



DF

Submersible Sewage Pumps



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Features and Applications



Model **DF**

■ Features

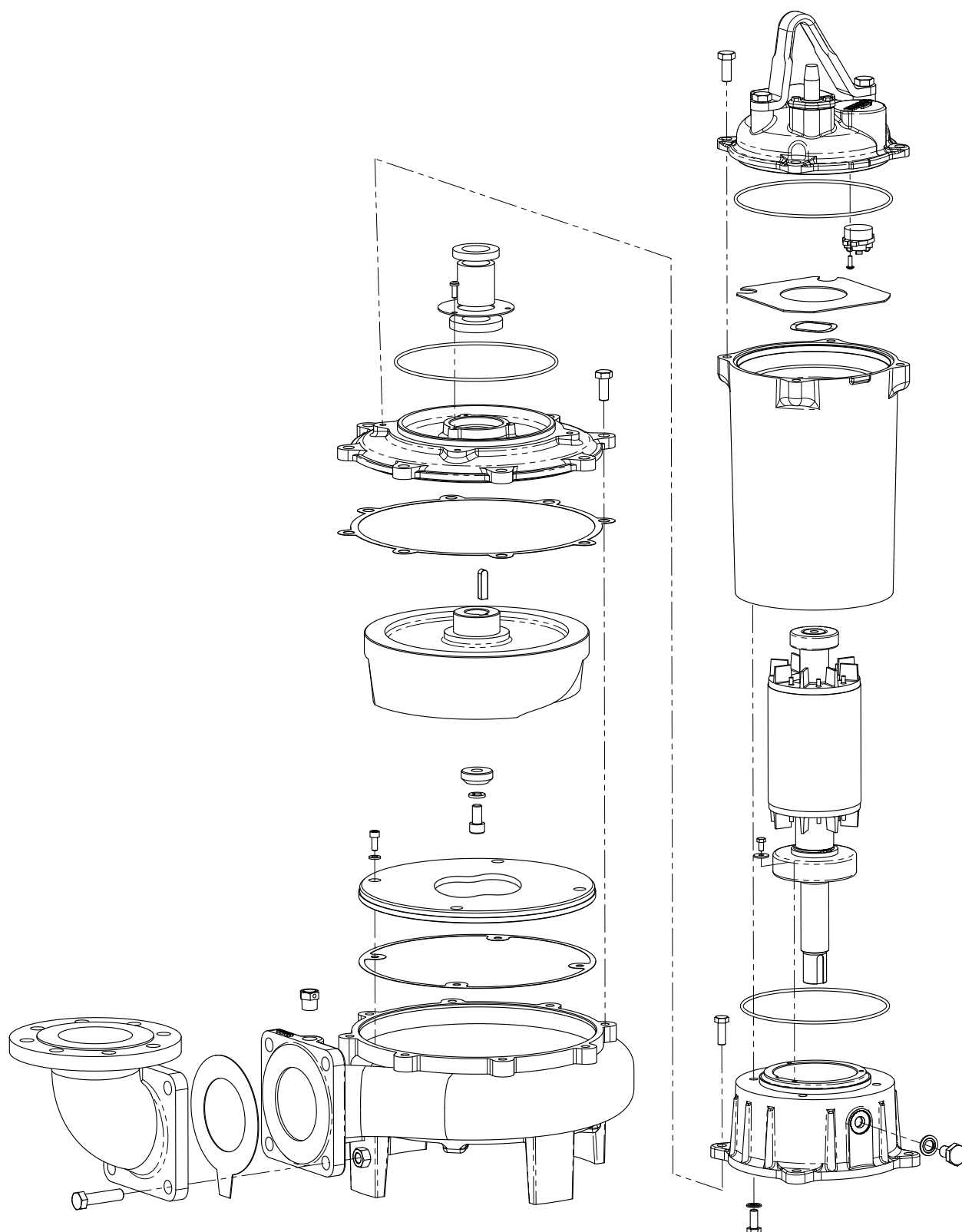
- Non-clog operation with "cutting" action.
Non-clog semi-open impellers and "cutting" action prevents clogging by fibrous matter. Models up to 3.7 kW have a chrysalis shaped suction port..
- Robust construction
Rugged cast iron construction, all fasteners of stainless steel and a 4 pole motor.
- Double 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 overload provides protection against overload, lock or open phase.

■ Applications

- Sewage.
- Waste water.
- Storm water drainage

Typical Exploded View

Note: Actual construction may vary depending on individual model.

