



DG

Submersible Grinder Pumps



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Features and Applications



Robust cast iron construction

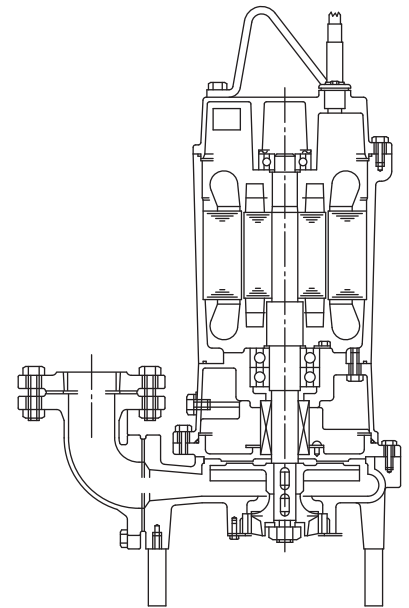
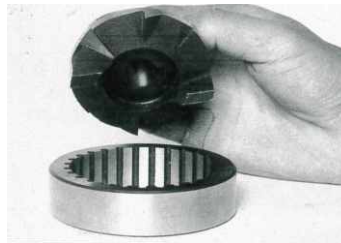
High torque motor

Double mechanical seal

Double row lower bearing

Vortex impeller

Powerful grinder mechanism



Features

- **Grinder mechanism**
Solids size is reduced by the powerful grinding mechanism made of hard 440 stainless steel
- **High torque motor**
A heavy duty high torque motor provides long and trouble free service life
- **Vortex impeller**
Clog free operation with vortex style impeller
- **Robust construction**
Heavy duty cast iron construction with double row lower bearings
- **Double mechanical seal in oil chamber**
An oil lubricated double mechanical seal with lower faces of hard silicon carbide provides strong and reliable shaft sealing
- **In built motor protection**
Quick acting dual response overloads provides protection against overload, locked rotor or open phase.

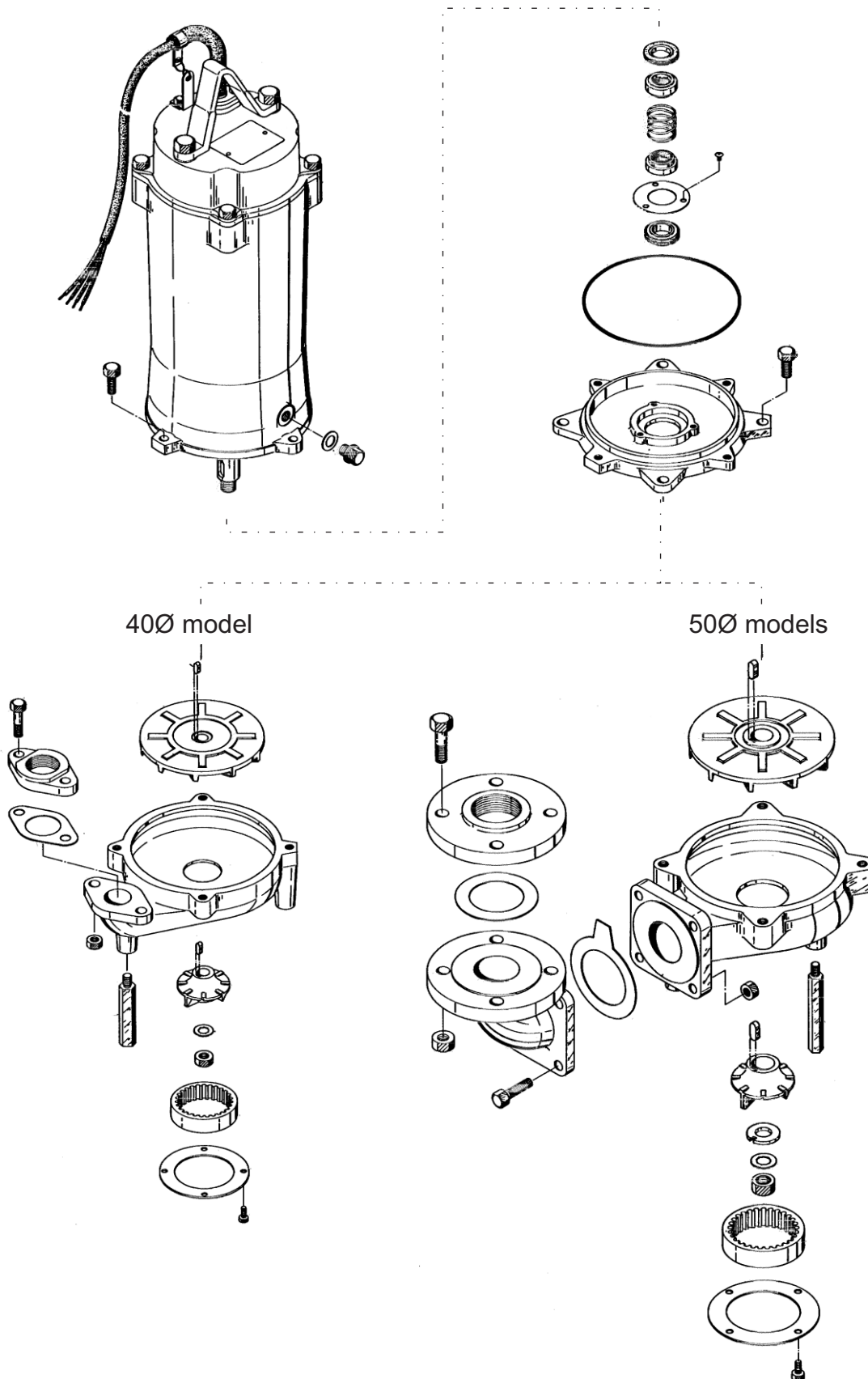
■ Applications

- Sewage
- Grey water containing soft solids*
- Small scale pressurised sewage systems

** Not suitable for waste water containing hard or abrasive solids*

Typical Exploded View

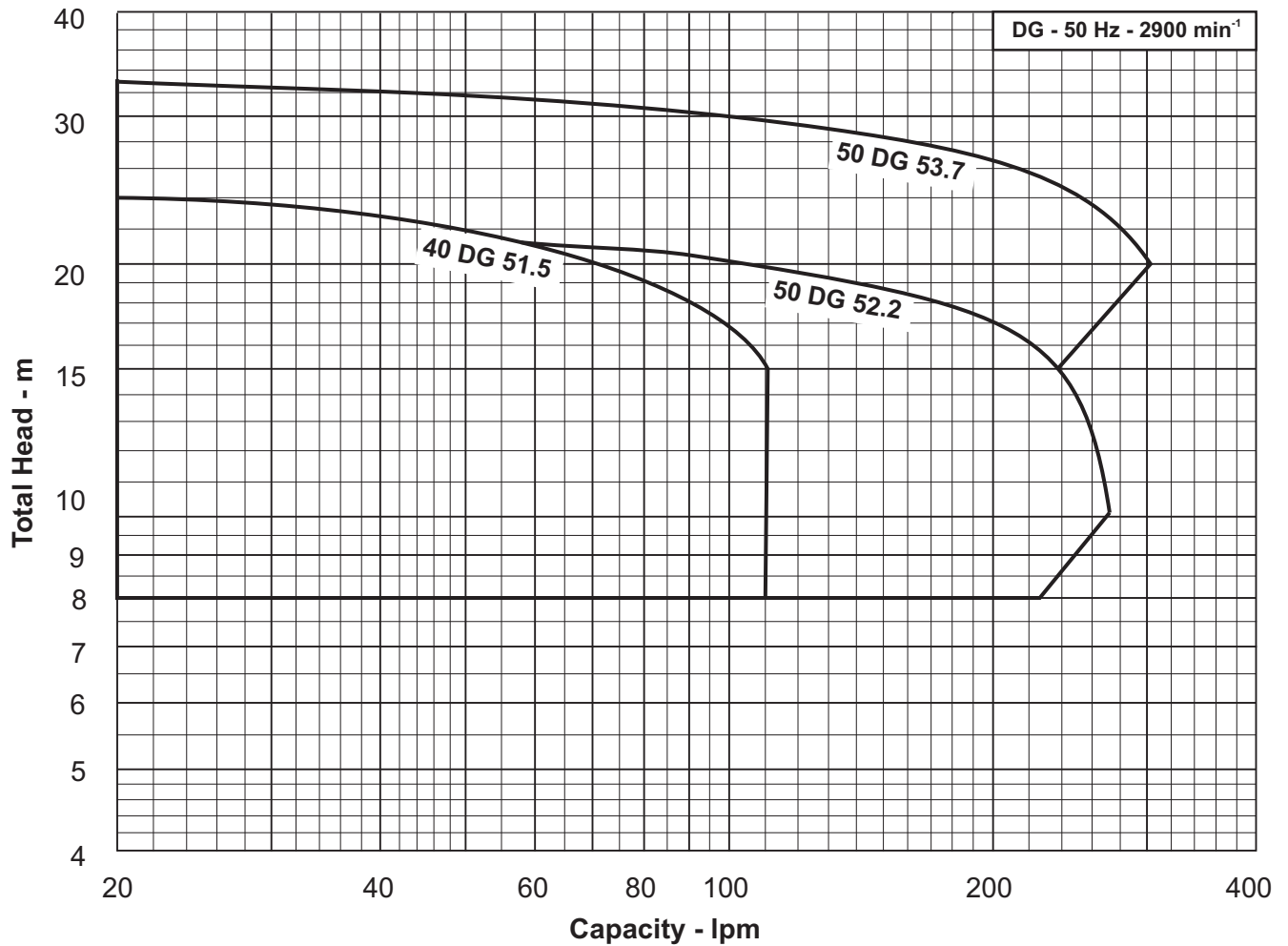
Note: Actual construction will vary depending on individual model.



