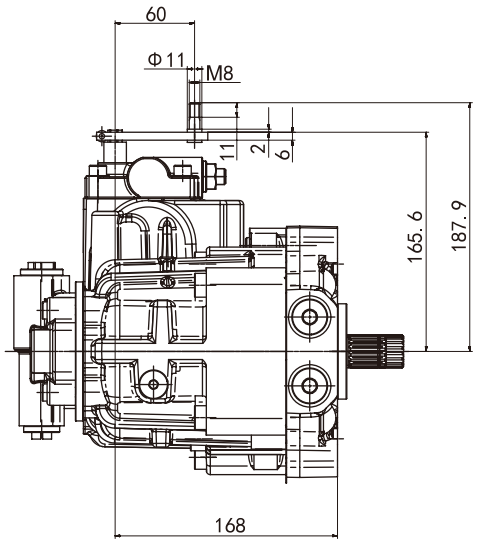
Installation Connection Dimensions

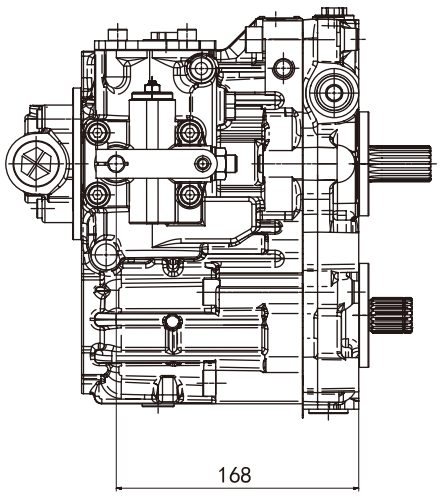
HW1 - Mechanical servo control, without hand lever





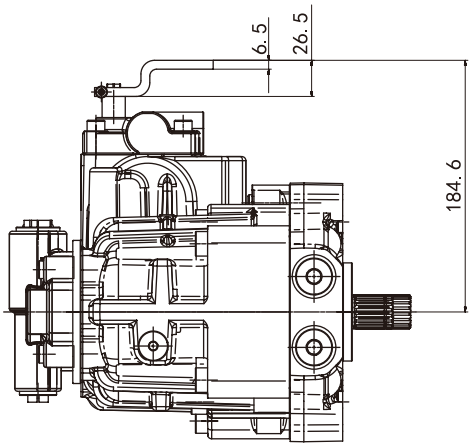
HW2 - Mechanical servo control, with cross handle

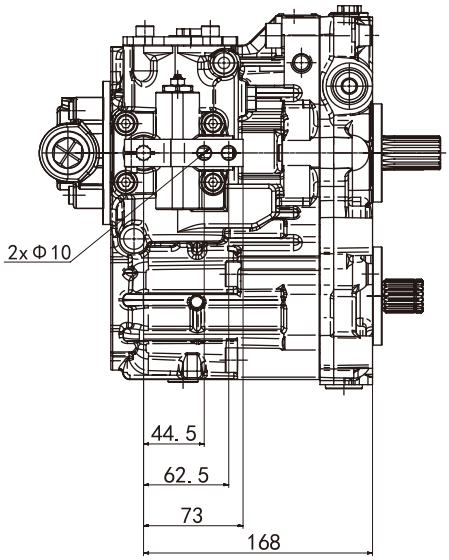




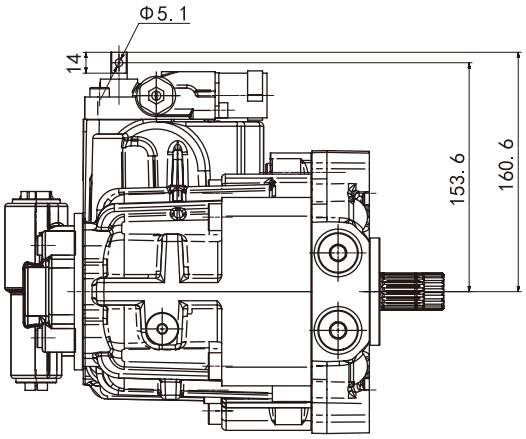
Installation Connection Dimensions

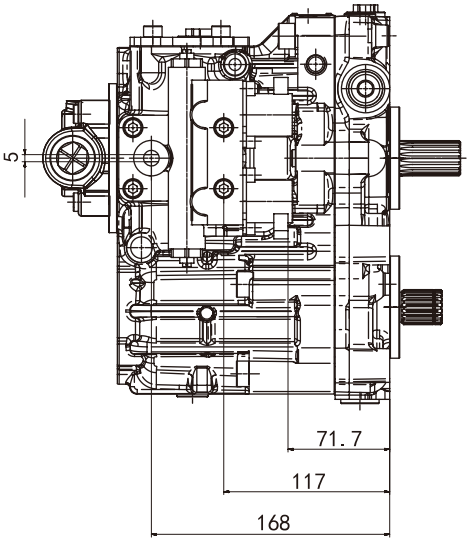
HW3 - Mechanical servo control, with Z-handle