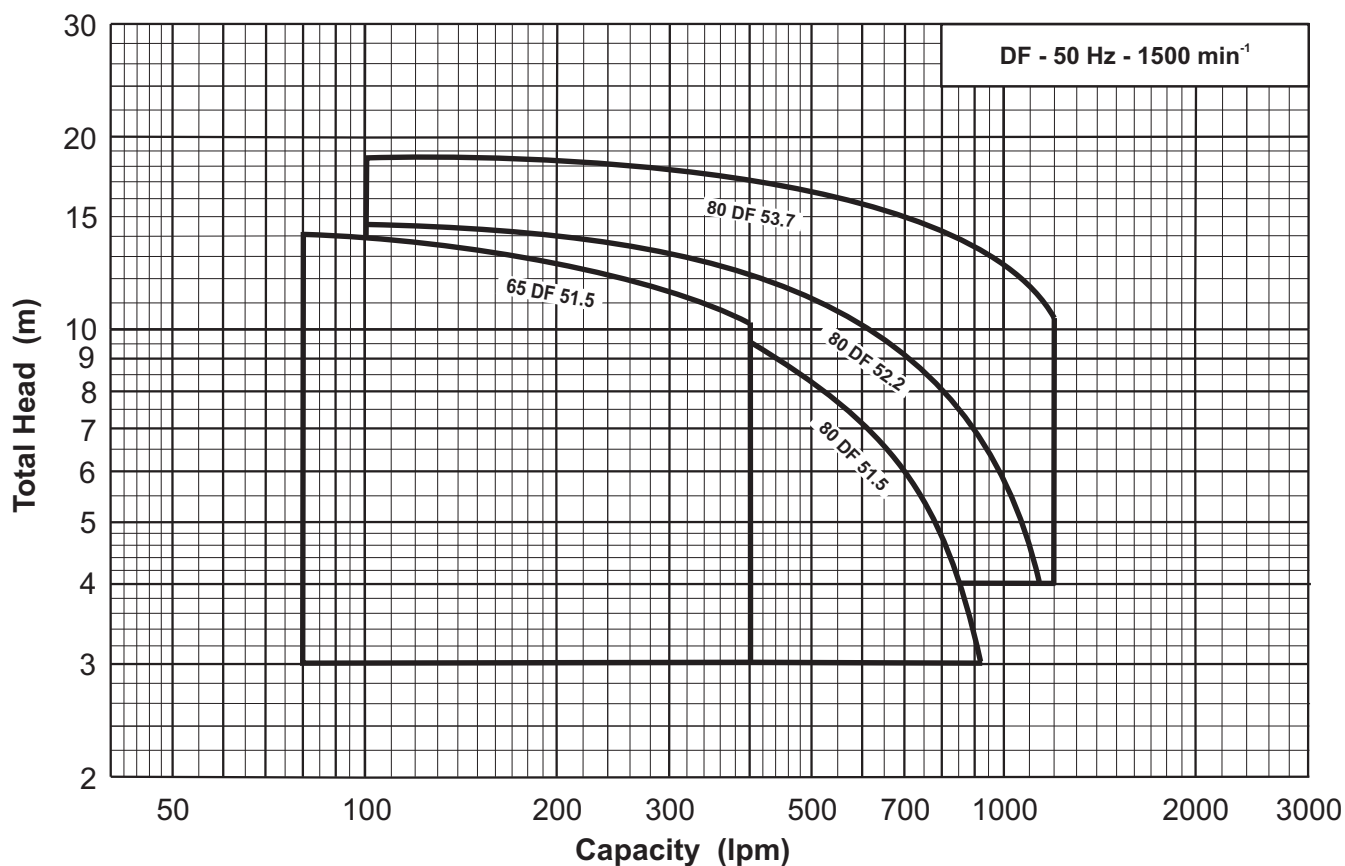


Specifications

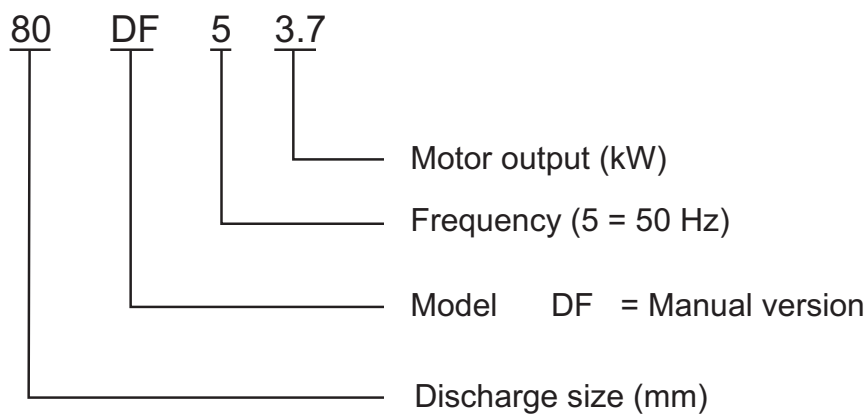
		Standard	Optional
Scope	Discharge	65 - 80 mm	
	Motor Power	1.5 - 3.7 kW (3ph.)	
	Performance	Capacity: 80 - 1200 lpm Head: 3 - 18m.	
Liquid	Type	Sewage, Storm water.	
	Max. Temp.	40°C	
	Max. Solids	Refer to table below	
Submergence	Maximum	8 m.	
	Minimum	Refer to low water level (L.W.L) in dimensions.	
Construction	Impeller	Non-clog semi-open.	
	Mechanical Seal	Oil lubricated double mechanical seal, single spring.	
Materials	Casing	Cast Iron	
	Impeller	Cast Iron	
	Suction Cover	Cast Iron	
	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, IP58, Class F insulation.	
	Poles/Speed	4 pole / 1500 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	10 m.	
Accessories	Flange	Discharge elbow with screwed companion flange.	
			Quick Discharge Connector (QDC)

Solids Handling			
Model	- discharge	65 Ø	80 Ø
	- motor kW	All	All
Max. diameter of solids		40 mm	46 mm
Max. length of fibres		195 mm	240 mm