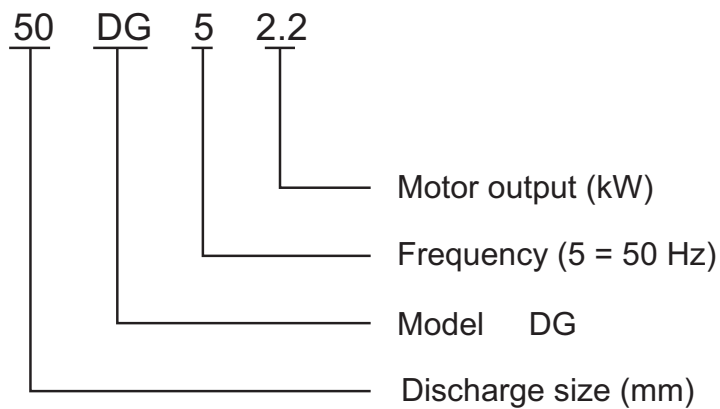
Specifications

		Standard	Optional
Scope	Discharge	40-50 mm	
	Motor Power	1.5 - 3.7 kW (3ph.)	
	Performance	Capacity: 20 - 300 lpm Head: 10 - 33 m.	
Liquid	Type	Sewage, Grey waste water (soft solids only)	
	Max. Temp.	40°C	
	Max. Solids	N/A	
Submergence	Maximum	8 m.	
	Minimum	Refer to low water level (L.W.L) in dimensions.	
Construction	Impeller	Vortex (and grinder mechanism)	
	Mechanical Seal	Oil lubricated double mechanical seal, single spring.	
Materials	Casing	Cast Iron	
	Impeller	Cast Iron	
	Grinder	440C Stainless Steel	
	Shaft	403 Stainless Steel	
	Motor Frame	Cast Iron	
	Fasteners	304 Stainless Steel	
	Mechanical Seal	Upper Faces: Carbon / Ceramic Lower Faces: Silicon Carbide / Silicon Carbide Lubricating Oil: Turbine oil VG32 (SAE 10W/20W)	
Motor	Type	Air filled dry submersible, IP68, Class F insulation.	
	Poles/Speed	2 pole / 2900 rpm	
	Applicable Voltages	380/400/415 Volt, 3 phase, 50 Hz	
	Starting	DOL	
	Protection	In built overload protection	
	Bearings	Pre lubricated sealed ball bearings.	
Cable	Length	10m.	
Accessories	Flange	Screwed oval type (40Ø sizes) Discharge elbow with screwed companion flange. (50Ø sizes)	
			Quick Discharge Connector (QDC) Baseplate for QDC

Performance Chart

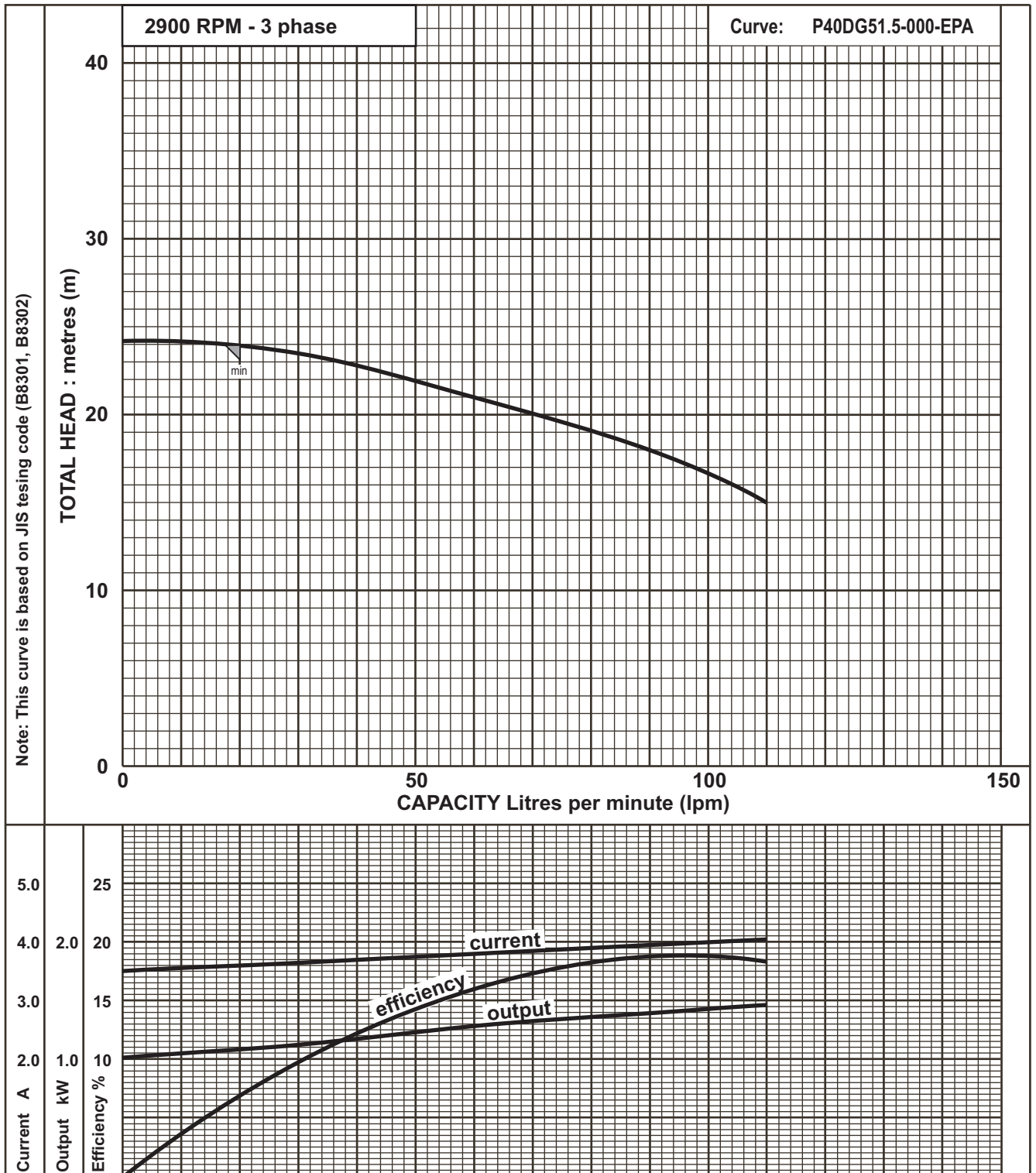


Model code



Performance Curve

40 DG 51.5

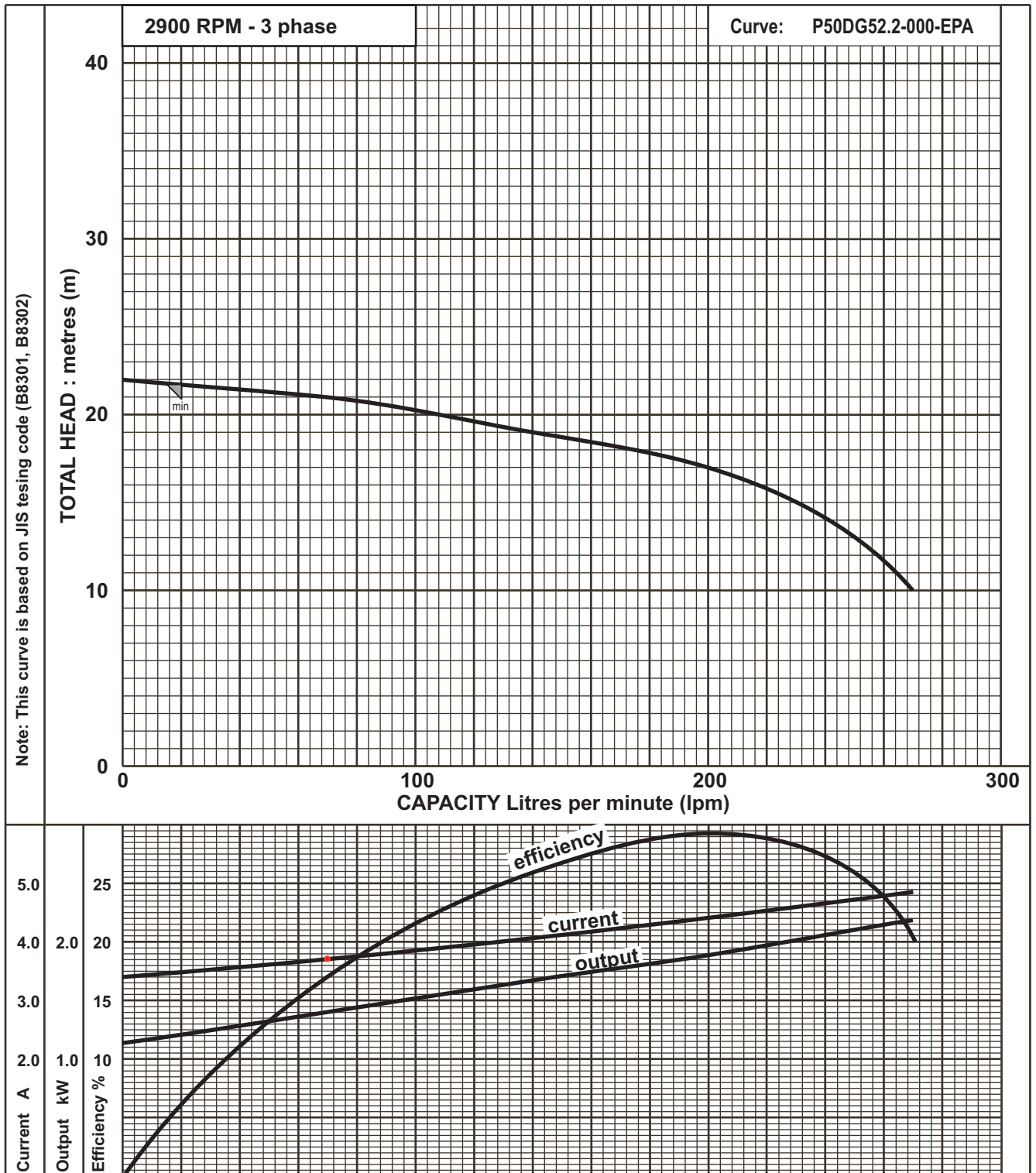


Test No.	Pump			Motor - 400 V - 3ph			
	Capacity lpm	Total Head m	Effic. %	Current A	Input kW	Effic. %	Output kW
1	0	24.2	0	3.530	1.608	65.3	1.050
2	30	23.5	9.8	3.650	1.733	67.0	1.161
3	60	21.0	16.0	3.800	1.872	68.4	1.280
4	90	18.0	18.8	3.950	2.009	69.7	1.400
5	110	15.0	18.4	4.030	2.080	70.2	1.460