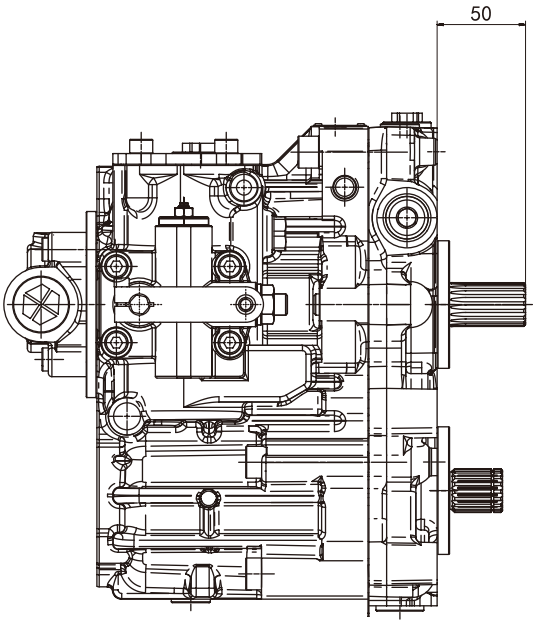
EP1 - Electrical proportional control



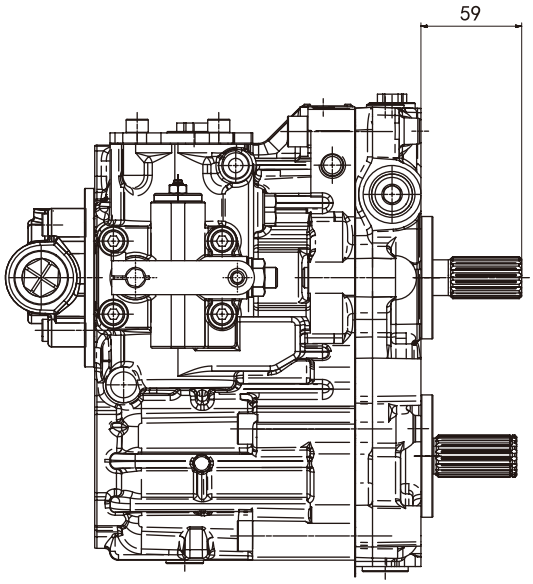


Installation Connection Dimensions

Pump shaft configuration J1

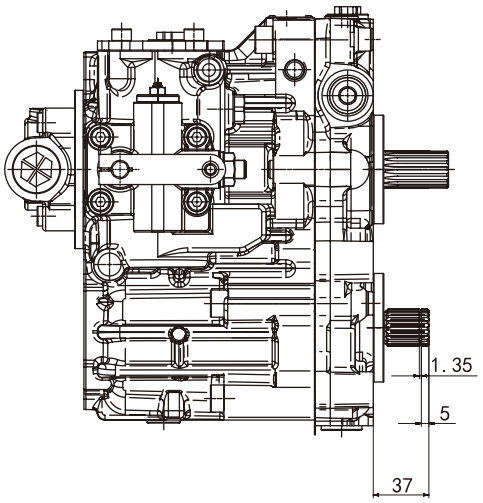


Pump shaft configuration J2

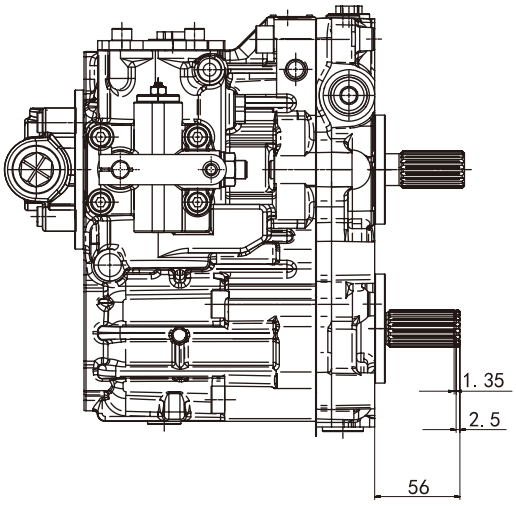


Installation Connection Dimensions

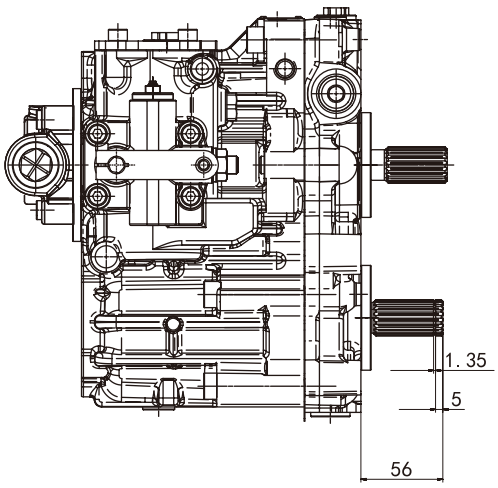
Motor shaft configuration J1



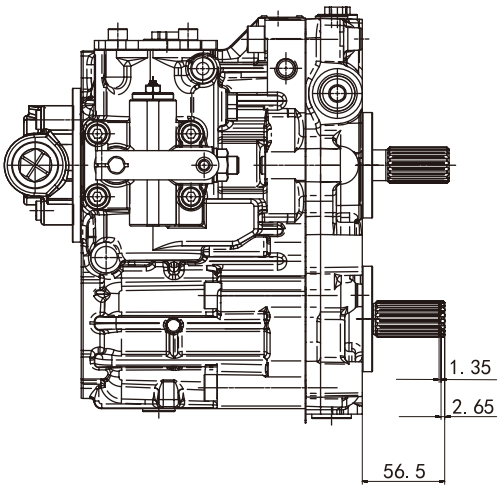