Performance Chart

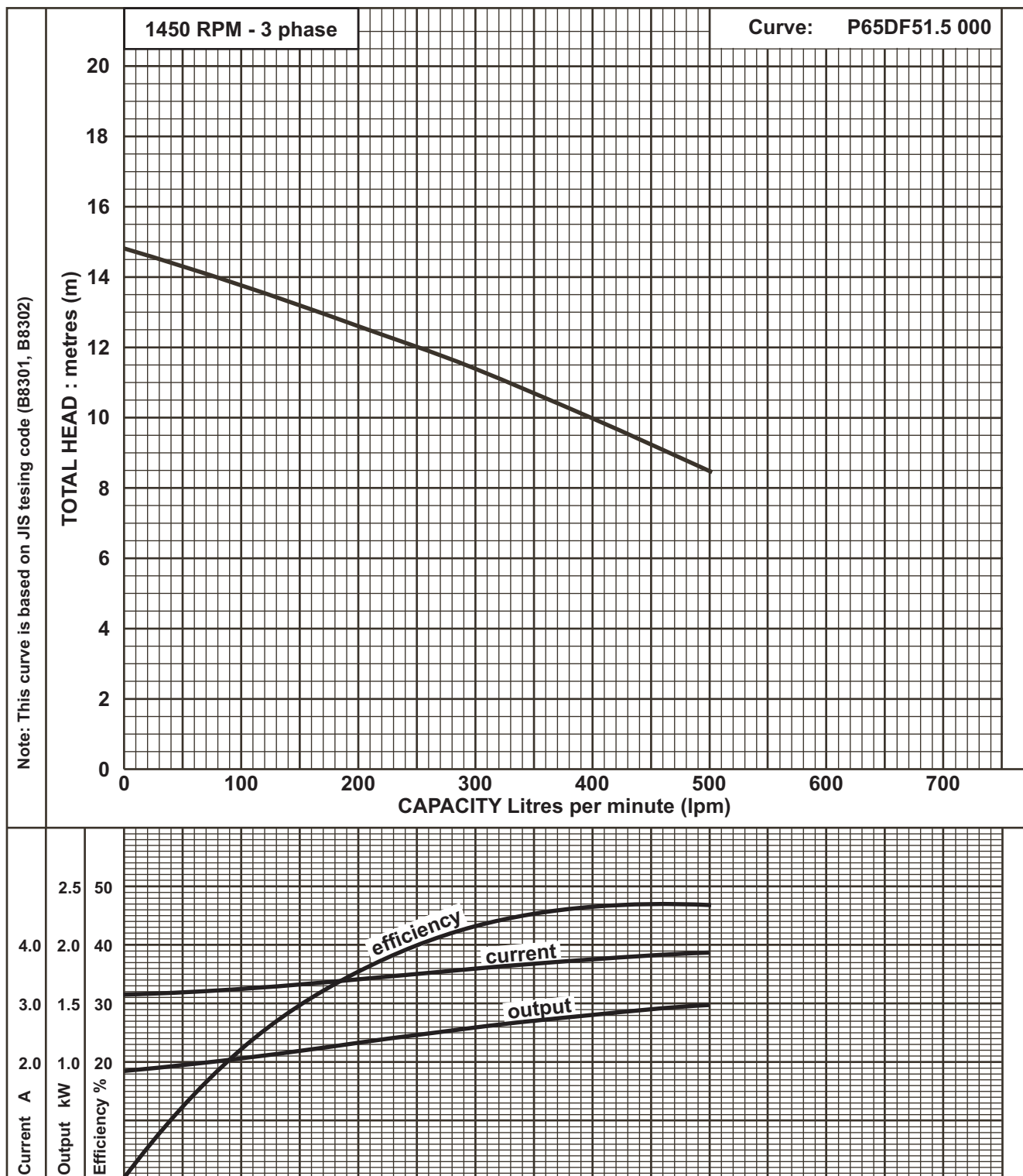


Model code



Performance Curve

65 DF 51.5

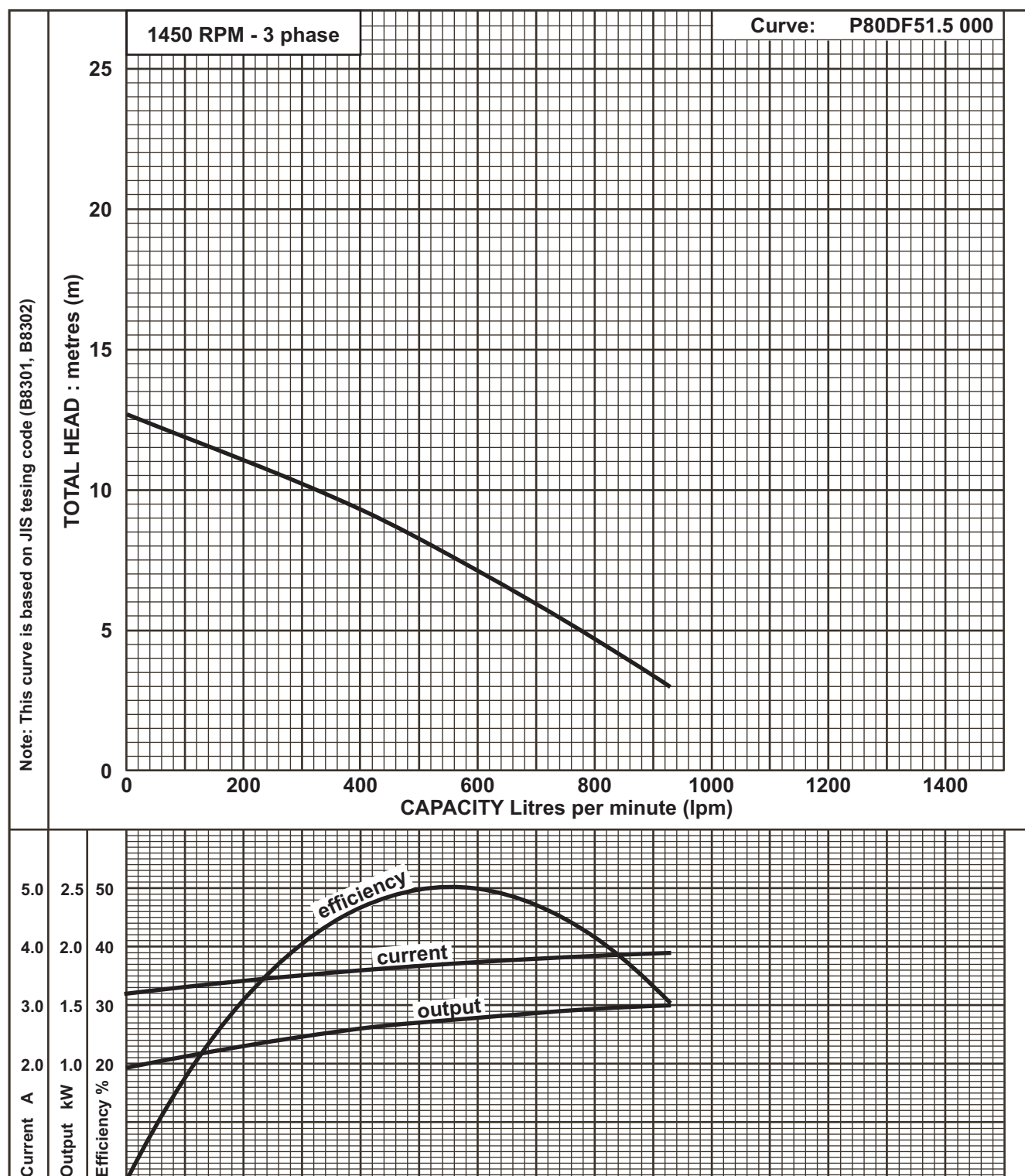


Test No.	Pump			Motor - 400 V - 3 ph			
	Capacity lpm	Total Head m	Effic. %	Current A	Input kW	Effic. %	Output kW
1	0	14.8	0	3.15	1.363	67.5	0.920
2	200	12.6	35.3	3.42	1.645	70.6	1.161
3	300	11.4	43.2	3.59	1.805	71.5	1.290
4	400	10.0	46.5	3.74	1.942	72.1	1.400
5	500	8.5	46.8	3.86	2.047	72.3	1.480

Model: 65 DF 51.5		Frequency: 50 Hz	
Discharge Ø: 65 mm		Output: 1.5 kW	
Pump Rating	Capacity - lpm :	200	500
	Total Head - m	12.6	8.5
Motor Rating	400Volt	3.9 Amp	1430rpm
	Maker: Ebara		Type: Dry Type