Model:	40 DG 51.5	Frequency:	50 Hz
Discharge Ø:	40 mm	Output:	1.5 kW
Pump Rating	Capacity - lpm :	20	110
	Total Head - m	24.0	15.0
Motor Rating	400 Volt	4.1 Amp	2 Pole
	Ebara VZDG	IP68	Dry Type

Performance Curve

50 DG 52.2

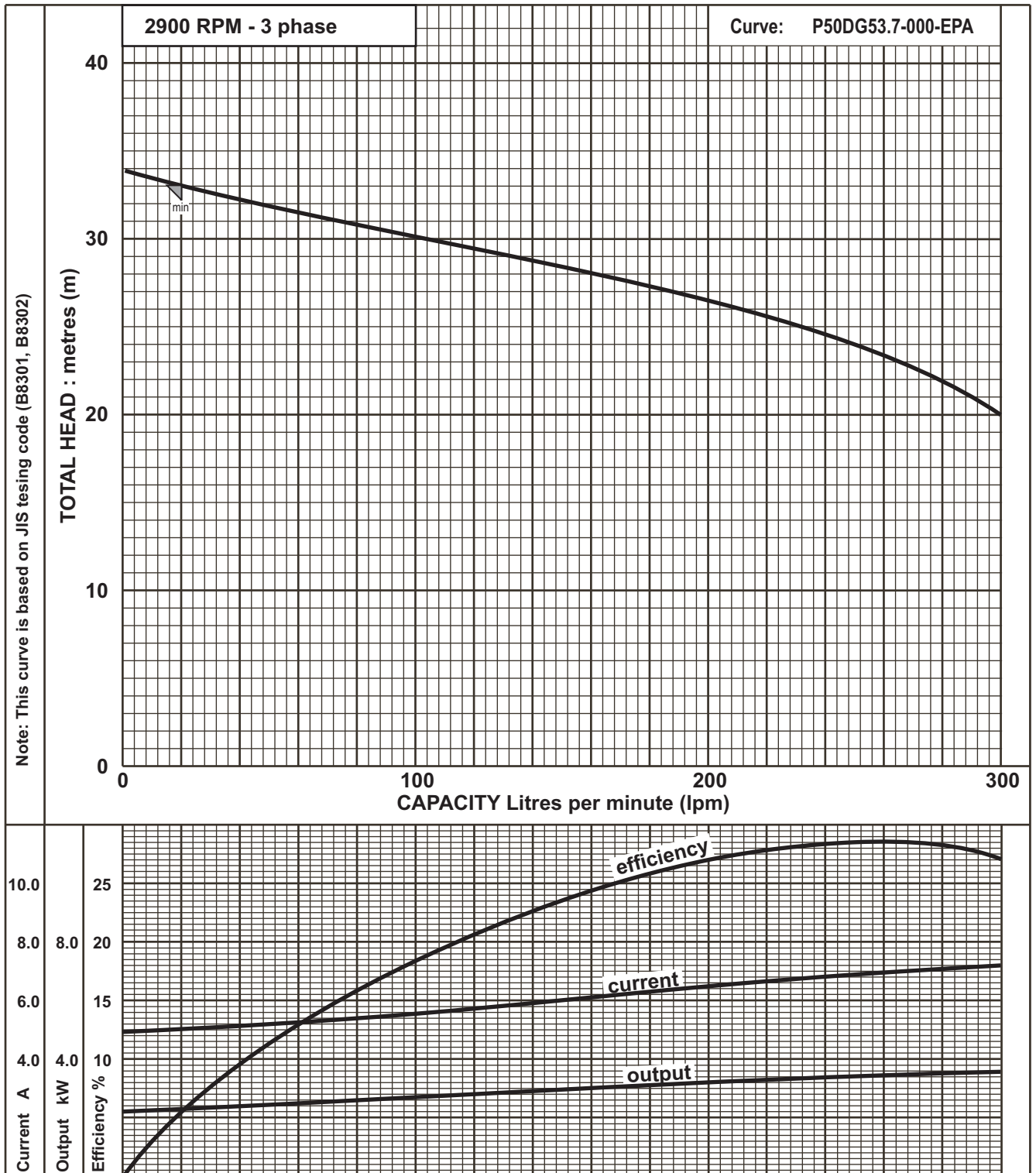


Test No.	Pump			Motor - 400 V - 3ph			
	Capacity lpm	Total Head m	Effic. %	Current A	Input kW	Effic. %	Output kW
1	0	22.0	0	3.380	1.682	67.2	1.130
2	70	21.0	17.0	3.730	1.996	70.6	1.409
3	140	19.0	25.9	4.090	2.296	72.8	1.671
4	200	17.0	29.3	4.410	2.546	74.2	1.889
5	270	10.0	20.0	4.870	2.897	75.6	2.190

Model:	50 DG 52.2	Frequency:	50 Hz
Discharge Ø:	50 mm	Output:	2.2 kW
Pump Rating	Capacity - lpm :	20	270
	Total Head - m	21.7	10.0
Motor Rating	400 Volt	4.9 Amp	2 Pole
	Ebara VZDG	IP68	Dry Type

Performance Curve

50 DG 53.7



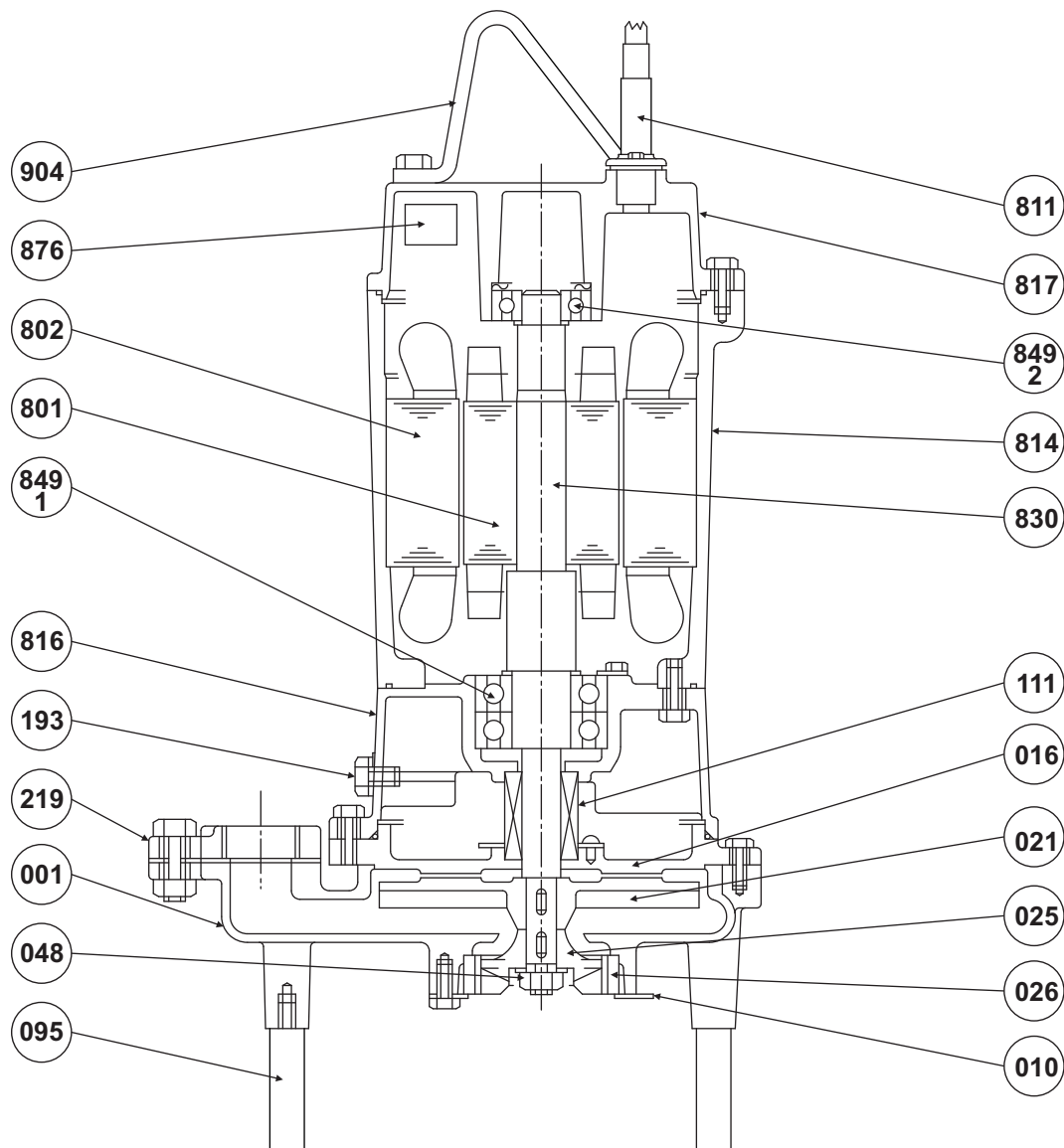
Test No.	Pump			Motor - 400 V - 3ph			
	Capacity lpm	Total Head m	Effic. %	Current A	Input kW	Effic. %	Output kW
1	0	33.9	0	4.930	2.982	74.8	2.230
2	100	30.0	18.4	5.580	3.468	76.5	2.653
3	200	26.5	27.1	6.460	4.094	77.7	3.181
4	250	24.0	28.5	6.880	4.381	78.1	3.421
5	300	20.0	27.1	7.200	4.607	78.2	3.602

