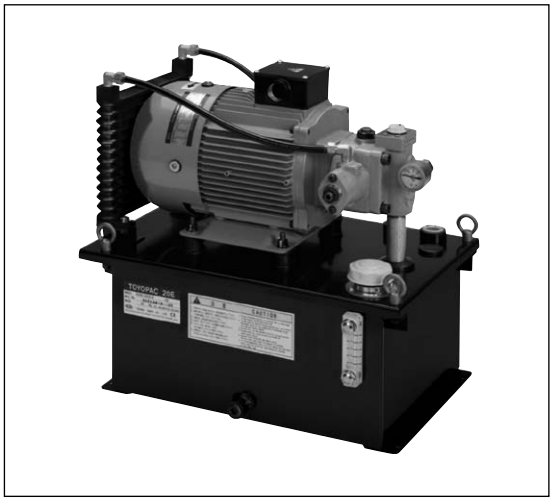
ENERGY-SAVING HYDRAULIC POWER UNIT-TOYOPAC ECO Ⅱ

RoHS



Commitment to 3 “S” levels

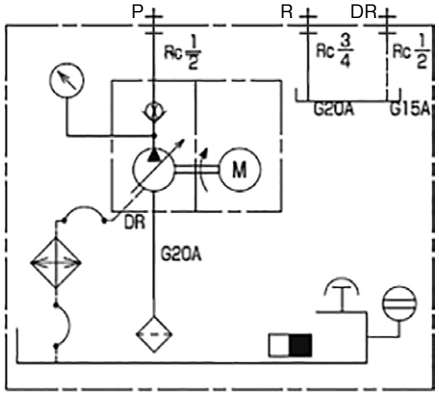
This hydraulic unit has been developed committed to these 3 ”Saves” of “Energy”, “Space” and “Noise”.

■Features

1. Energy saving by improving the volumetric efficiency of variable displacement vane pump
2. Space saving and weight reduction by employing a compact tank and reducing the size of pump and motor
3. Low noise compared with conventional models
4. Selection of a variety of optional components is possible, including the level switch, magnetic separator, return filter, oil pan, or others for applications such as the leak test by filling water.
5. Compliant to RoHS directives

- Select combinations of pump, motor and tank from the following model designation and specifications.
- Confirm that hydraulic fluid is filled to the H level of oil level gauge in the tank.
  Replenish hydraulic fluid after operation since the fluid level drops as fluid enters in the tank.
- Use the phases L1 (R)-U, L2 (S)-V and L3 (T)-W at the power supply side and motor side. Run and stop alternately during test run and confirm that the pressure rises on the pressure gauge provided at the discharge side. If it doesn't, check the direction of rotation of the motor. The direction of rotation is CW viewed from the fan side of motor.
- Bleed air. Air can be bled faster if it is connected to the return at the farthest point on the pipeline.
- Always ground the hydraulic power unit. Failure to ground it will cause electrocution or fire. You are recommended to install an earth leakage breaker to prevent electric shock accident and fire with certainty.
- Use a rubber hose of working pressure at 14 MPa or higher and longer than 1 m to connect the hydraulic device to the pipe at the main unit side, with sufficient sag. Where it is shorter than 1 m or surge pressure is likely to rise, install a surge relief valve.
- Use general mineral oil base hydraulic fluid (equivalent to ISO VG32) within the fluid temperature range 5 to 60℃. Using hydraulic fluid outside the specified temperature range may cause failure of the hydraulic power unit and deterioration of the fluid. Fire-resistant fluid cannot be used.
- When replacing the fluid, use fluid of the same brand.
- Use hydraulic devices within the ambient temperature range 5 to 35℃.
- Replace hydraulic oil once every year or when contamination is observed. Control the contamination level to achieve better than Class 10 of NAS1638. Using contaminated fluid will shorten the service life of hydraulic devices and failure in operation.
- The water content of the hydraulic fluid must be 0.1% or less. Water in the hydraulic fluid causes hydraulic power unit failure.
- A special model is necessary for applications under low speed drive condition using an inverter. Please consult us.
- The pump discharge rate is set at the maximum and the discharge pressure is set at the minimum at shipping from factory. When using the unit, change these settings to necessary rate and pressure.

●Hydraulic circuit



■Description of the model designation

TP10E-BEA1-B-(*)-03

- Model No.
- Option (Please refer to page K-5 for details.)
- Motor capacity (Efficiency level: IE3)
  - B:0. 75kW 4P
  - C:1. 5kW 4P
  - D:2. 2kW 4P
- Pressure adjustment range
  - A1: 1.5 to 2.5 MPa
  - A2: 2.5 to 4 MPa
  - A3: 4 to 7 MPa
  - B3: 4 to 7 MPa (Fixed HP type)
    (Type that suppresses cut-off pressure and input)
  - A4: 6 to 8 MPa
- Pump capacity
  - BE: 8 cm^3/rev
  - CE: 16.7 cm^3/rev
- “ECO” series
- Tank capacity
  - 10:10L
  - 20:18L
- TOYOPAC

* Select combinations of the tank capacity, pump capacity and motor capacity from the base model column in the table of specifications.

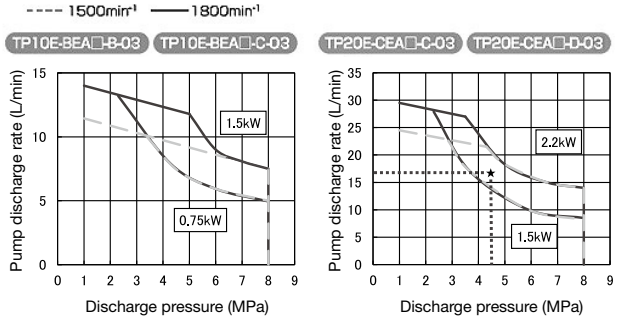
■Specifications

Base model	Motor capacity (kW)	Tank capacity (L)	Pump capacity (cm³/rev)	Max. operating pressure (MPa)	Pressure adjustment range (MPa)	Voltage (V)	Mass (kg)*1
TP10E-BEA1-B-03	0.75 kW 4P	10	8	2.5	1.5 to 2.5	AC200V 50/60Hz AC220V 60Hz	33
TP10E-BEA2-B-03				4	2.5 to 4.0		
TP10E-BEA3-B-03				7	4.0 to 7.0		
TP10E-BEA3-C-03	1.5 kW 4P						38
TP20E-BEA4-C-03		18		8	6.0 to 8.0		39
TP20E-CEA2-C-03			16.7	4	2.5 to 4.0		
TP20E-CEB3-C-03				7	4.0 to 7.0		
TP20E-CEA3-D-03	2.2 kW 4P						47
TP20E-CEA4-D-03				8	6.0 to 8.0		

*1: Hydraulic fluid and options are not included.