Motor shaft configuration J3



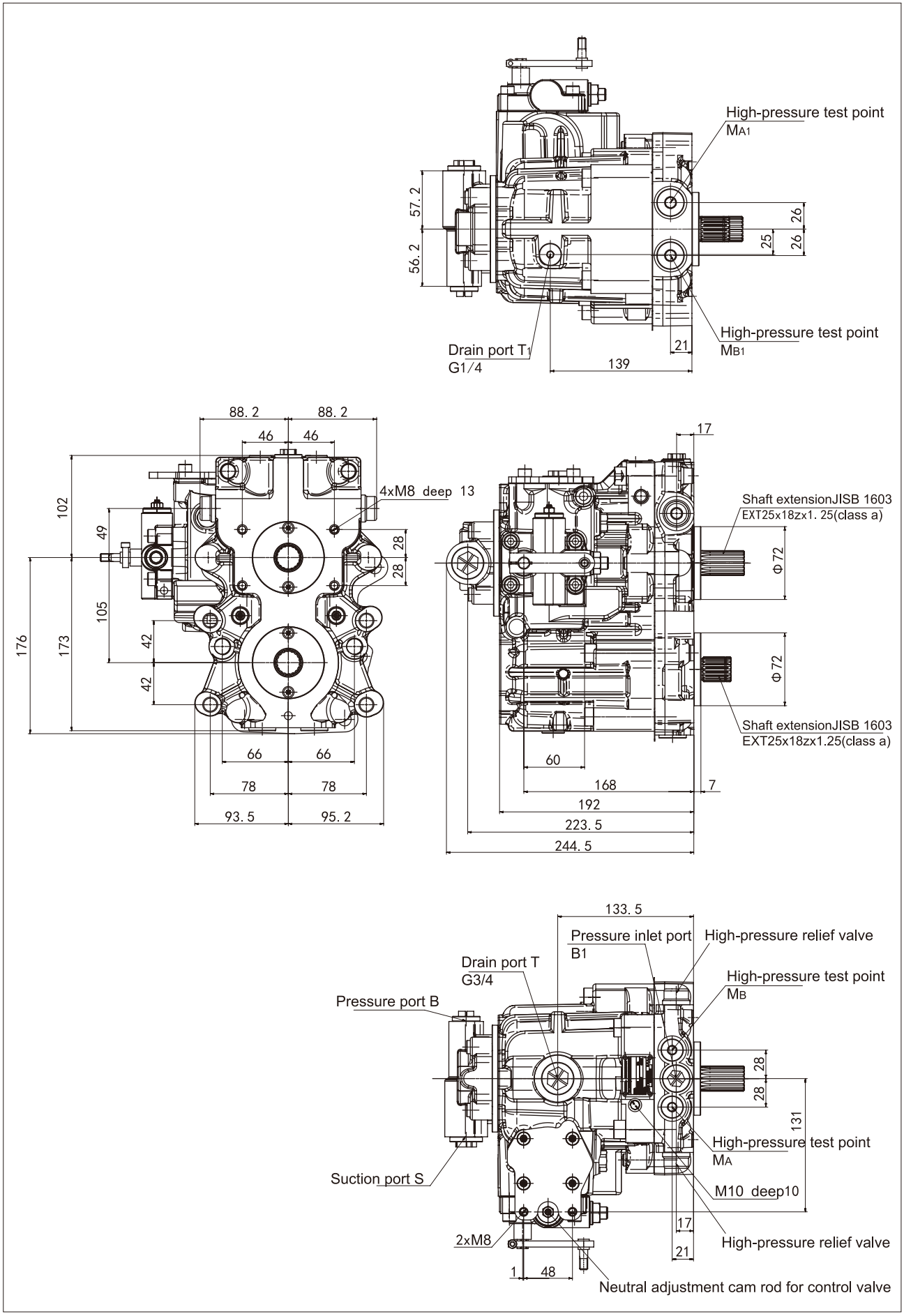
Motor shaft configuration J2



Motor shaft configuration J4



Installation Connection Dimensions



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- Intemal Gear Pump
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- Vane Pump
- Variable Displacement Motor
- Proportional valve/ Industrial Hydraulic Valve

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