Model:	50 DG 53.7	Frequency:	50 Hz
Discharge Ø:	50 mm	Output:	3.7 kW
Pump Rating	Capacity - lpm :	20	300
	Total Head - m	33.0	20.0
Motor Rating	400 Volt	7.4 Amp	2 Pole
	Ebara VZDG	IP68	Dry Type

Sectional View

■ Applicable Models - 40 DG 51.5

Three Phase - Manual Type



Item Number	Description	Material	Quantity per unit
001	Casing	FC200 Cast Iron	1
010	Disc Cover	SUS304 Stainless Steel	1
016	Mechanical Seal Cover	FC200 Cast Iron	1
021	Impeller	FC200 Cast iron	1
025	Grinder Impeller	SUS440C Stainless Steel	1
026	Grinder Disc	SUS440C Stainless Steel	
048	Impeller Nut	SUS304 Stainless Steel	1
095	Pump Stand	SGD Steel	3
111	Mechanical Seal		1
193	Oil Plug	SUS304 Stainless Steel	1
219	Companion Flange	FC200 Cast Iron	1

Item Number	Description	Material	Quantity per unit
801	Rotor		1
802	Stator		1
811	Cable		1
814	Motor Frame	FC150 Cast Iron	1
816	Lower Bracket	FC150 Cast Iron	1
817	Motor Cap	FC150 Cast Iron	1
830	Shaft #	SUS403 Stainless Steel	1
849-1	Ball Bearing		1
849-2	Ball Bearing		1
876	Auto Cut		1
904	Handle	SS Steel	1

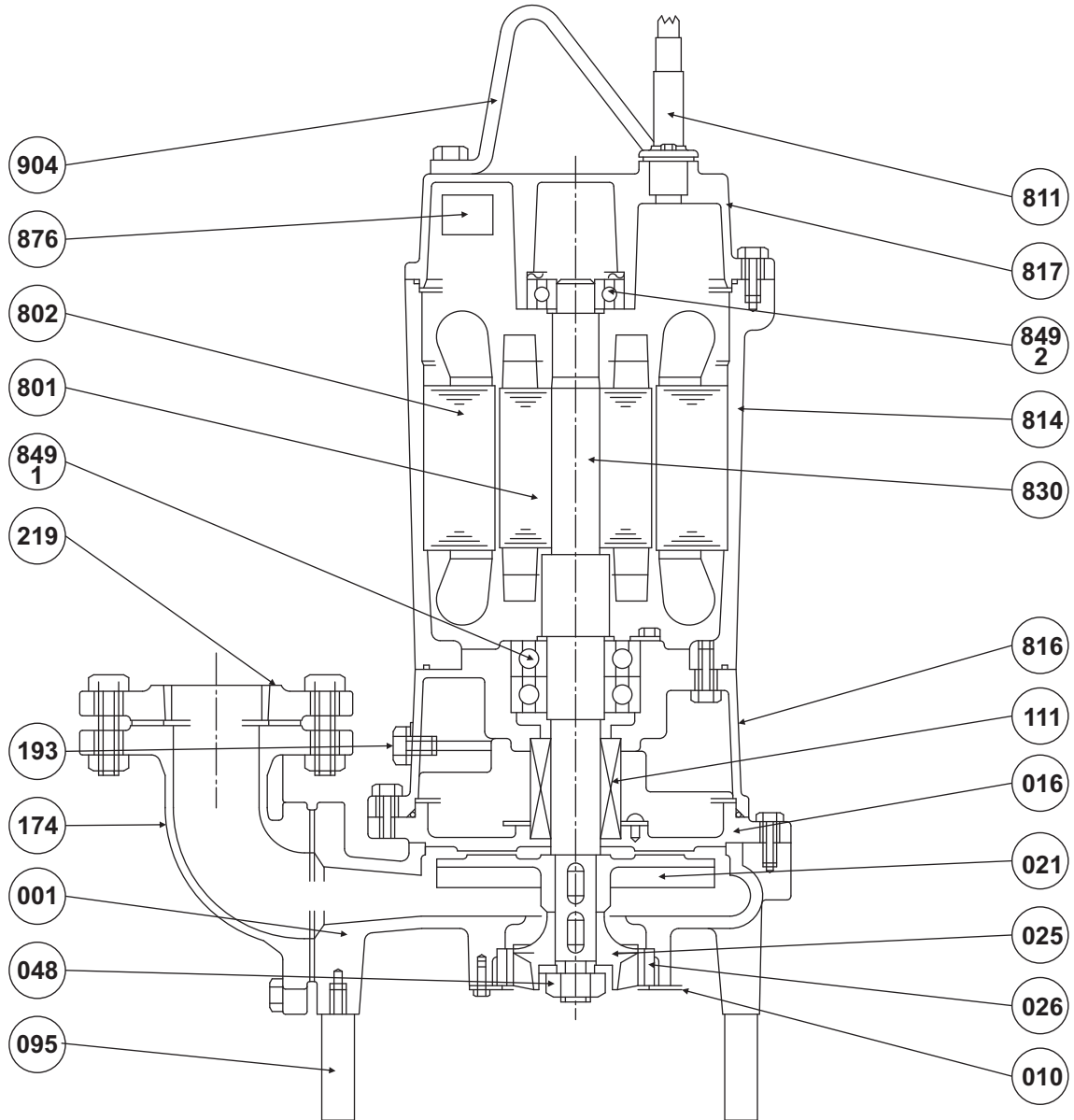
VDG-012

refers to pump side of shaft material

Sectional View

■ Applicable Models - 50 DG 52.2 , 50 DG 53.7

Three Phase - Manual Type



Item Number	Description	Material	Quantity per unit
001	Casing	FC200 Cast Iron	1
010	Disc Cover	SUS304 Stainless Steel	1
016	Mechanical Seal Cover	FC200 Cast Iron	1
021	Impeller	FC200 Cast iron	1
025	Grinder Impeller	SUS440C Stainless Steel	1
026	Grinder Disc	SUS440C Stainless Steel	
048	Impeller Nut	SUS304 Stainless Steel	1
095	Pump Stand	SGD Steel	3
111	Mechanical Seal		1
174	Discharge Elbow	FC200 Cast Iron	1
193	Oil Plug	SUS304 Stainless Steel	1
219	Companion Flange	FC200 Cast Iron	1

Item Number	Description	Material	Quantity per unit
801	Rotor		1
802	Stator		1
811	Cable		1
814	Motor Frame	FC150 Cast Iron	1
816	Lower Bracket	FC150 Cast Iron	1
817	Motor Cap	FC150 Cast Iron	1
830	Shaft #	SUS403 Stainless Steel	1
849-1	Ball Bearing		1
849-2	Ball Bearing		1
876	Auto Cut		1
904	Handle	SS Steel	1
-	-	-	-