■Motor selection chart

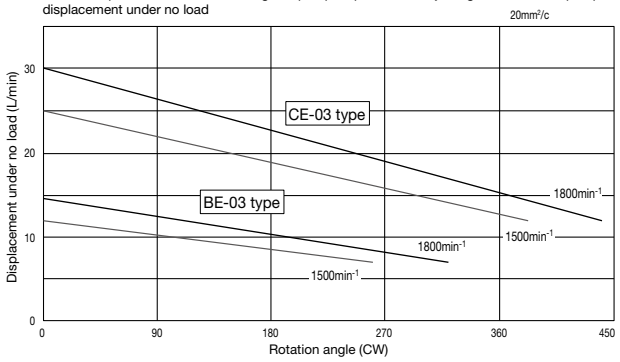
* Underside of the curve is the allowable operation range at rated output of each motor.



Selecting method of motor (example)
As …*… in the graph shows, the motor to be selected is found in the area above the point where the pressure 4.5 MPa on the horizontal axis intersects with the displacement 17 L/min on the vertical axis. In this case, select "TP20E-CEA3-D-03" from the motor 2.2 kW (D) and pressure 4 to 7 MPa (A3).

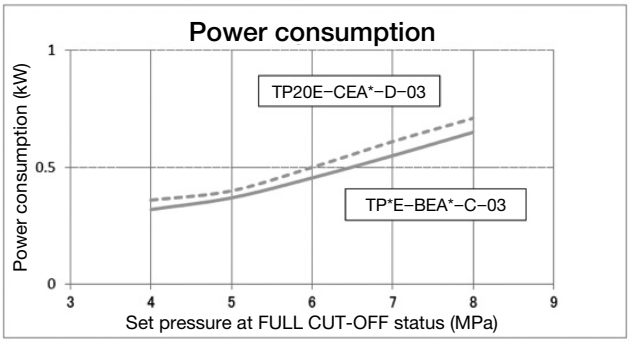
■Adjustment of displacement by the pump displacement adjusting screw

Relationship between the rotation angle of pump displacement adjusting screw and the pump displacement under no load



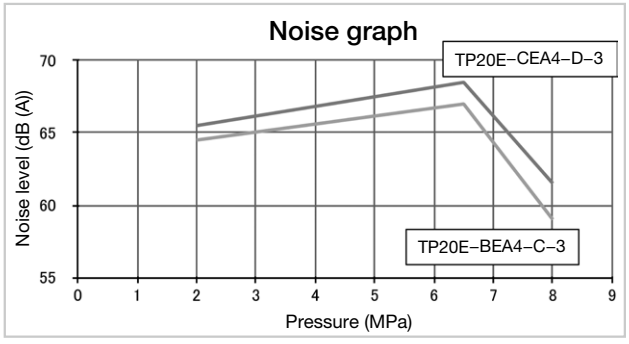
- To adjust the displacement from the factory shipment state (0-deg position), adjust it referring to the angle of rotation in the above graph.
- Do not turn the displacement adjusting screw to left (CCW) from the shipment position.

■Power consumption



Conditions
●Hydraulic fluid: ISO VG32 ●Fluid temperature: 50℃ ●Power supply: AC200V, 60 Hz

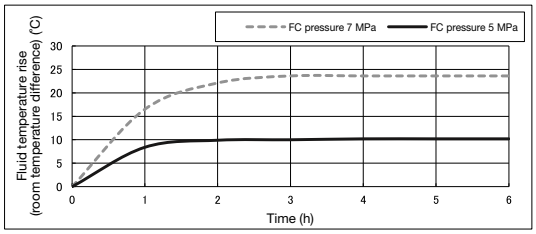
■Noise characteristics



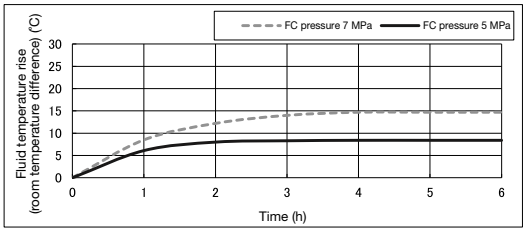
Conditions
●Hydraulic fluid: ISO VG32 ●Fluid temperature: 50℃ ●Power supply: AC200V, 60 Hz
●Measurement point: Average of measurements in 4 directions when measured at 1 m from the device horizontally and at 1.2 m above the floor.
* The data is a representative value which could vary depending on the conditions of installation floor or frame and surrounding objects that reflect noise.