Performance Curve

80 DF 51.5

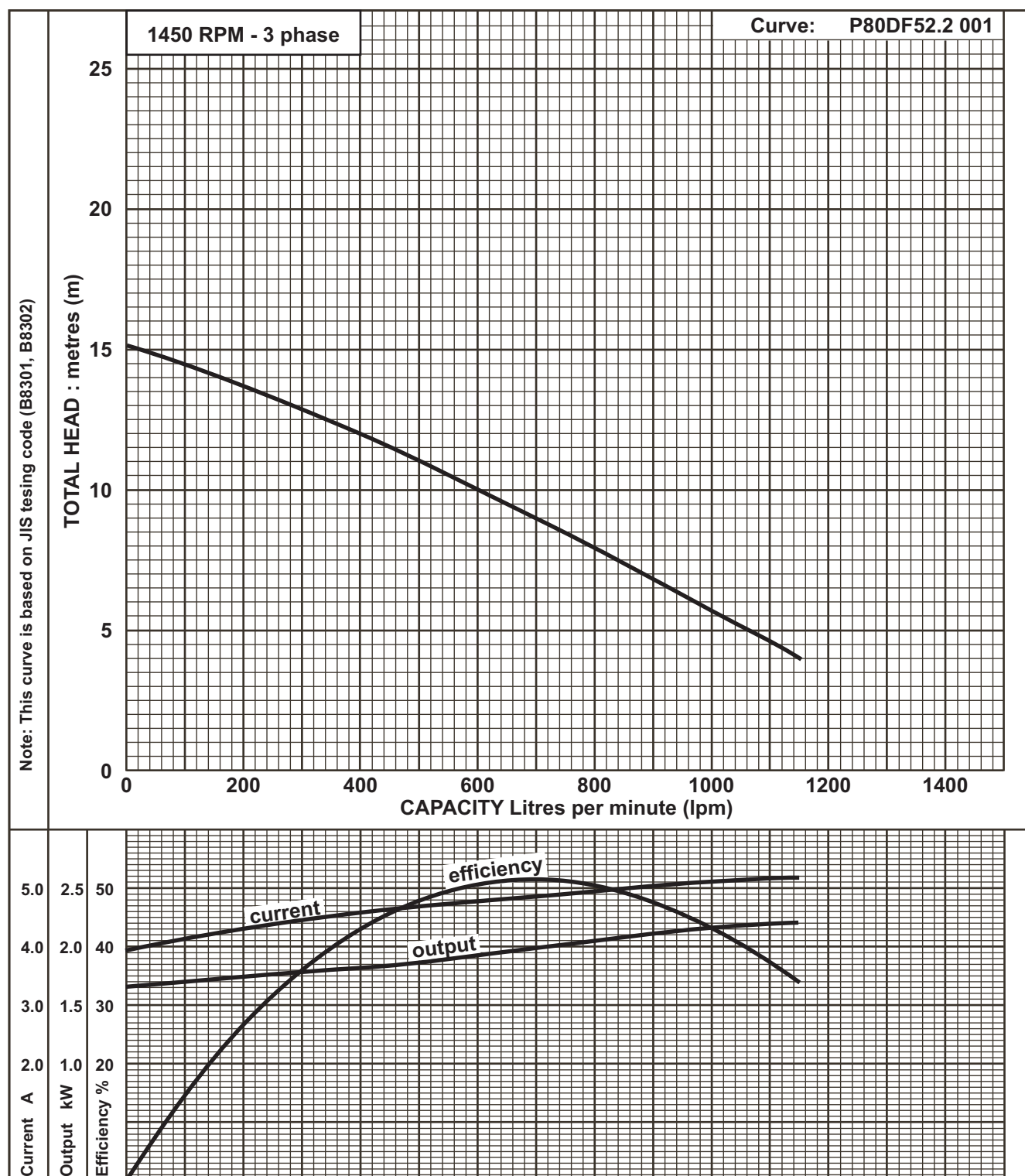


Test No.	Pump			Motor - 400 V - 3 ph			
	Capacity lpm	Total Head m	Effic. %	Current A	Input kW	Effic. %	Output kW
1	0	12.7	0	3.19	1.408	68.2	0.960
2	400	9.3	46.6	3.60	1.816	71.6	1.300
3	600	7.1	49.9	3.73	1.931	72.0	1.390
4	800	4.7	41.6	3.84	2.034	72.3	1.470
5	930	3.0	30.3	3.89	2.072	72.4	1.500

Model: 80 DF 51.5		Frequency: 50 Hz	
Discharge Ø: 80 mm		Output: 1.5 kW	
Pump Rating	Capacity - lpm :	400	930
	Total Head - m	9.3	3.0
Motor Rating	400Volt	3.9 Amp	1430rpm
	Maker: Ebara		Type: Dry Type

Performance Curve

80 DF 52.2

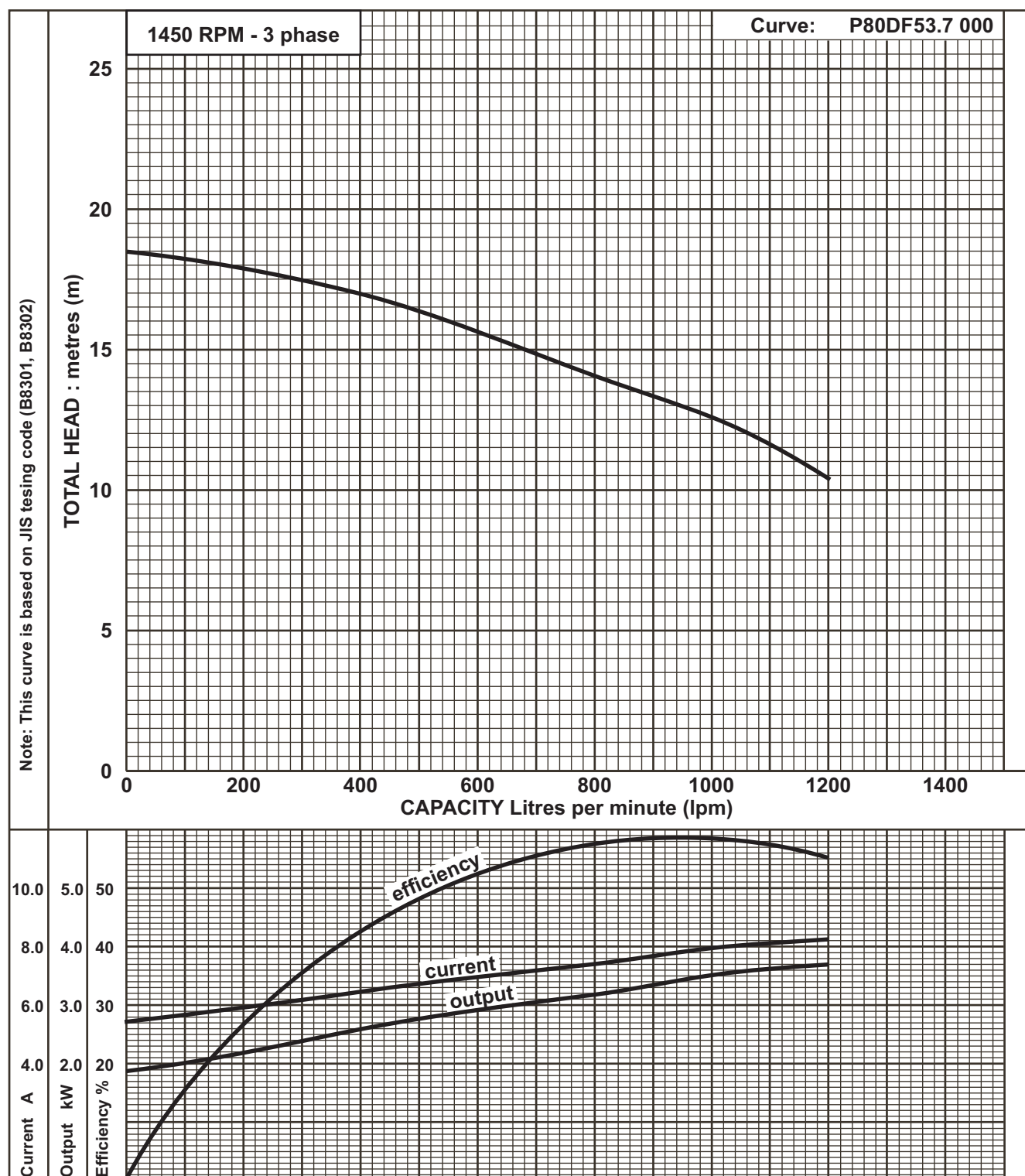


Test No.	Pump			Motor - 400 V - 3 ph			
	Capacity lpm	Total Head m	Effic. %	Current A	Input kW	Effic. %	Output kW
1	0	15.2	0	3.93	1.985	67.0	1.660
2	400	12.0	43.0	4.59	2.572	70.7	1.818
3	700	9.0	51.6	4.84	2.782	71.5	1.989
4	1000	5.7	43.0	5.12	2.996	72.5	2.160
5	1150	4.0	34.0	5.18	3.047	72.2	2.200