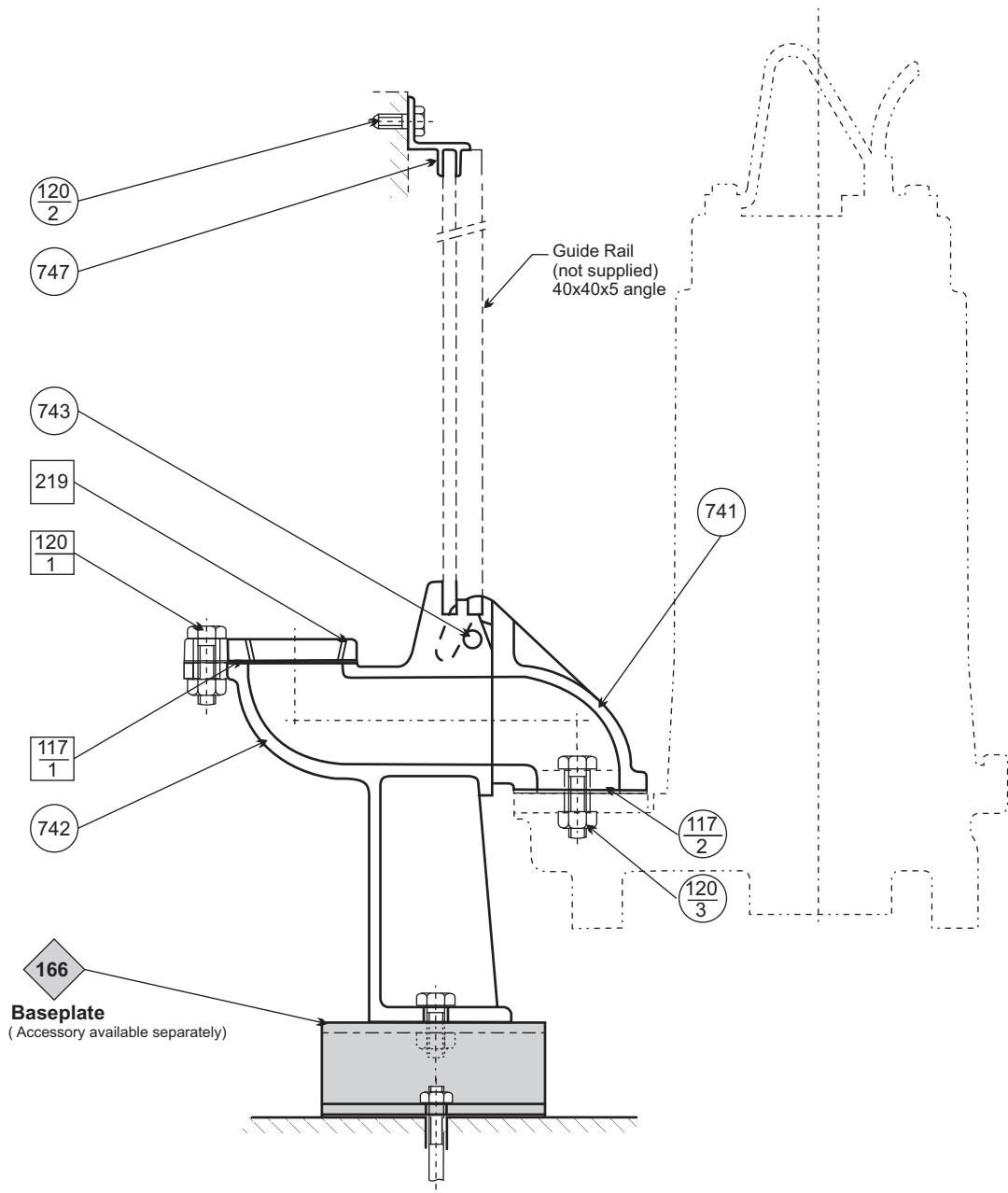
VDG-022

refers to pump side of shaft material

Sectional View

Model LS 40 Quick Discharge Connector

■ Applicable Models - 40 DG 51.5



Item Number	Description	Material	Quantity per unit
117-1	Gasket	NBR Rubber	1
117-2	Gasket	NBR Rubber	1
120-1	Bolt & Nut	SUS Stainless Steel	2
120-2	Bolt	SUS Stainless Steel	2
120-3	Bolt & Nut	SUS Stainless Steel	2

Item Number	Description	Material	Quantity per unit
219	Companion Flange	FC200 Cast iron	1
741	Sliding Guide	FC200 Cast iron	1
742	QDC Body	FC200 Cast iron	1
743	Suspension Bar	SUS Stainless Steel	1
747	Guide Support	SS Steel (Plated)	1

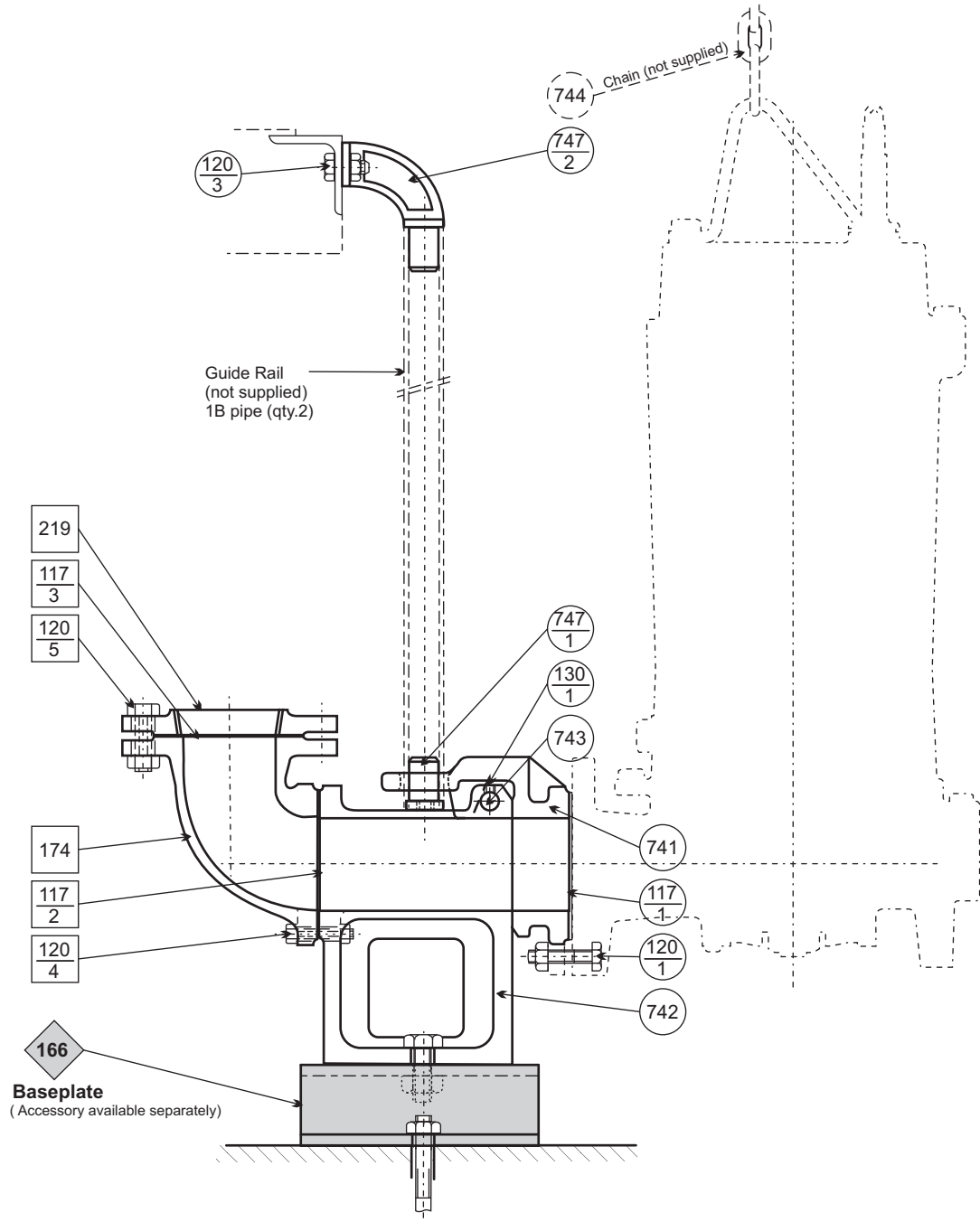
Note: Those parts with item number indicated in a are supplied with the pump.

VLS-011DG

Sectional View

Model LM 50 Quick Discharge Connector

■ Applicable Models - 50 DG 52.2 , 50 DG 53.7

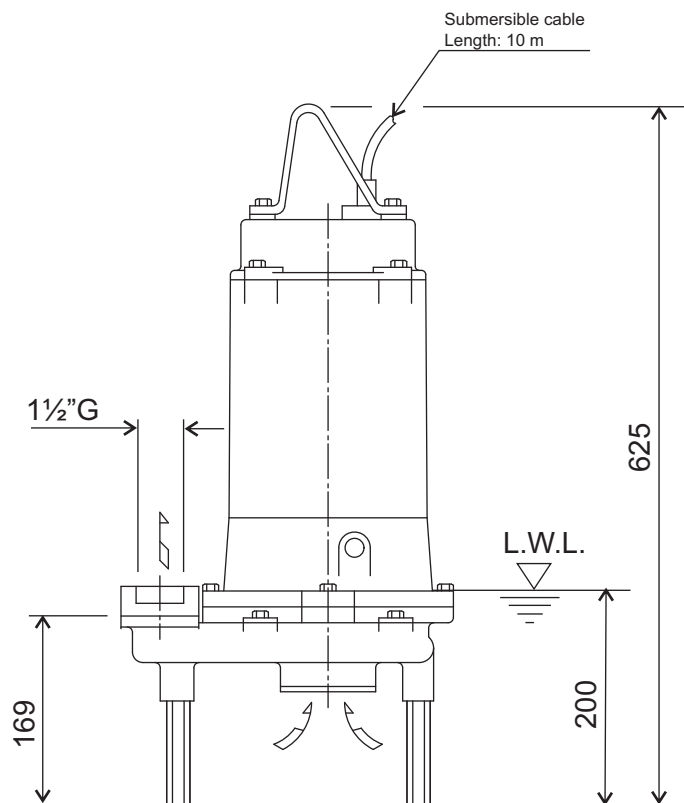
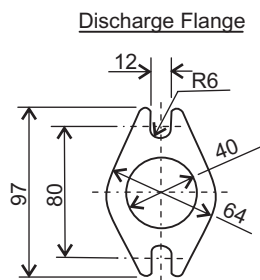
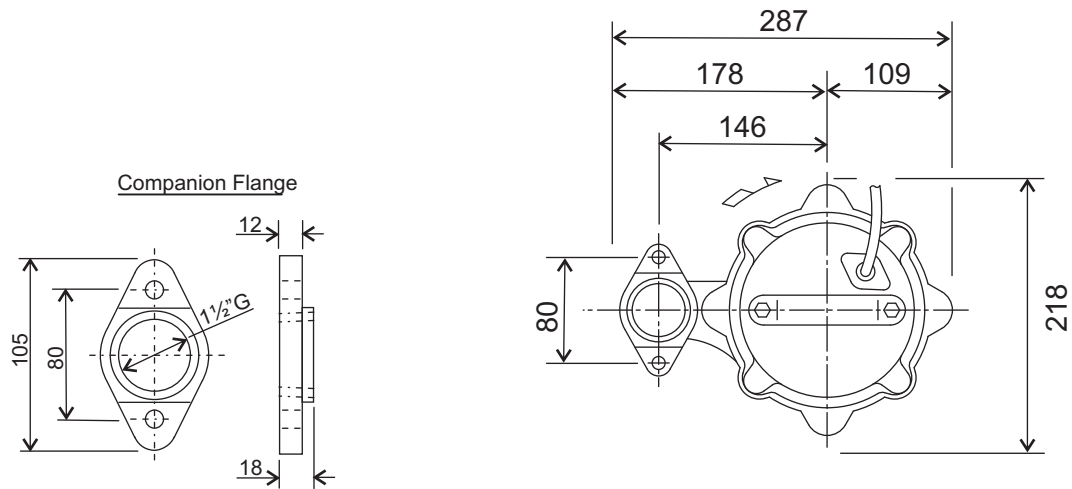