■Fluid temperature characteristics

TP10E-BEA3-B-03



TP20E-CEA3-D-03



Conditions

●Hydraulic fluid: ISO VG32 ●Fluid temperature: 35℃ ●Power supply: AC200V, 60 Hz

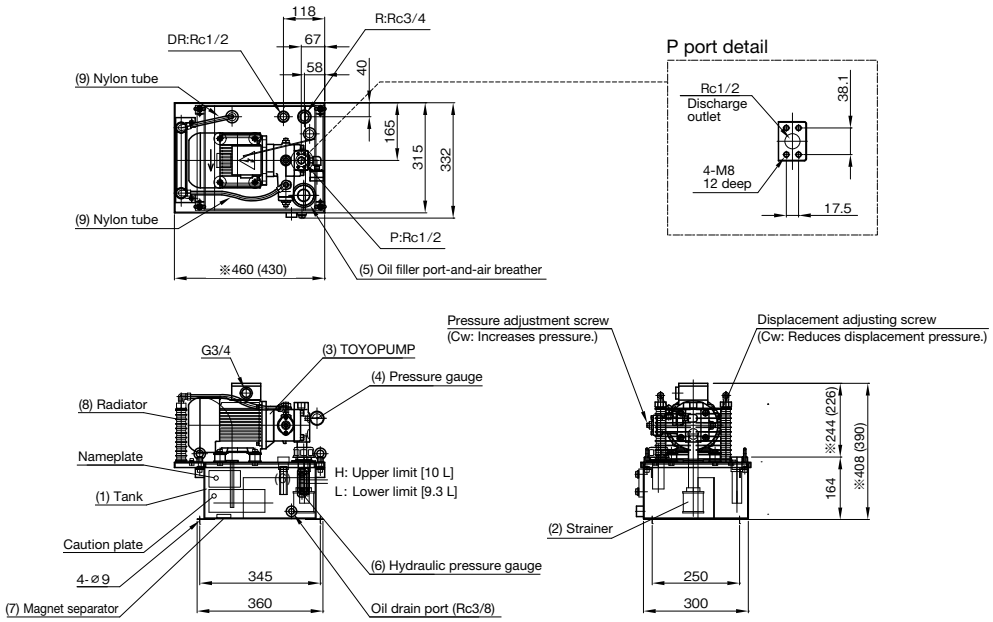
● The data is obtained in windless condition with the discharge side of pump blocked, full cut-off (FC)

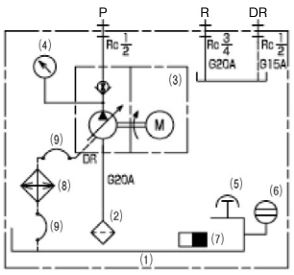
Caution

●The data is a representative valve which could vary depending on constituting circuit devices and operation cycles. Fluid temperature should be no higher than 60℃.

■Outside dimensions

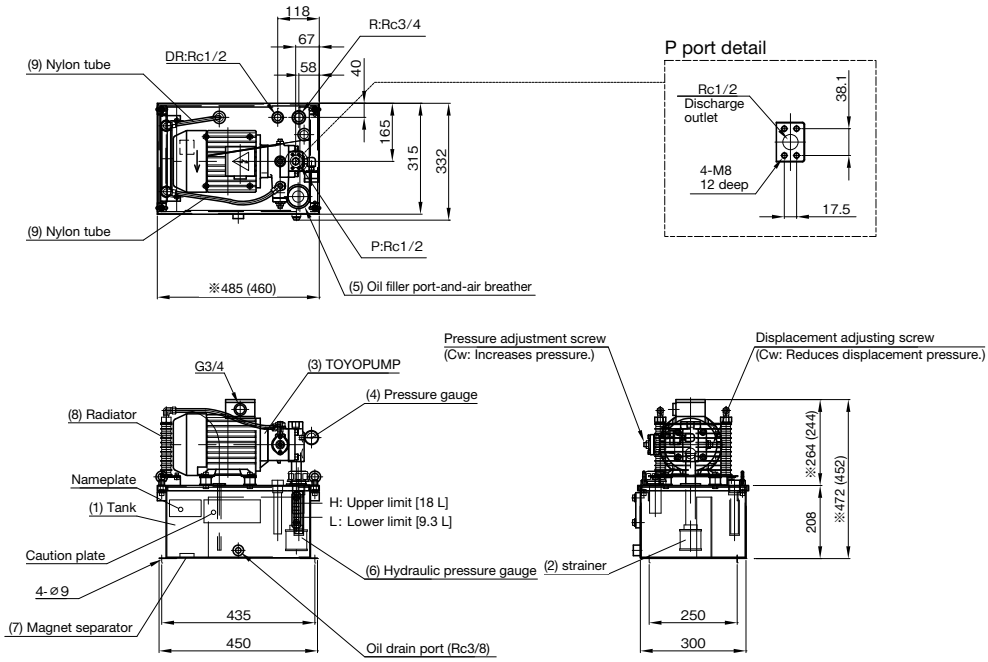
TP10E-□□-B-03 [BASE MODEL] **TP10E-□□-C-03 [BASE MODEL]** ※( ) for TP10E-□□-B-03

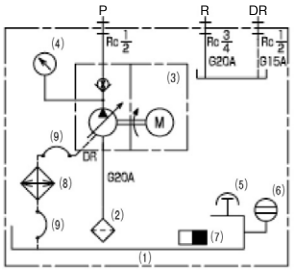




No	Part name
1	Tank
2	Strainer
3	TOYOPUMP
4	Pressure gauge
5	Oil filler port-and air breather
6	Oil level gauge
7	Magnet separator
8	Radiator
9	Nylon tube

TP20E-□□-C-03 [BASE MODEL] **TP20E-□□-D-03 [BASE MODEL]** ※( ) for TP20E-□□-C-03





No	Part name
1	Tank
2	Strainer
3	TOYOPUMP
4	Pressure gauge
5	Oil filler port-and air breather
6	Oil level gauge
7	Magnet separator
8	Radiator
9	Nylon tube

■Option model nomenclature

TP10E / TP20E -*EA*-*- (B) (L) (M) (A) (F) (T) (P) (G) (R) (D) (1) -03

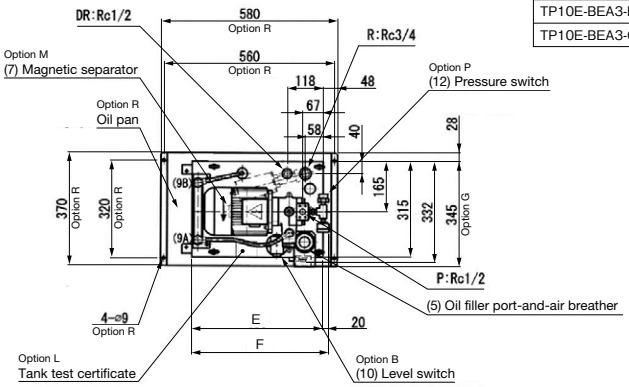
- B : With level switch
- L : With leak test by filling with water
- M : With magnetic separator
- A : With radiator filter
- F : With return filter
- T : With thermometer (TP20E only)
- 1 : 1-station manifold
- 2 : 2-station manifold
- 3 : 3-station manifold
- D : Maintenance direction change
- R : With oil pan
- G : With oil level gauge cover
- P : With pressure switch

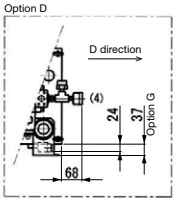
■Option device external dimensions (* in the fully equipped state. excluding manifold.)

