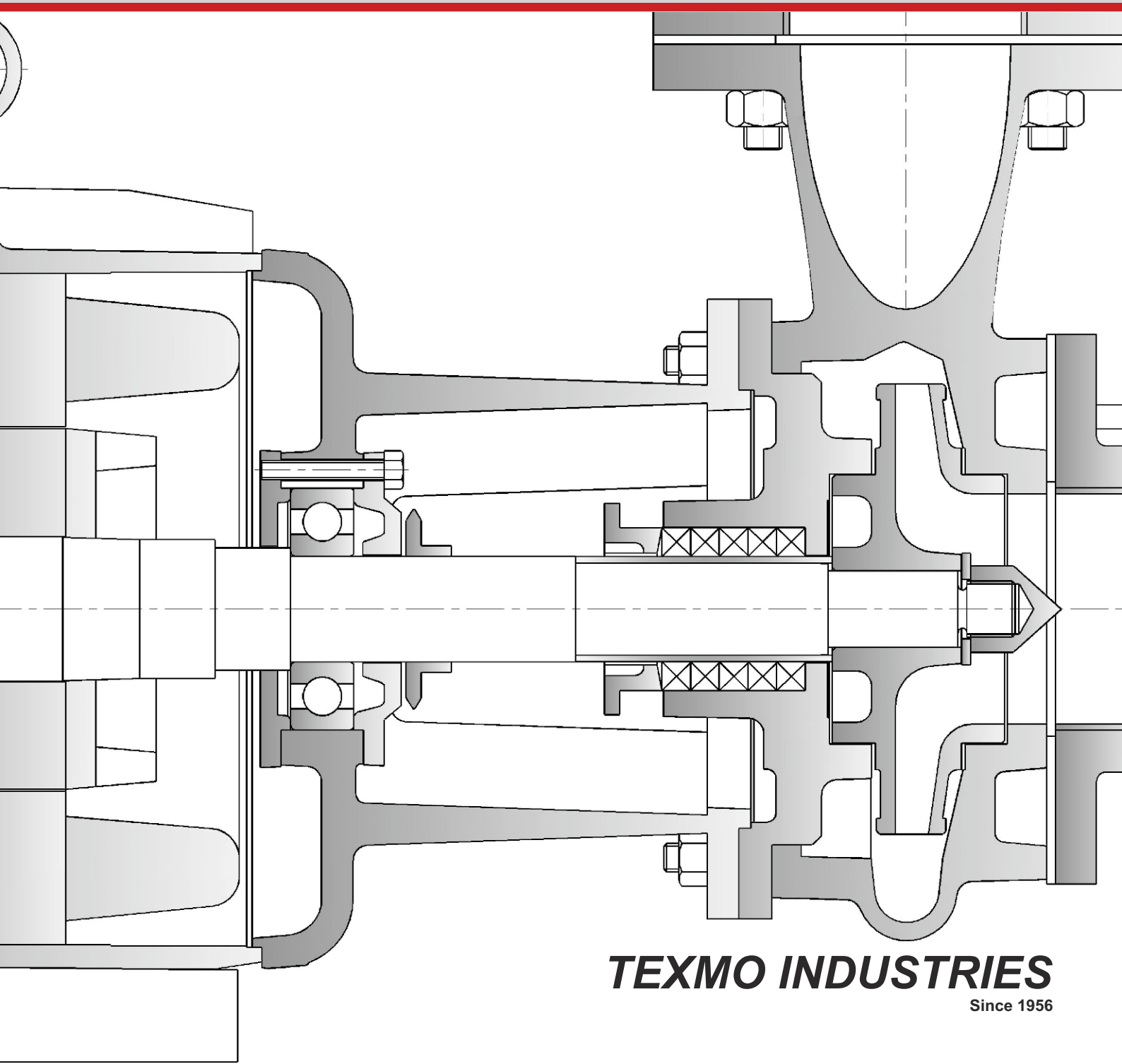
Taro

SINGLE PHASE CENTRIFUGAL MONOBLOCS
PERFORMANCE CHART



TEXMO INDUSTRIES

Since 1956

GENERAL INFORMATION

PERFORMANCE RELATED SPECIFICATIONS

- Recommended voltage range (At motor terminal) :

Single Phase	Three Phase
180 - 240 V	350 - 440 V
150 - 200 V (L-Series)	250 - 380 V (L-Series)

- Electric power supply : 415 / 220 V, 50 Hz, AC power supply

- Suitable overload relay for three phase and MCB for single phase products are to be provided as an electrical safety measure for the machine.
- Advisable to operate in the pump set in the recommended range for trouble free operation and to ensure a long life.
- Time interval between subsequent starts : 5 minutes (minimum)
- Pump sets are suitable for pumping clear, cold, non-aggressive water without any abrasive solid particles with the following characteristics