Item Number	Description	Material	Quantity per unit
117-1	Gasket	NBR Rubber	1
117-2	Gasket	NBR Rubber	1
117-3	Gasket	NBR Rubber	1
120-1	Bolt & Nut	SUS Stainless Steel	4
120-3	Bolt & Nut	SUS Stainless Steel	2
120-4	Bolt & Nut	SUS Stainless Steel	4
120-5	Bolt & Nut	SUS Stainless Steel	4
130-1	Set Screw	SUS Stainless Steel	1

Item Number	Description	Material	Quantity per unit
174	Discharge Bend	FC200 Cast iron	1
219	Companion Flange	FC200 Cast iron	1
741	Sliding Guide	FC200 Cast iron	1
742	QDC Body	FC200 Cast iron	1
743	Suspension Bar	SUS Stainless Steel	1
744	Chain	(Not supplied)	1
747-1	Guide Pin	SS Steel	2
747-2	Guide Support	SCS13 Cast Stainless Steel	1

Note: Those parts with item number indicated in a are supplied with the pump.

Dimensions - model 40 DG 51.5



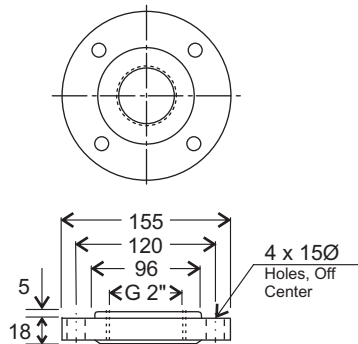
Note:

- 1/. L.W.L (Low Water Level)
Is limited to 10 minutes operation at low water level.
- 2/. Is limited to 30 minutes operation with water level below top of motor.

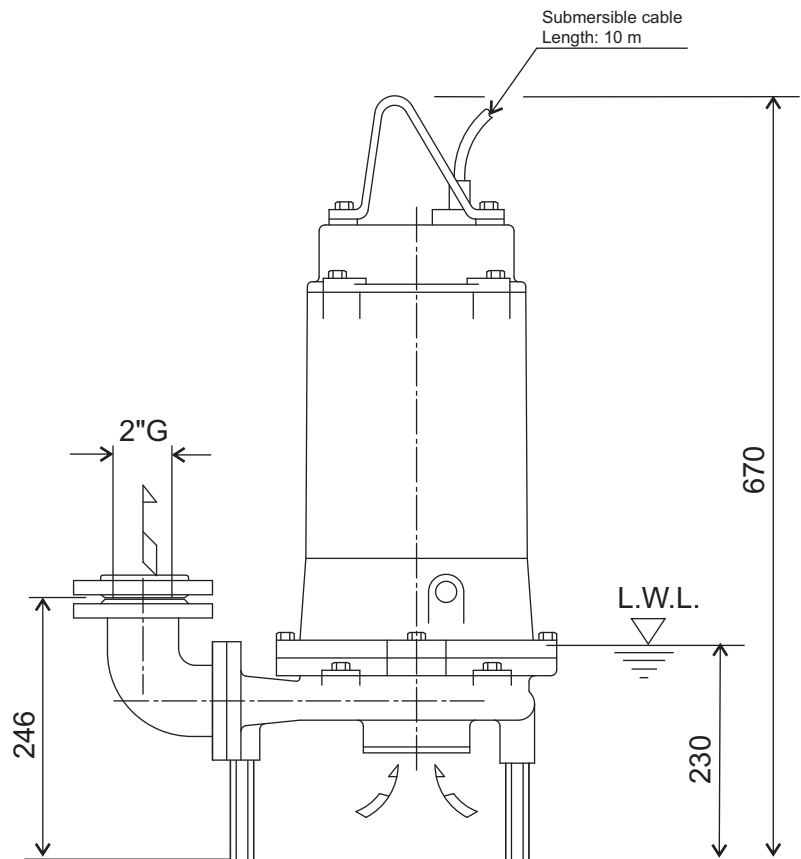
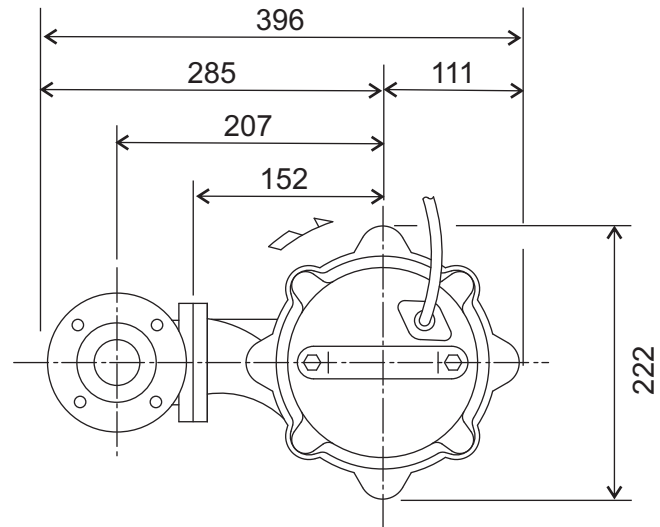
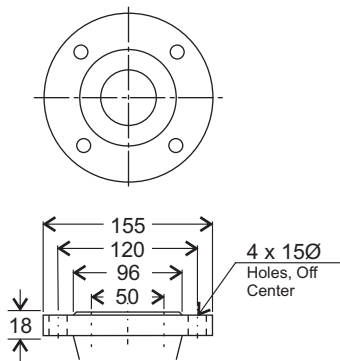
Pump Model	Weight
40 DG 51.5	40 kg

Dimensions - model 50 DG 52.2

Companion Flange Dimensions
(JIS 7 kgf/cm²)



Discharge Flange Dimensions
(JIS 10kgf/cm²)



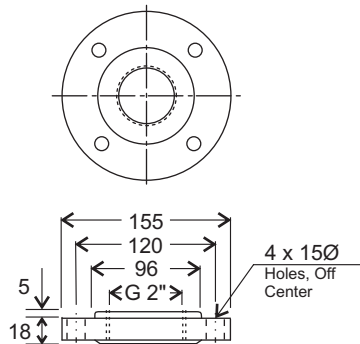
Note:

- 1/. L.W.L. (Low Water Level)
Is limited to 10 minutes operation
at low water level.
- 2/. Is limited to 30 minutes operation
with water level below top of motor.

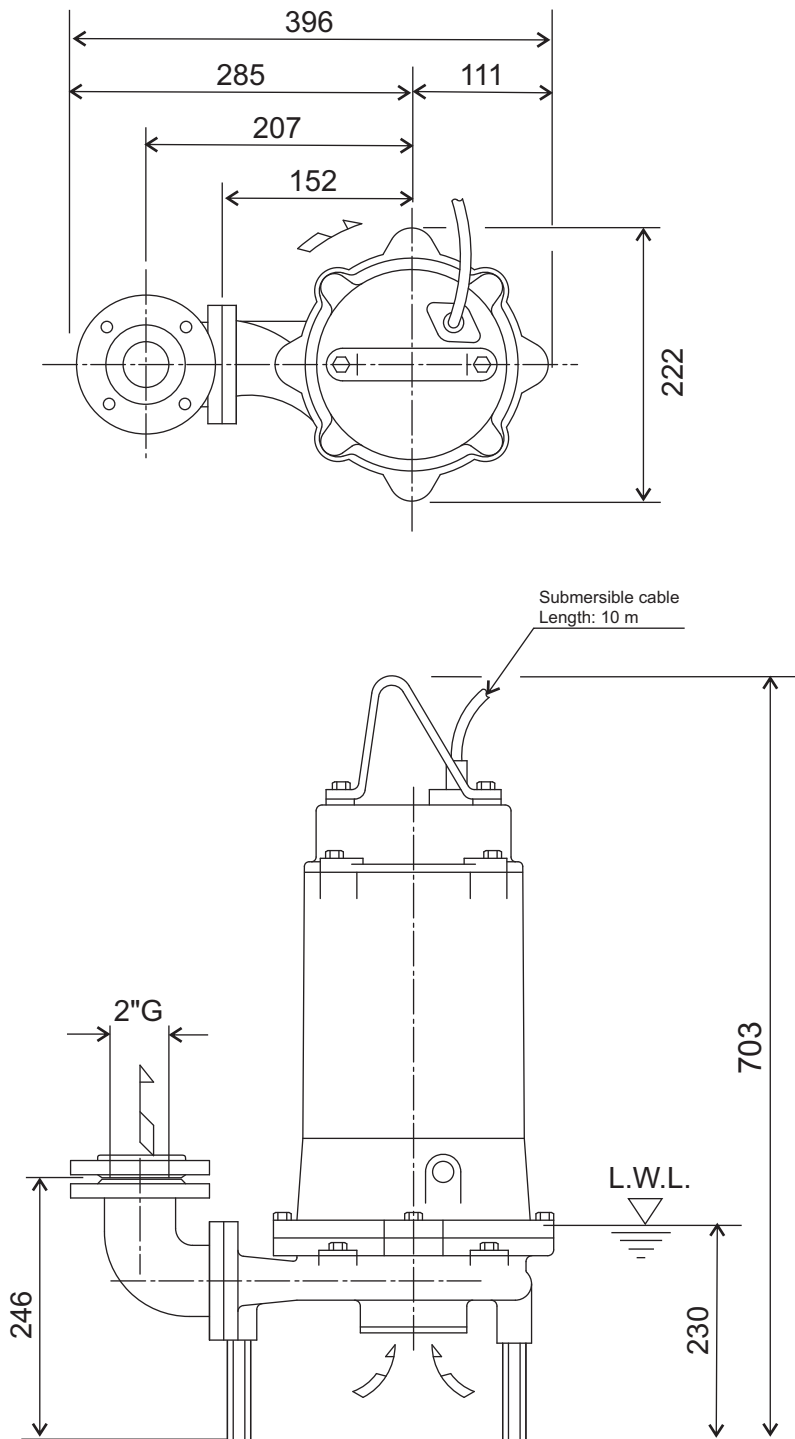
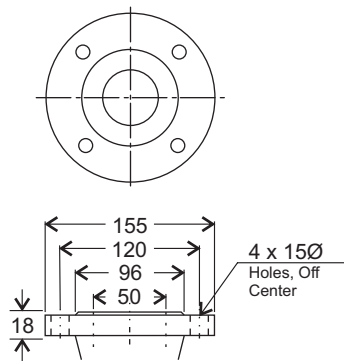
Pump Model	Weight
50 DG 52.2	55 kg