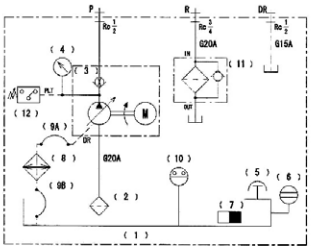
TP10E-****-B-*-03 TP10E-****-C-*-03

(Unit: mm)

Model	Dimensions					
	A	B	C	D	E	F
TP10E-BEA1-B-03	171	(226)	(390)	(425)	430	450
TP10E-BEA2-B-03	171	(226)	(390)	(425)	430	450
TP10E-BEA3-B-03	171	(226)	(390)	(425)	430	450
TP10E-BEA3-C-03	181	(244)	(408)	(443)	460	480

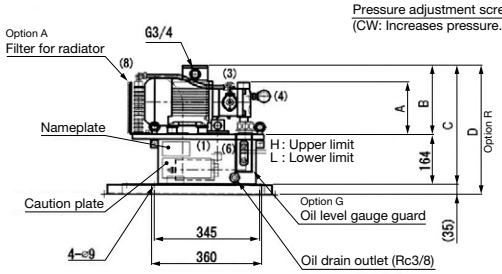


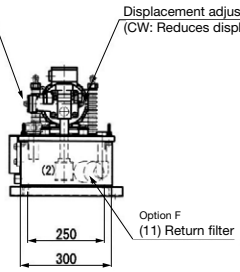




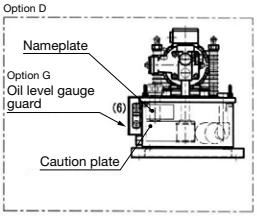
Option B
Code (10) level switch "Opens" at 5 mm below the lower limit of level gauge.

No	Part name
1	Tank
2	Strainer
3	TOYOPUMP
4	Pressure gauge
5	Oil filler port-and-air breather
6	Oil level gauge
7	Magnetic separator
8	Radiator
9	Nylon tube
10	Level switch
11	Return filter
12	Pressure switch





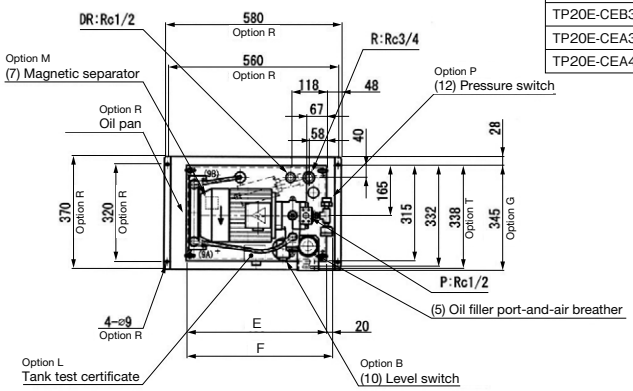
Option L
Tank is tested with the leak test by filling with water.

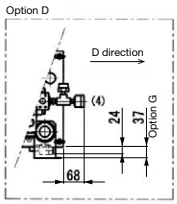


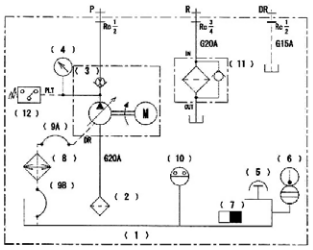
TP20E-****-C-*-03 TP20E-****-D-*-03

(Unit: mm)

Model	Dimensions					
	A	B	C	D	E	F
TP20E-BEA4-C-03	181	(244)	(452)	(487)	460	480
TP20E-CEA2-C-03	181	(244)	(452)	(487)	460	480
TP20E-CEB3-C-03	181	(244)	(452)	(487)	460	480
TP20E-CEA3-D-03	191	(264)	(472)	(507)	485	505
TP20E-CEA4-D-03	191	(264)	(472)	(507)	485	505

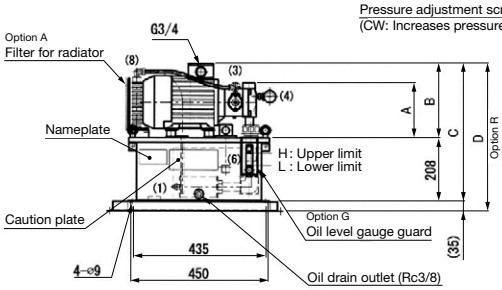


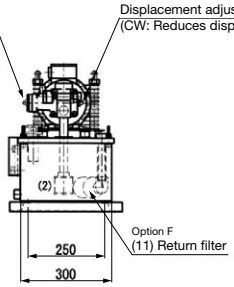




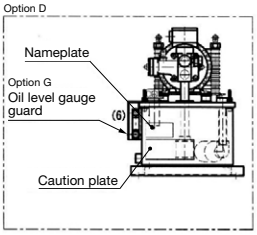
Option B
Code (10) level switch "Opens" at 5 mm below the lower limit of level gauge.