Model: 80 DF 52.2		Frequency: 50 Hz	
Discharge Ø: 80 mm		Output: 2.2 kW	
Pump Rating	Capacity - lpm :	400	1150
	Total Head - m	12.0	4.0
Motor Rating	400Volt	5.2 Amp	1430rpm
	Maker: Ebara	Type: Dry Type	

Performance Curve

80 DF 53.7

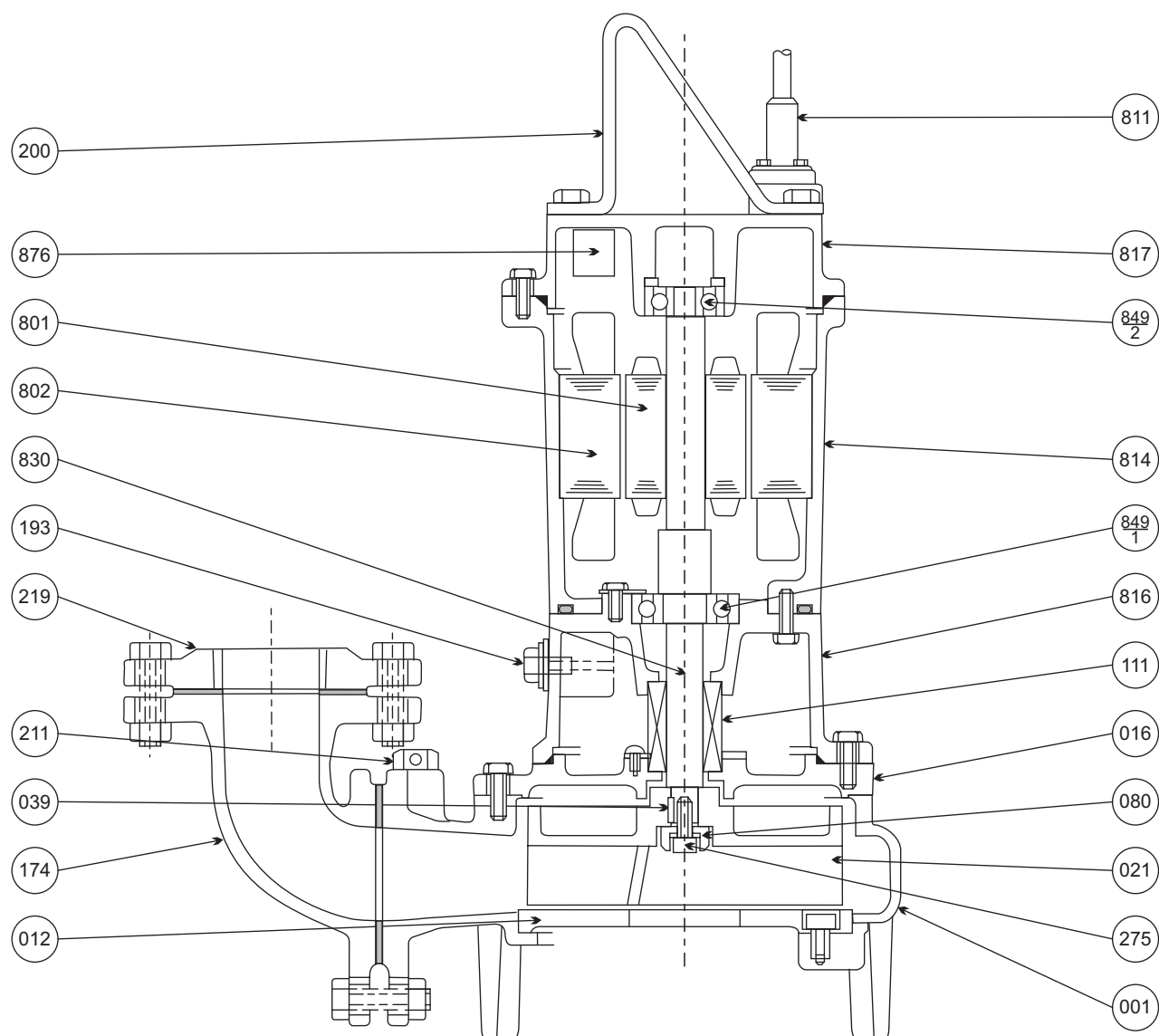


Test No.	Pump			Motor - 400 V - 3 ph			
	Capacity lpm	Total Head m	Effic. %	Current A	Input kW	Effic. %	Output kW
1	0	18.5	0	5.43	2.895	64.3	1.861
2	400	17.0	42.7	6.44	3.758	69.0	2.593
3	800	14.0	57.4	7.38	4.476	71.0	3.178
4	1000	12.6	58.3	7.97	4.915	71.6	3.519
5	1200	10.4	55.2	8.25	5.119	71.9	3.680

Model: 80 DF 53.7		Frequency: 50 Hz	
Discharge Ø: 80 mm		Output: 3.7 kW	
Pump Rating	Capacity - lpm :	400	1200
	Total Head - m	17.0	10.4
Motor Rating	400Volt	8.3 Amp	1430rpm
	Maker: Ebara	Type: Dry Type	

Sectional View

65 DF 51.5, 80 DF 51.5, 2.2, 3.7



Item Number	Description	Material	Quantity per unit
001	Casing	FC200 Cast iron	1
012	Suction Cover	FC200 Cast iron	1
016	Mechanical Seal Cover	FC200 Cast iron	1
021	Impeller	FC200 Cast iron	1
039	Impeller Key	SUS Stainless Steel	1
080	Bushing	SS Steel	1
111	Mechanical Seal		1
174	Discharge Elbow	FC200 Cast Iron	1
193	Oil Plug	C3604 or SUS304 Brass or Stainless Steel	1
200	Lifting Hanger	SS Steel	1
211	Air Vent Valve	C3604 Brass	1
219	Companion Flange	FC200 Cast Iron	1