Dimensions - model 50 DG 53.7

Companion Flange Dimensions (JIS 7 kgf/cm²)



Discharge Flange Dimensions (JIS 10kgf/cm²)

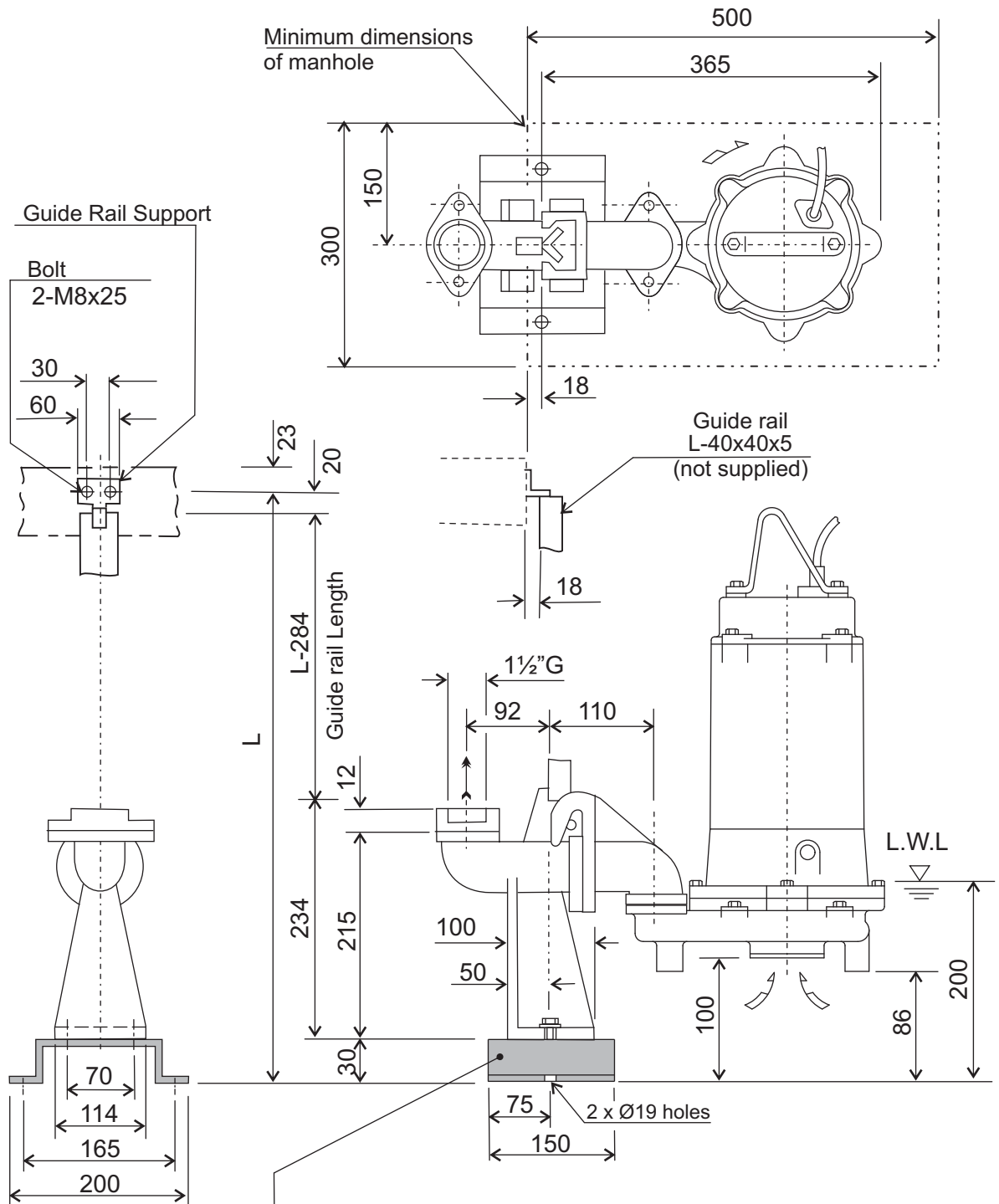


Note:

- 1/. L.W.L. (Low Water Level)
Is limited to 10 minutes operation at low water level.
- 2/. Is limited to 30 minutes operation with water level below top of motor.

Pump Model	Weight
50 DG 53.7	55 kg

■ Applicable Models - 40 DG 51.5 with LS40 QDC



It is recommended that the pump suction is 100 mm or more from the bottom of the pit. A suitable baseplate is available as a separate accessory.

Note:

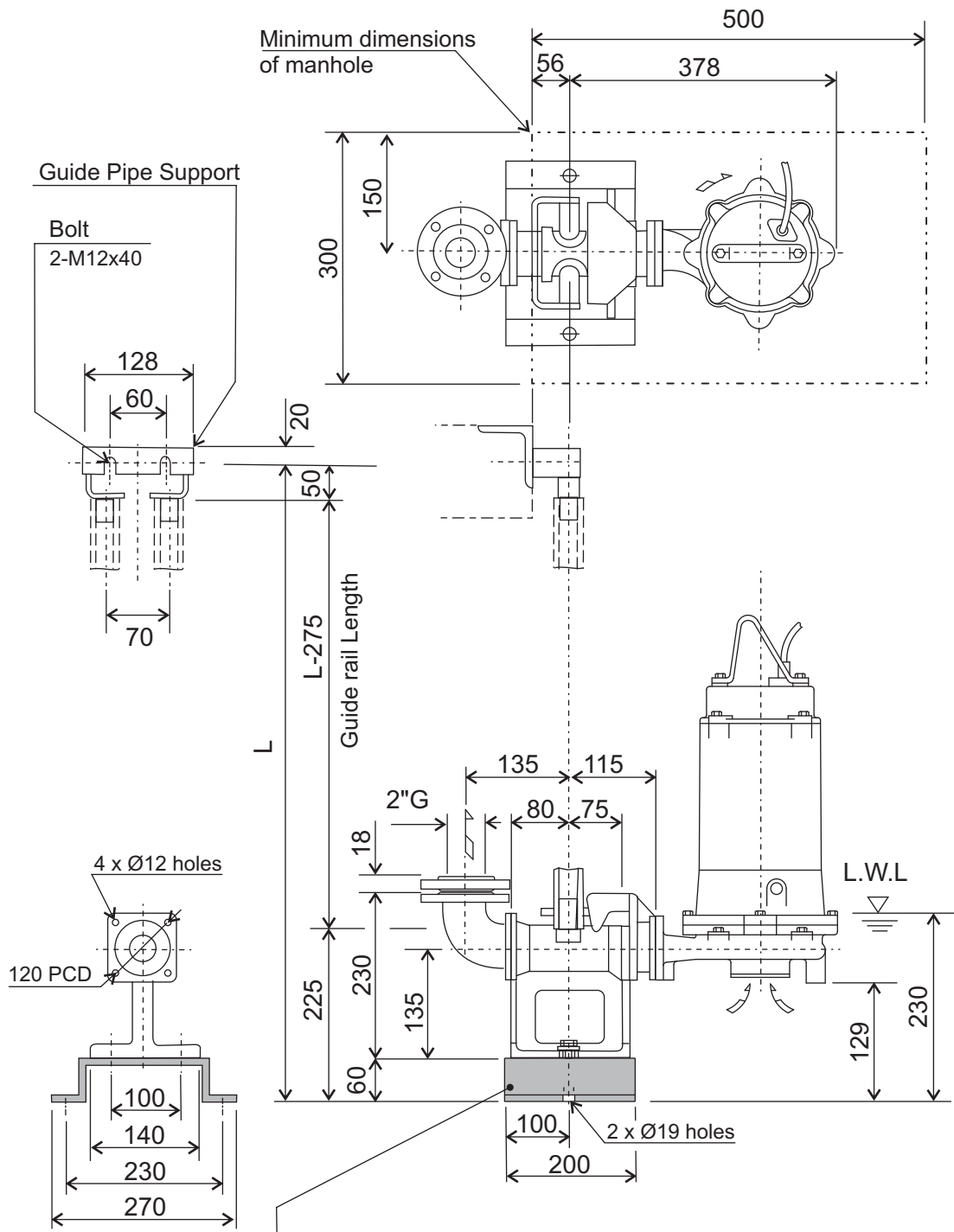
- 1/. For detailed dimensions of the pumps, refer to separate dimension data sheets.
- 2/. The companion flange supplied with the pump are used with the QDC.