No	Part name
1	Tank
2	Strainer
3	TOYOPUMP
4	Pressure gauge
5	Oil filler port-and-air breather
6	Oil level gauge
7	Magnetic separator
8	Radiator
9	Nylon tube
10	Level switch
11	Return filter
12	Pressure switch

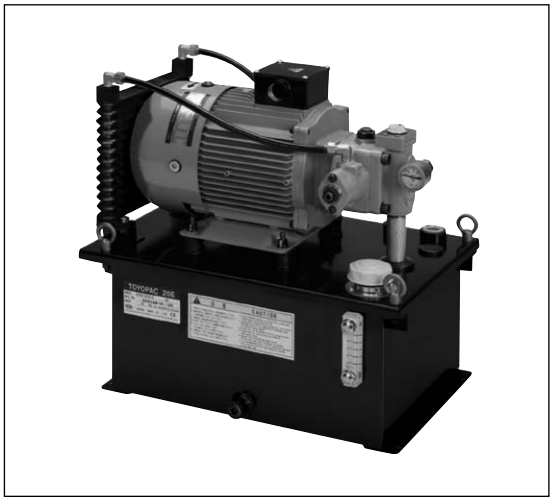




Option L
Tank is tested with the leak test by filling with water.



ENERGY-SAVING HYDRAULIC POWER UNIT FOR USA – TOYOPAC ECO Ⅱ



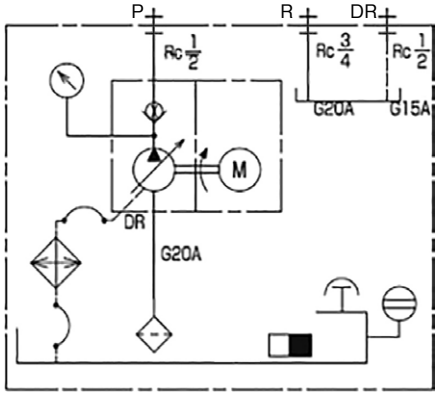
■Features

This energy-saving hydraulic unit is compliant to the regulations on the efficiency of low-pressure 3-phase induction motor, which are promoted in many countries over the world.

・Compliant to the high efficiency regulations - For USA

- Select combinations of pump, motor and tank from the following model designation and specifications.
- Confirm that hydraulic fluid is filled to the H level of oil level gauge in the tank. Replenish hydraulic fluid after operation since the fluid level drops as fluid enters in the tank.
- Use the phases L1 (R)-U, L2 (S)-V and L3 (T)-W at the power supply side and motor side. Run and stop alternately during test run and confirm that the pressure rises on the pressure gauge provided at the discharge side. If it doesn't, check the direction of rotation of the motor. The direction of rotation is CW viewed from the fan side of motor.
- Bleed air. Air can be bled faster if it is connected to the return at the farthest point on the pipeline.
- Always ground the hydraulic power unit. Failure to ground it will cause electrocution or fire. You are recommended to install an earth leakage breaker to prevent electric shock accident and fire with certainty.
- Use a rubber hose of working pressure at 14 MPa or higher and longer than 1 m to connect the hydraulic device to the pipe at the main unit side, with sufficient sag. Where it is shorter than 1 m or surge pressure is likely to rise, install a surge relief valve.
- Use general mineral oil base hydraulic fluid (equivalent to ISO VG32) within the fluid temperature range 5 to 60℃. Using hydraulic fluid outside the specified temperature range may cause failure of the hydraulic power unit and deterioration of the fluid. Fire-resistant fluid cannot be used.
- When replacing the fluid, use fluid of the same brand.
- Use hydraulic devices within the ambient temperature range 5 to 35℃.
- Replace hydraulic oil once every year or when contamination is observed. Control the contamination level to achieve better than Class 10 of NAS1638. Using contaminated fluid will shorten the service life of hydraulic devices and failure in operation.
- The water content of the hydraulic fluid must be 0.1% or less. Water in the hydraulic fluid causes hydraulic power unit failure.
- A special model is necessary for applications under low speed drive condition using an inverter. Please consult us.
- The pump discharge rate is set at the maximum and the discharge pressure is set at the minimum at shipping from factory. When using the unit, change these settings to necessary rate and pressure.

●Hydraulic circuit



■Description of the model designation

TP10E-BEA1-B-(*)-CC200-03

- Model No.
- Motor with CC marking - For USA
  - CC200：AC200V/50Hz, AC200V/60Hz, AC220V/60Hz
  - CC230：AC230V/60Hz
  - CC460：AC460V/60Hz
- Option (Please refer to page K-9 for details.)
- Motor capacity (Efficiency level: IE3)
  - B：0. 75kW 4P
  - C：1. 5kW 4P
  - D：2. 2kW 4P
- Pressure adjustment range
  - A1: 1.5 to 2.5 MPa
  - A2: 2.5 to 4 MPa
  - A3: 4 to 7 MPa
  - B3: 4 to 7 MPa (Fixed HP type)
    (Type that suppresses cut-off pressure and input)
  - A4: 6 to 8 MPa
- Pump capacity
  - BE: 8 cm^3/rev
  - CE: 16.7 cm^3/rev
- "ECO" series
- Tank capacity
  - 10：10L
  - 20：18L
- TOYOPAC

* Select combinations of the tank capacity, pump capacity and motor capacity from the base model column in the table of specifications.

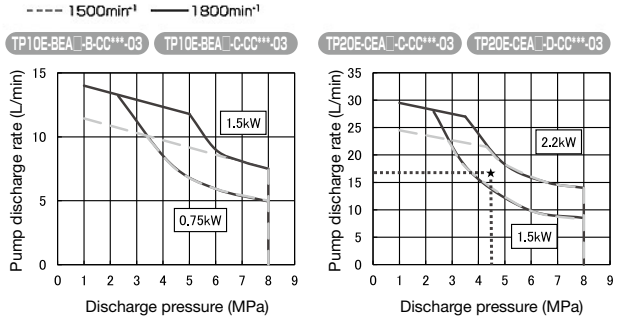
■Specifications

Base model	Motor capacity (kW)	Tank capacity (L)	Pump capacity (cm³/rev)	Max. operating pressure (MPa)	Pressure adjustment range (MPa)	Voltage (V)	Mass (kg)*1
TP10E-BEA1-B-CC***-03	0.75 kW 4P	10	8	2.5	1.5 to 2.5	CC200 AC200V 50/60Hz AC220V 60Hz	33
TP10E-BEA2-B-CC***-03				4	2.5 to 4.0		
TP10E-BEA3-B-CC***-03				7	4.0 to 7.0		
TP10E-BEA3-C-CC***-03	1.5 kW 4P						38
TP20E-BEA4-C-CC***-03		18		8	6.0 to 8.0	CC230 AC230V 60Hz CC460 AC460V 60HZ	39
TP20E-CEA2-C-CC***-03			16.7	4	2.5 to 4.0		
TP20E-CEB3-C-CC***-03				7	4.0 to 7.0		
TP20E-CEA3-D-CC***-03	2.2 kW 4P						47
TP20E-CEA4-D-CC***-03				8	6.0 to 8.0		

*1: Hydraulic fluid and options are not included.