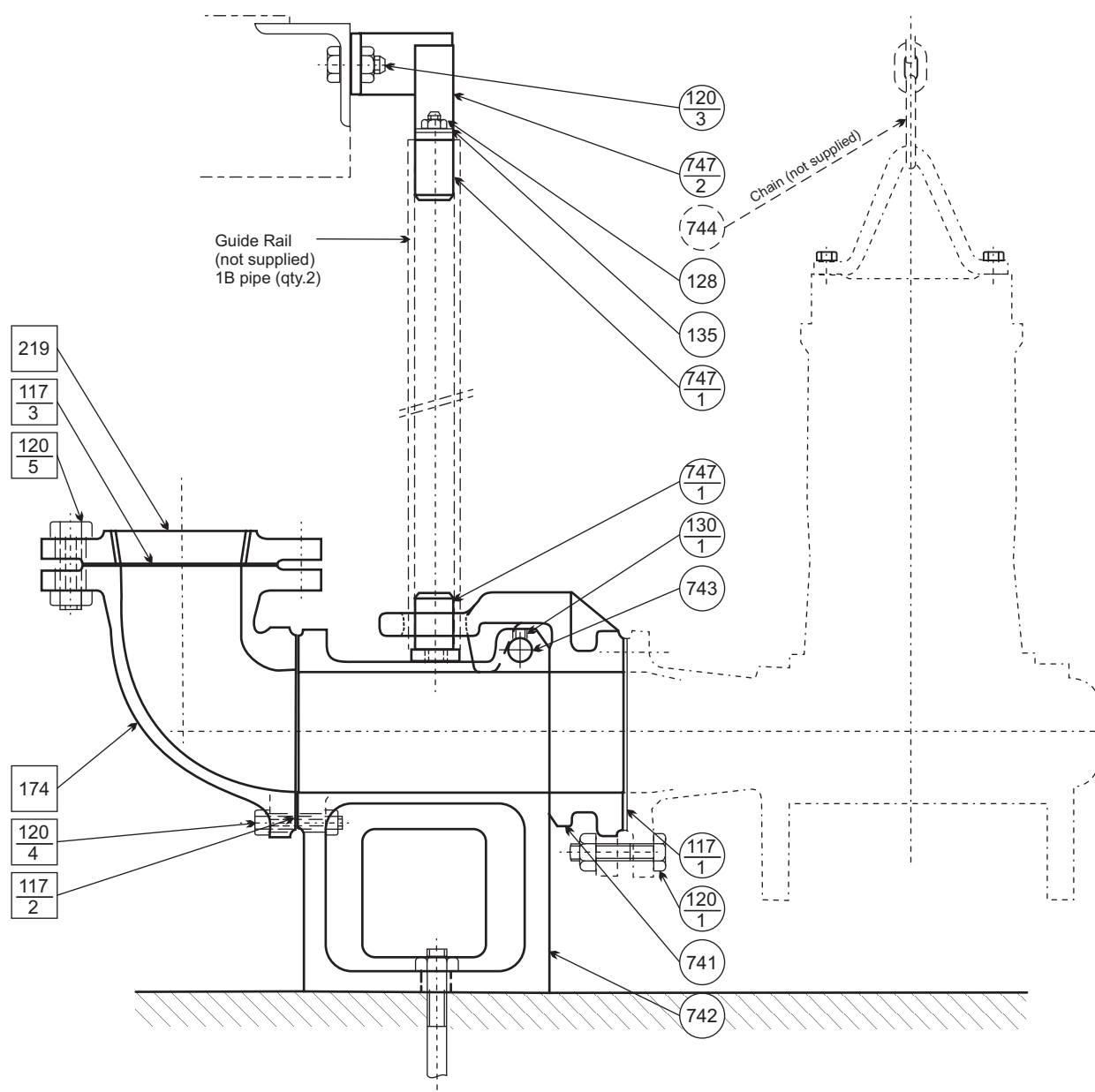
Item Number	Description	Material	Quantity per unit
275	Impeller Bolt	SUS304 Stainless Steel	1
801	Rotor		1
802	Stator		1
811	Cable		1
814	Motor Frame	FC150 Cast iron	1
816	Lower Bracket	FC150 Cast iron	1
817	Upper Bracket	FC150 Cast iron	1
830	Shaft #	SUS403 Stainless Steel	1
849-1	Ball Bearing		1
849-2	Ball Bearing		1
876	Auto Cut		1

refers to pump side of shaft material

Sectional View

LM 65, 80 QDC

Applicable to all 65 & 80 mm DF models

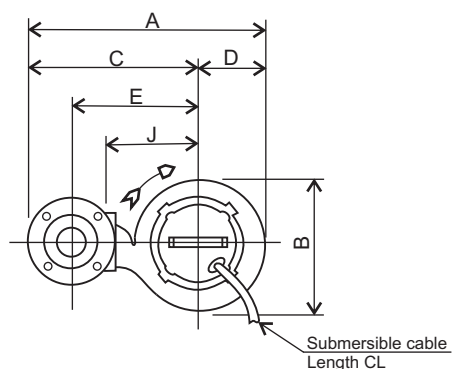


Item Number	Description	Material	Quantity per unit
117-1	Gasket	NBR Rubber	1
117-2	Gasket	NBR Rubber	1
117-3	Gasket	NBR Rubber	1
120-1	Bolt & Nut	SUS Stainless Steel	4
120-3	Bolt & Nut	SUS Stainless Steel	2
120-4	Bolt & Nut	SUS Stainless Steel	4
120-5	Bolt & Nut	SUS Stainless Steel	4or8
128	Nut	SUS Stainless Steel	2
130-1	Set Screw	SUS Stainless Steel	1

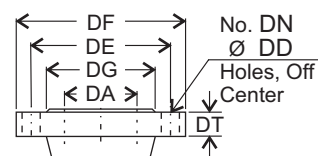
Item Number	Description	Material	Quantity per unit
135	Washer	SUS Stainless Steel	2
174	Discharge Bend	FC200 Cast iron	1
219	Companion Flange	FC200 Cast iron	1
741	Sliding Guide	FC200 Cast iron	1
742	QDC Body	FC200 Cast iron	1
743	Suspension Bar	SUS Stainless Steel	1
744	Chain	(Not supplied)	1
747-1	Guide Pin	S17C Steel	4
747-2	Guide Support	SS Steel	1

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

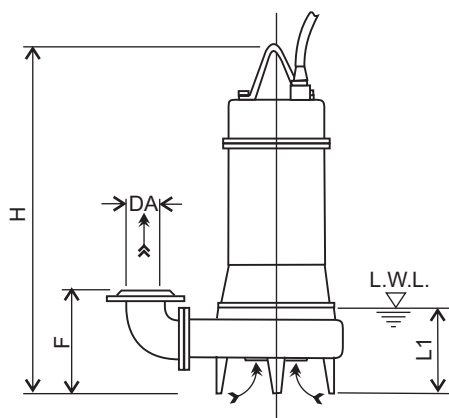
Dimensions



Discharge Flange Dimensions
(JIS 10kgf/cm²)