- 3/. Standard accessories supplied with QDC include:-
 - Connector body.
 - Guide rail support
 - Adaptor Flange
 (Guide Rail & Chain is not supplied.)

QDC Model	Weight*
LS40	10 kg

* refers only to the weight of the QDC. (does not include baseplate)
Refer to pump dimension sheet for weight of pump.

■ Applicable Models - 50 DG 52.2 & 3.7 with LM50 QDC



It is recommended that the pump suction is 100 mm or more from the bottom of the pit. A suitable baseplate is available as a separate accessory.

Note:

1/ For detailed dimensions of the pumps, refer to separate dimension data sheets.

2/ The companion flange supplied with the pump are used with the QDC.

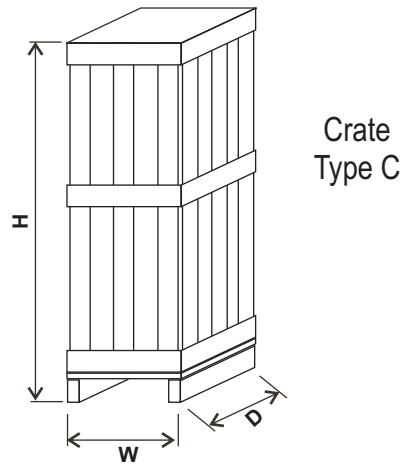
3/ Standard accessories supplied with QDC include:-

- Connector body
- Guide rail support
- Adaptor Flange (Guide Pipe & Chain is not supplied.)

QDC Model	Weight*
LM50	14 kg

* refers only to the weight of the QDC. (does not include baseplate) Refer to pump dimension sheet for weight of pump.

Shipping dimensions



	Pump Model	Type	Packing Size (cm)			Approx. Shipping Weight
			W	D	H	
3 Phase	40 DG 51.5	C	36	32	80	48 kg
	50 DG 52.2	C	36	32	100	65 kg
	50 DG 53.7	C	36	32	100	70 kg

Units: mm unless otherwise specified

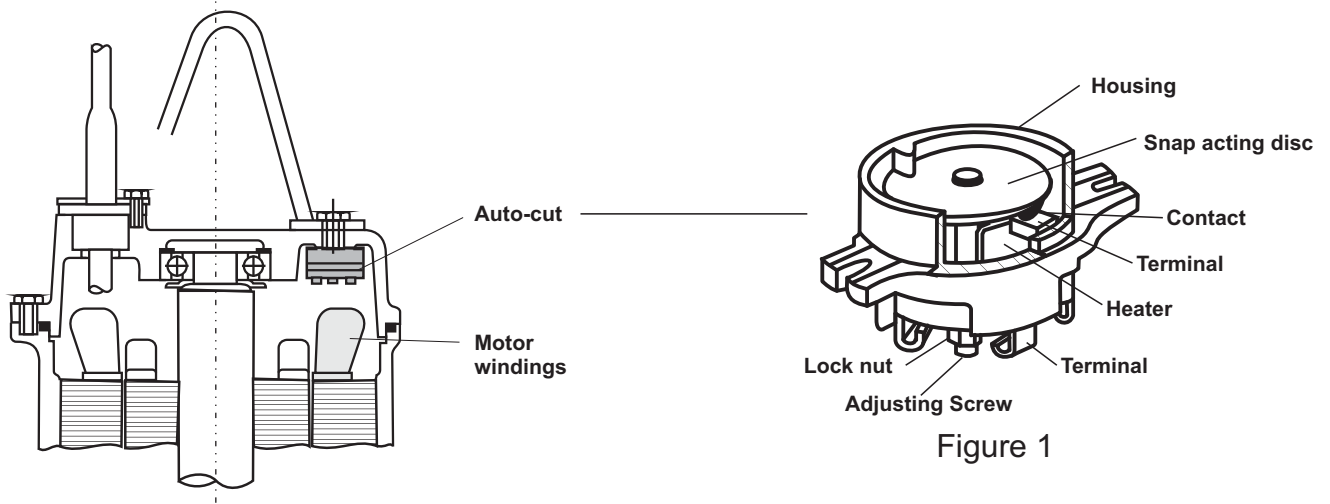
Applicable Models	Output kW	Mechanical Seal Type	Lubricating Oil		Bearings	
			Capacity - CC	Type	Bottom	Top
40 & 50 DG models	1.5	A-20	1000	Turbine Oil SAE 10W or SAE 20W (Turbine Oil#32)	6306ZZC3DR	6304ZZC3
	2.2	A-30	1200		6307ZZC3DR	6304ZZC3
	3.7				6307ZZC3DR	6304ZZC3

No.	Part Name	Material	No. per Set	Type A-20 A-30	
1	Packing	N.B.Rubber	1		
2	Floating Ring	Ceramic	1		
3	Seal Ring	Carbon Graphite	1		
4	Spring	304 SS	1		
5	Seal Ring	Silicon Carbide	1		
6	Floating Ring	Silicon Carbide	1		
7	Packing	N.B.Rubber	1		

Applicable to DG up to 3.7 kW

The three pole model that is used for three phase models illustrated below.

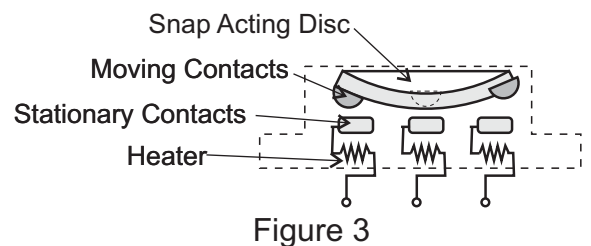
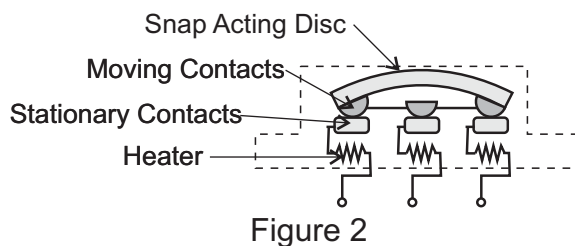
The Auto-Cut consists of: 3 sets of contacts, 1 snap-acting disk, 3 heaters, 3 terminals and 1 calibration bolt and nut, all enclosed in a bakelite housing.



The Auto-Cut is installed directly over the motor winding of the motor where it not only senses over heating of the winding but also excess amperage draw by each winding.

Figure 2 shows the Auto-Cut in its normal operating condition (contacts closed). When actuating temperature is reached, the snap acting disc opens to interrupt the circuit as shown in figure 3 and stops the motor.

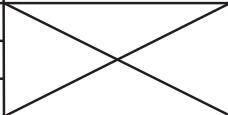
When the motor temperature cools down to the safe operating temperature, the snap acting disc resets automatically to the original position as shown in figure 2, and the motor restarts.

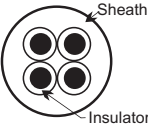


To suit models DG		
Phase	Power kW	Auto-Cut
Three Phase	1.5	KA-313-GQXL102
	2.2	KA-313-GQDR103
	3.7	KA-313-GCXL103

Technical Data

Cable Specifications

Applicable Models		Motor kW	Starting method	Length of cable	Material	Number & size of conductor(s)	
						Power Cable(s)	Protector Cable
DG	Three Phase	1.5	DOL	10m	H07RN-F	4 x 1.5 mm ²	
		2.2	DOL	10m	H07RN-F	4 x 1.5 mm ²	
		3.7	DOL	10m	H07RN-F	4 x 1.5 mm ²	

Item	Cross sectional area of conductors	No. of conductors	Cable Type	Sheath Material	Insulation Material	Sheath Thickness mm	Insulation Thickness mm	Overall Diameter mm	
Applicable to ThreePhase	1.5 mm ²	4	H07RN-F	PCR	EPR	1.7	0.8	11.2	

CR = Polychloroprene Rubber

EPR = Ethylene Propylene Rubber

Motor Data

1.5 to 3.7 kW, Three Phase, 2 Pole Motors

Hz	Poles	Phase	Output (kW)	Voltage	Applicable Models
50	2	3	1.5 to 3.7	400 V	DG

Name-Plate Rating	Model	VZDG	VZDG	VZDG			
	Output - kW	1.5	2.2	3.7			
	Phase	3	3	3			
	Poles	2	2	2			
	Volts	400	400	400			
	Amps	4.1	4.9	7.4			
	Speed - rpm	2900	2890	2845			
	Insulation Class	F	F	F			
No Load Test	Amps	2.7	2.2	2.0			
	Watts	440	420	550			
Resistance at 20° C	Ohms	4.35	3.12	2.44			
75% Load	Current - Amps	3.6	4.1	5.8			
	Efficiency - %	66.48	72.70	76.84			
	Power Factor - %	67.64	80.72	90.06			
	Speed - rpm	2925	2917	2889			
100% Load	Current - Amps	4.1	4.9	7.4			
	Efficiency - %	70.66	75.80	78.35			
	Power Factor - %	74.74	85.50	92.12			
	Speed - rpm	2900	2889	2848			
Locked Rotor Torque - %		369	357	225			
Start Current - amps		30	41	46			
Number starts per hour		20	20	20			
Design Standard		JEC37	JEC37	JEC37			
Voltage Tolerance		± 10%	± 10%	± 10%			
Frequency Tolerance		± 5%	± 5%	± 5%			
Mft's Symbols		EB	EB	EB			