■Motor selection chart

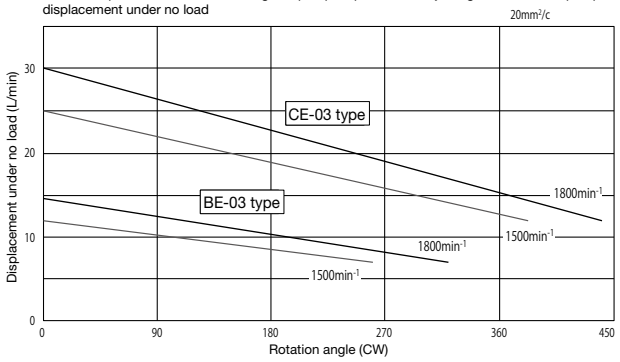
* Underside of the curve is the allowable operation range at rated output of each motor.



Selecting method of motor (example)
As …*… in the graph shows, the motor to be selected is found in the area above the point where the pressure 4.5 MPa on the horizontal axis intersects with the displacement 17 L/min on the vertical axis. In this case, select "TP20E-CEA3-D-CC***-03" from the motor 2.2 kW (D) and pressure 4 to 7 MPa (A3).

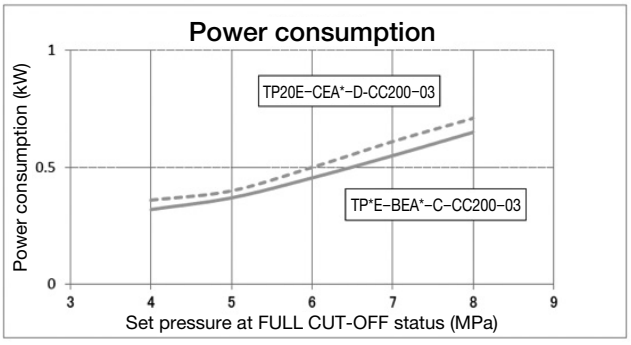
■Adjustment of displacement by the pump displacement adjusting screw

Relationship between the rotation angle of pump displacement adjusting screw and the pump displacement under no load



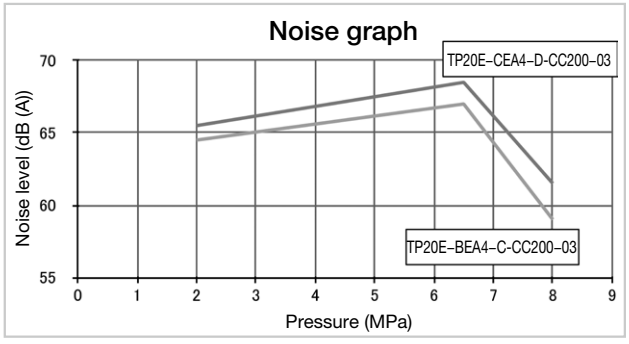
- To adjust the displacement from the factory shipment state (0-deg position), adjust it referring to the angle of rotation in the above graph.
- Do not turn the displacement adjusting screw to left (CCW) from the shipment position.

■Power consumption



Conditions
●Hydraulic fluid: ISO VG32 ●Fluid temperature: 50℃ ●Power supply: AC200V, 60 Hz

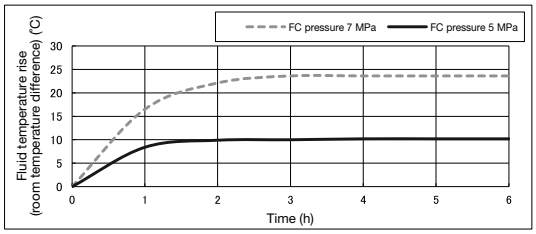
■Noise characteristics



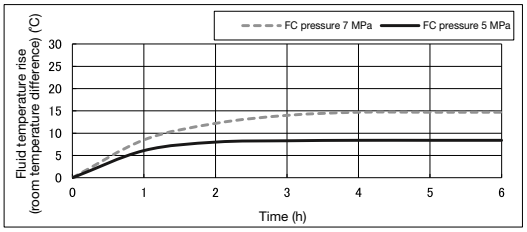
Conditions
●Hydraulic fluid: ISO VG32 ●Fluid temperature: 50℃ ●Power supply: AC200V, 60 Hz
●Measurement point: Average of measurements in 4 directions when measured at 1 m from the device horizontally and at 1.2 m above the floor.
* The data is a representative value which could vary depending on the conditions of installation floor or frame and surrounding objects that reflect noise.