DA	DE	DF	DG	DT	DN	DD
65	150	175	116	18	4	15
80	150	185	126	18	4	15



Note:

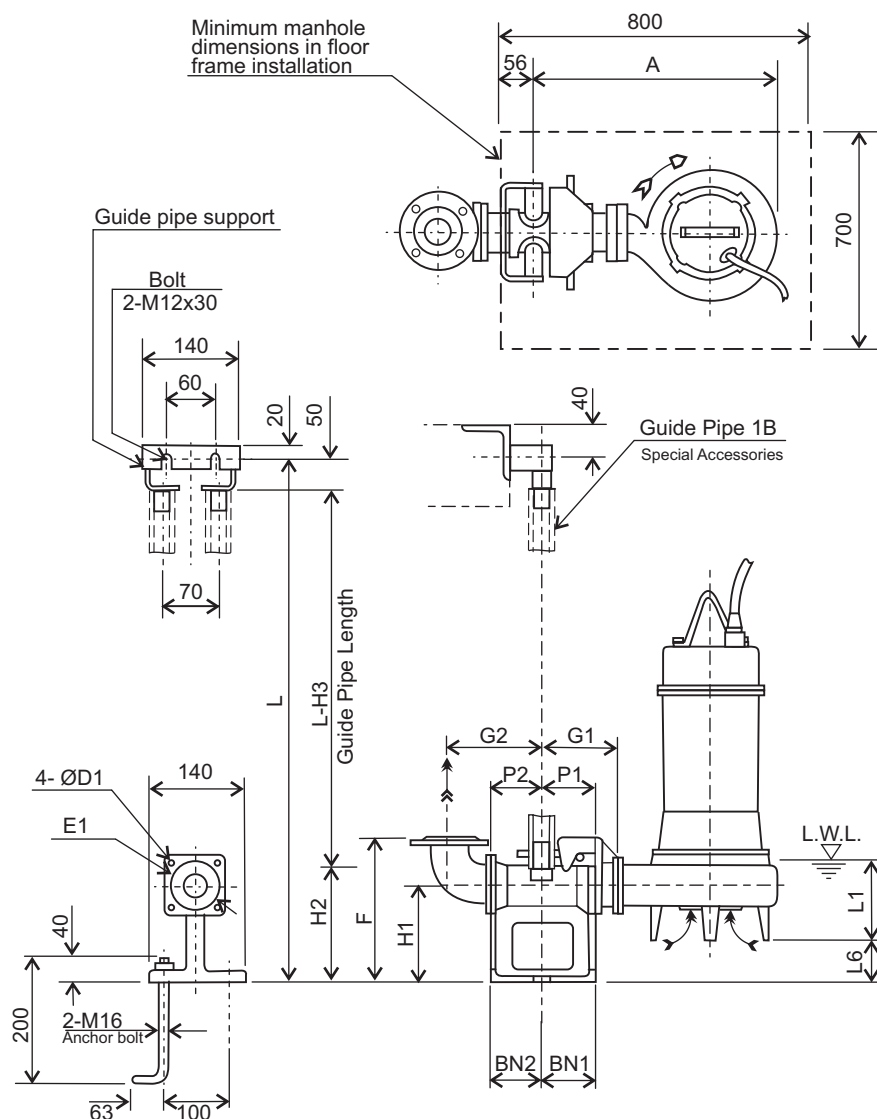
- 1/. L.W.L. (Low Water Level)
Is limited to 10 minutes operation at low water level.
- 2/. Is limited to 30 minutes operation with water level below top of motor.

Size DA	Model	Output KW	A	B	C	D	E	F	H	J	L1	CL	Weight
65	65 DF 51.5	1.5	497	291	353	144	265	200	576	200	140	10 m	52 kg
80	80 DF 51.5	1.5	524	292	378	146	285	220	597	210	165	10 m	55 kg
	80 DF 52.2	2.2	542	308	388	154	295	220	654	220	165	10 m	67 kg
	80 DF 53.7	3.7	567	328	403	164	310	220	687	235	165	10 m	75 kg

Units: mm unless otherwise specified



■ Applicable Models - 65 & 80 DF



Note:

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

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

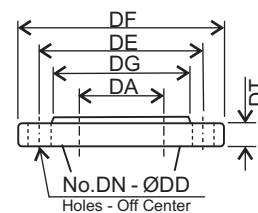
3/. The weight in dimension tables refers only to the weight of the QDC.

4/. Standard accessories supplied with QDC include:-

- Connector body with foundation bolts.
- Guide pipe support
- Sliding Glide
- Adaptor Flange

Guide Pipe is not supplied.

Discharge Flange
(JIS 10kgf/cm²)

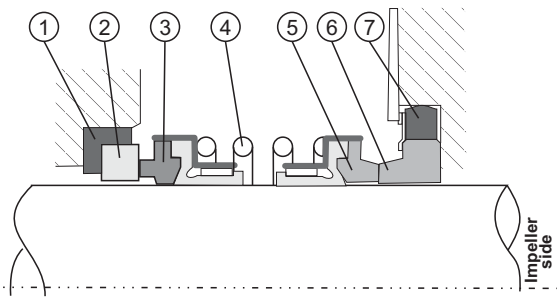


DA	DE	DF	DG	DT	DN	DD
65	140	175	116	18	4	15
80	150	185	126	18	8	15

Pump Model	A	P1	P2	G1	G2	F	H1	H2	H3	L1	L6	BN1	BN2	D1	E1	QDC Model	Weight
65 DF 51.5	464	75	95	120	160	250	145	190	240	140	50	75	95	12	140	LM65	14 kg
80 DF 51.5	481	75	90	125	165	285	175	230	280	165	65	75	90	15	155	LM80	17 kg
80 DF 52.2	499	75	90	125	165	285	175	230	280	165	65	75	90	15	155	LM80	17 kg
80 DF 53.7	524	75	90	125	165	285	175	230	280	165	65	75	90	15	155	LM80	17 kg

Units: mm unless otherwise specified

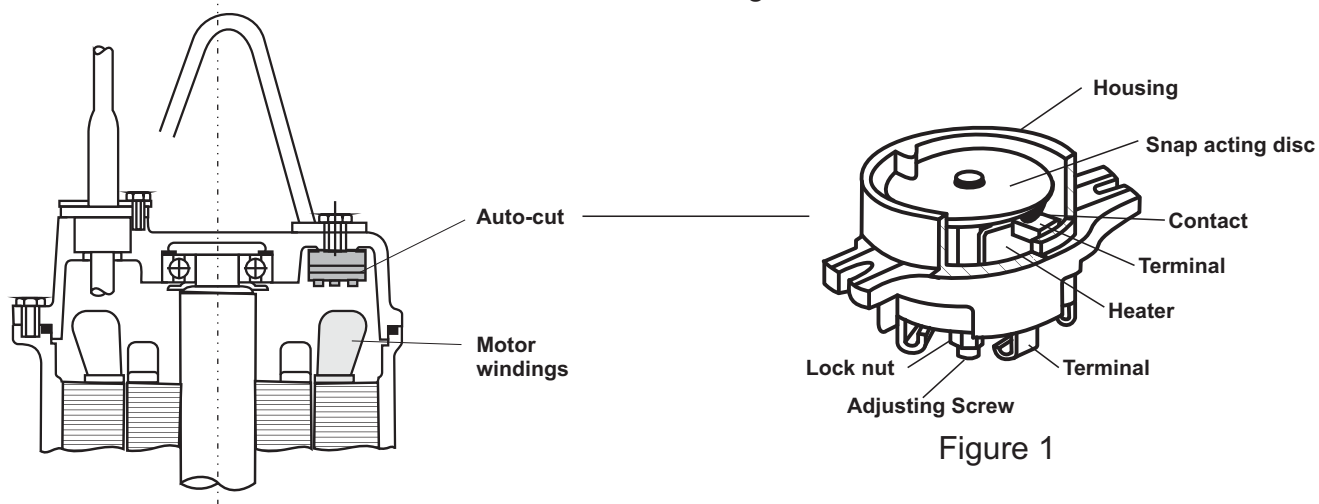
Applicable Models	Output kW	Mechanical Seal Type	Lubricating Oil		Bearings	
			Capacity - CC	Type	Bottom	Top
DF	1.5	A-25	920	Turbine Oil SAE 10W or SAE 20W (Turbine Oil#32)	6306ZZ	6204ZZ
	2.2	A-30	1500		6307ZZ	6205ZZ
	3.7				6308ZZ	6205ZZ

No.	Part Name	Material	No. per Set	Type A-25 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 1.5 to 3.7 kW DF models

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

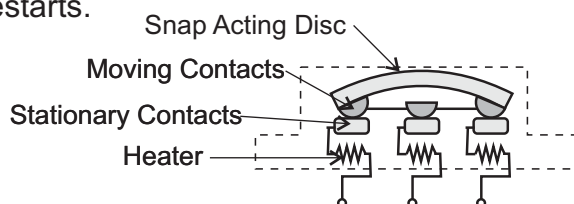


Figure 2

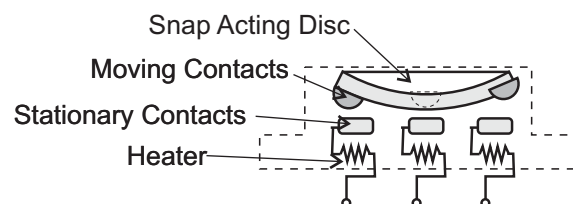
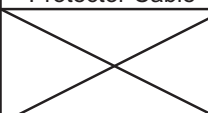


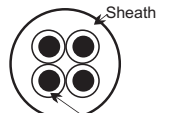
Figure 3

To suit models DF		
Phase	Power kW	Auto-Cut
Three Phase	1.5	KA-313-GQTL104
	2.2	KA-313-GQXL102
	3.7	KA-313-GCXL110

Technical Data

Cable Specifications

Applicable Models		Motor kW	Starting method	Length of cable	Material	Number & size of conductor(s)	
						Power Cable(s)	Protector Cable
DF	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									
Three Phase	1.5 mm ²	4	H07RN-F	PCR	EPR	1.7	0.8	11.2	

PCR = Polychloroprene Rubber EPR = Ethylene Propylene Rubber

Note: Cable specifications were changed in 2009 to be meet CE market requirements.
See page 500 for more details.

Motor Data
1.5 to 3.7 kW, Three Phase, 4 Pole Motors

Hz	Poles	Phase	Output (kW)	Voltage	Applicable Models
50	4	3	1.5 to 3.7	415 V	DF

Name-Plate Rating	Model	VZDL	VZDL	VZDL			
	Output - kW	1.5	2.2	3.7			
	Phase	3	3	3			
	Poles	4	4	4			
	Volts	415	415	415			
	Amps	3.7	5.2	7.6			
	Speed - rpm	1430	1440	1440			
	Insulation Class	F	F	F			
No Load Test	Amps	1.95	3.20	3.90			
	Watts	400	420	450			
Resistance at 20° C	Ohms	10.080	5.875	3.385			
75% Load	Current - Amps	3.10	4.46	6.28			
	Efficiency - %	62.71	69.23	76.38			
	Power Factor - %	80.58	74.40	80.93			
	Speed - rpm	1441	1458	1455			
100% Load	Current - Amps	3.70	5.20	7.60			
	Efficiency - %	65.21	71.82	77.98			
	Power Factor - %	86.49	81.96	86.85			
	Speed - rpm	1419	1443	1440			
Locked Rotor Torque - %		379	301	296			
Start Current - amps		24.0	32.0	49.0			
Number starts per hour		20	20	20			
Design Standard		JEC37	JEC37	JEC37			
Voltage Tolerance		± 10%	± 10%	± 10%			
Frequency Tolerance		± 5%	± 5%	± 5%			
Gd ² - kgm ²							
Mft's Symbols		EB	EB	EB			

Change to Cable Specifications (3 phase models)

Note: Cable specifications were changed in 2009 to be meet CE market requirements.

Materials and colour of cables where changed as below.

Cables with the same gland shape are interchangeable, providing conductor size is suitable for motor power.

Note that superceded cable conductors were often of larger size as they were designed for use with lower voltage (200Volt) motors.

“New” CE Marked cables (from August 2009)									
Applicable Models		Motor kW	Starting method	Length of cable	Material	Power Cable Details			Protector Cable
						Qty	Size	Gland Shape	Size & Gland
DF	Three Phase	1.5	DOL	10m	H07RN-F	1	4 x 1.5 mm ²		N/A
		2.2							
		3.7							

DF models are DOL start with a single 4 core power cable (with an inbuilt motor overload)

Cable Colours (& tag)	BLACK 1 (U1), BLACK 2 (V1) & BLACK 3 (W1) with GREEN/YELLOW Earth (PE)
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The cable number is printed along each black cable.



Superceded cables (pre August 2009)									
Applicable Models		Motor kW	Starting method	Length of cable	Material	Power Cable Details		Protector Cable	
						Size	Gland Shape	Size & Gland	
DF	Three Phase	1.5	DOL	10m	HVCT	4 x 1.25 mm ²			N/A
		2.2							
		3.7				4 x 2 mm ²			

Cable Colours	RED, WHITE & BLACK with GREEN Earth
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