■Fluid temperature characteristics

TP10E-BEA3-B-CC200-03



TP20E-CEA3-D-CC200-03



Conditions

●Hydraulic fluid: ISO VG32 ●Fluid temperature: 35℃ ●Power supply: AC200V, 60 Hz

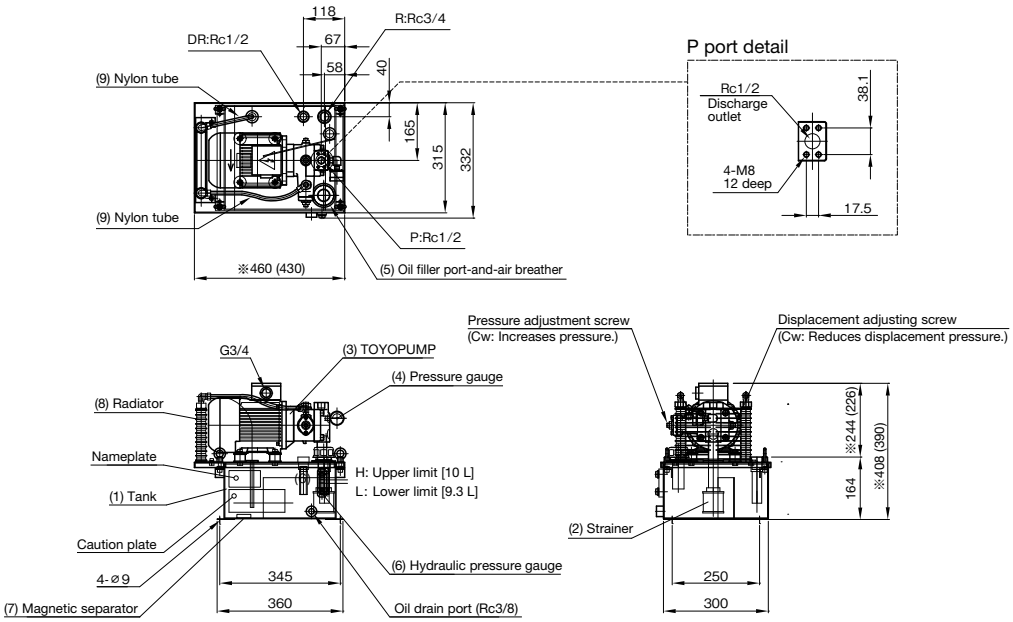
● The data is obtained in windless condition with the discharge side of pump blocked, full cut-off (FC)

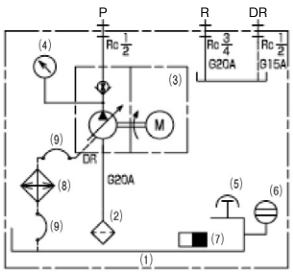
Caution

●The data is a representative valve which could vary depending on constituting circuit devices and operation cycles.
Fluid temperature should be no higher than 60℃.

■Outside dimensions

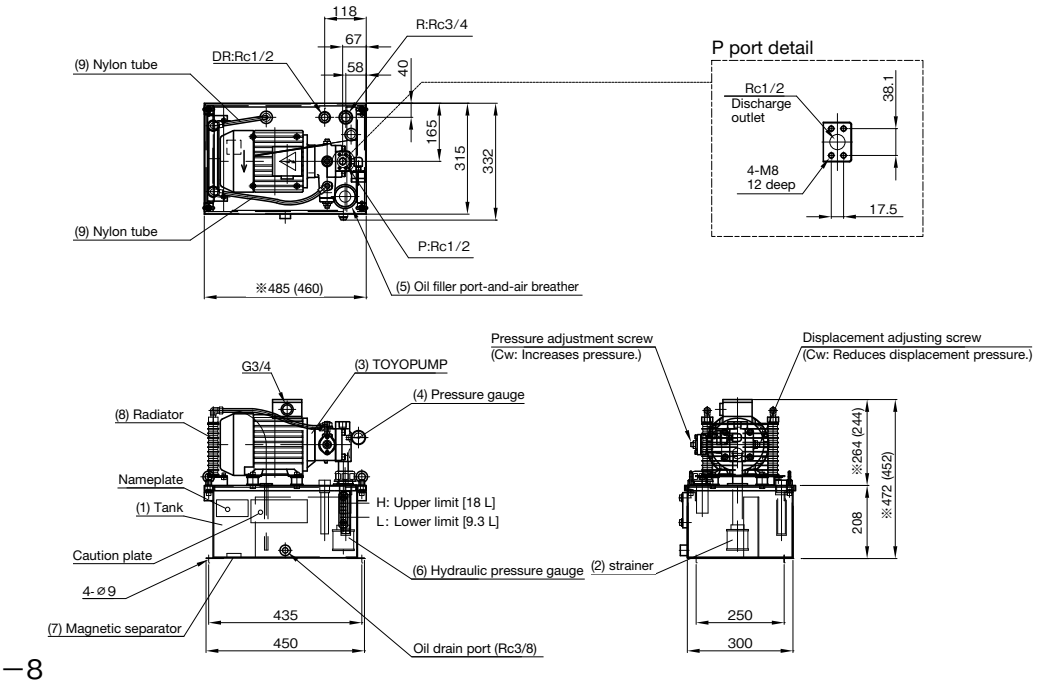
TP10E-□□-B-CC□□□-03 [BASE MODEL] **TP10E-□□-C-CC□□□-03 [BASE MODEL]** ※ ( ) for TP10E-□□-B-CC□□□-03

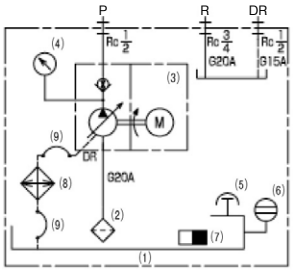




No	Part name
1	Tank
2	Strainer
3	TOYOPUMP
4	Pressure gauge
5	Oil filler port-and air breather
6	Oil level gauge
7	Magnetic separator
8	Radiator
9	Nylon tube

TP20E-□□-C-CC□□□-03 [BASE MODEL] **TP20E-□□-D-CC□□□-03 [BASE MODEL]** ※ ( ) for TP20E-□□-C-CC□□□-03





No	Part name
1	Tank
2	Strainer
3	TOYOPUMP
4	Pressure gauge
5	Oil filler port-and air breather
6	Oil level gauge
7	Magnetic separator
8	Radiator
9	Nylon tube

■Option model nomenclature

TP10E / TP20E -*EA*-*-(B) (L) (M) (A) (F) (T) (P) (G) (R) (D) (1)-CC*-03**

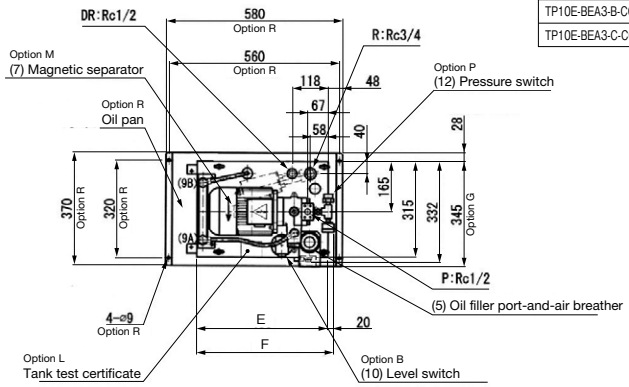
- B : With level switch
- L : With leak test by filling with water
- M : With magnetic separator
- A : With radiator filter
- F : With return filter
- T : With thermometer (TP20E only)
- 1 : 1-station manifold
- 2 : 2-station manifold
- 3 : 3-station manifold
- D : Maintenance direction change
- R : With oil pan
- G : With oil level gauge cover
- P : With pressure switch

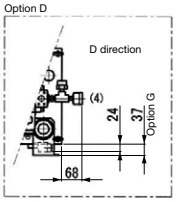
■Option device external dimensions (* in the fully equipped state. excluding manifold.)

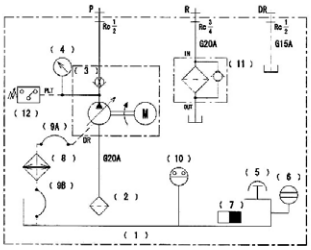
TP10E-****-B-*-CC***-03 TP10E-****-C-*-CC***-03

(Unit: mm)

Model	Dimensions					
	A	B	C	D	E	F
TP10E-BEA1-B-CC***-03	171	(226)	(390)	(425)	430	450
TP10E-BEA2-B-CC***-03	171	(226)	(390)	(425)	430	450
TP10E-BEA3-B-CC***-03	171	(226)	(390)	(425)	430	450
TP10E-BEA3-C-CC***-03	181	(244)	(408)	(443)	460	480

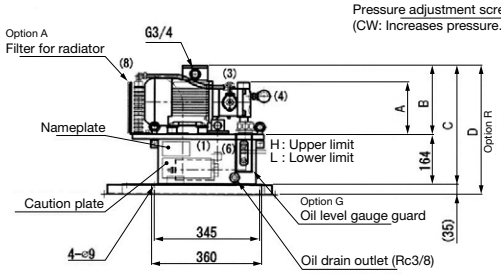


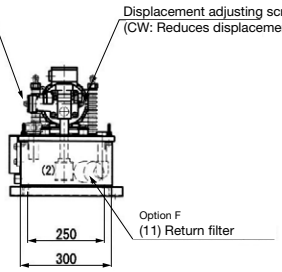




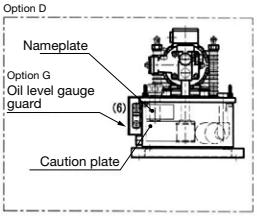
Option B
Code (10) level switch "Opens" at 5 mm below the lower limit of level gauge.

No	Part name
1	Tank
2	Strainer
3	TOYOPUMP
4	Pressure gauge
5	Oil filler port-and-air breather
6	Oil level gauge
7	Magnetic separator
8	Radiator
9	Nylon tube
10	Level switch
11	Return filter
12	Pressure switch





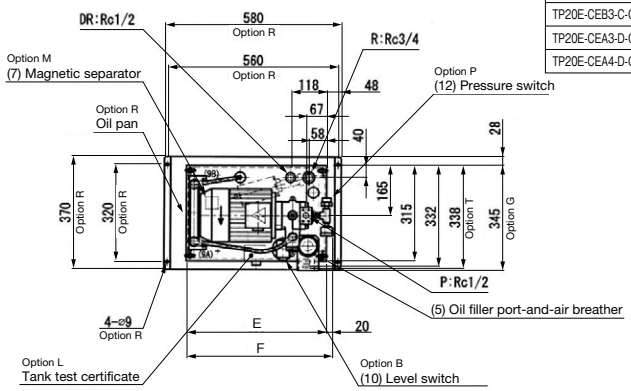
Option L
Tank is tested with the leak test by filling with water.

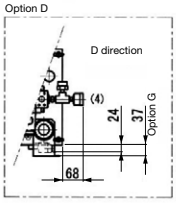


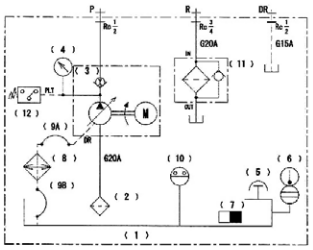
TP20E-****-C-*-CC***-03 TP20E-****-D-*-CC***-03

(Unit: mm)

Model	Dimensions					
	A	B	C	D	E	F
TP20E-BEA4-C-CC***-03	181	(244)	(452)	(487)	460	480
TP20E-CEA2-C-CC***-03	181	(244)	(452)	(487)	460	480
TP20E-CEB3-C-CC***-03	181	(244)	(452)	(487)	460	480
TP20E-CEA3-D-CC***-03	191	(264)	(472)	(507)	485	505
TP20E-CEA4-D-CC***-03	191	(264)	(472)	(507)	485	505

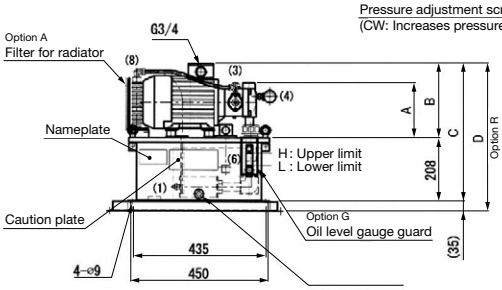


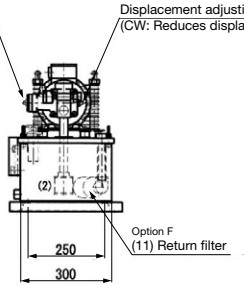




Option B
Code (10) level switch "Opens" at 5 mm below the lower limit of level gauge.

No	Part name
1	Tank
2	Strainer
3	TOYOPUMP
4	Pressure gauge
5	Oil filler port-and-air breather
6	Oil level gauge
7	Magnetic separator
8	Radiator
9	Nylon tube
10	Level switch
11	Return filter
12	Pressure switch





Option L
Tank is tested with the leak test by filling with water.