Temperature	:	33^{0}C Maximum
Allowable sand content	:	50 mg / lit Maximum
Total Dissolved Solids	:	3000 mg / lit Maximum
Hardness	:	300 Maximum
pH value	:	6.5 - 8.5
Direction of rotation	:	Anti clockwise when viewed from the delivery side of the pump

Others

- Performance values given are subject to change in accordance with prevailing voltage and frequency conditions.
- Head values given in the performance charts are exclusive of pipe friction and fitting losses. These losses need to be taken into account while calculating the actual total head before selecting a suitable pump set.
- All performance values given are based on a suction head of 6 metres.
- In view of continuous improvements on existing products, information and performance values given in the catalogue are subject to change without notice.

Note : Shaded figures in the chart indicate the recommended operating range.

PUMP SELECTION

Irrigation wells and pumps are costly installations, which require efficient utilization. A major part of the energy used in agriculture is in pumping water. Hence efficient utilization of the limited energy resources calls for the selection of the most suitable pump, keeping in view the requirements of irrigation, characteristics of the well / water source, kind of power available, economic conditions of the farmer and other factors. It is a process of matching of well and pump characteristics for optimum water output.

CRITERIA FOR SELECTION

The main factors influencing the selection of pumping sets are :

i. Peak water requirement
ii. Yield of well or water source
iii. Availability of energy

WATER REQUIREMENT, V IN L/D

It is the maximum quantity of water required in litres / day to meet out the daily crop water requirement and pumping rate in l/s is calculated by V / (T x 3600) where, T – Average pumping hours.

Relevant Details

1. Daily crop water requirement in litres or cm for different stages
2. Cropped area in m^2 (m^2 x cm x 10 will give water requirement in litres)

YIELD OF WELL OR WATER SOURCE, Y IN L/S

It is the recuperation rate at which water recharges into the well and it is the maximum rate at which water can be pumped out under steady draw down conditions. This can be assessed directly from pump testing results or converted from inch to lit./s referring to discharge table.

Relevant Details

1. Type of water source (Open well / River / Sump)
2. Static water level below ground level (Water level when pump is switched off)
3. Dynamic water level below ground level (Expected level when pump is switched on)
4. Expected maximum low water level during summer
5. Proposed pump set erection depth
6. Existing / proposed pipe details (Sizes and lengths)
7. Vertical elevation from water source to discharge point
8. Number of fittings like (Tee, Bends, Valves etc.,)

ENERGY AVAILABLE, HP

It is the quantitative and qualitative data on the power available for pumping out the water from the water source. This includes phase, sanctioned HP, frequency, voltage fluctuation and three and two phase power supply and time of which power in available.

Relevant Details

1. Main line to starter distance
2. Starter to pump set distance

Selection Procedure

Step 1 - Discharge calculation, Q

V – Maximum crop water requirement in litres, D in case of irrigation depth in cm for peak demand of water for the selected cropping pattern

A – Cropped area in m2

T – Allowed water filling time or pumping time in sec (considering power availability hrs)

Required pumping rate, Q = V / T or (D x A x 10) / T

[In case of trying out maximum possible discharge, Q is to be assumed]

Step 2 – Comparison of discharge, Q with yield, Y

As indicated earlier, discharge rate has to be limited to 80% of the safe yield for trouble free performance and better pump life avoiding any dry running

Step 3 – Selection of pump size or series

Based on the calculated discharge rate, Q the suitable pump size is to be selected. In case of bore well submersibles, suitable pump series is to be selected considering bore well size also.

Step 4 – Total head calculation, H

Suction head, Hs

Ds – Size of suction pipe in mm

Ls – Length of suction pipe in m including equivalent length of pipe for the fittings

Vs – Vertical distance of pump set from working water level in m

Refer to pipe friction loss chart or table and read friction value, Fs% in m / 100 m length of suction pipe against discharge, Q and existing or selected pipe size, Ds.

Pipe friction in suction pipe, Fs = (Ls x Fs%) / 100

Suction head, Hs = Vs + Fs

Note: For Submersible pump sets the suction head value is zero

Delivery head, Hd

Dd – Size of delivery pipe in mm

Ld – Length of delivery pipe in m including equivalent length of pipe for the fittings

Vd – Vertical distance of discharge point from pump set level in m including ground elevation

Refer to pipe friction loss chart or table and read friction value, Fd% in m per 100 m length of delivery pipe, against discharge, Q and existing or selected pipe size, Dd.

Pipe friction in delivery pipe, Fd = (Ld x Fd%) / 100

Delivery head, Hd = Vd + Fd

Step 5 – Total head

Total head, H = Hs + Hd + Hf + He

Hf – Fitting loss in the entire pipeline system (Refer to fitting loss table)

He – Exit pressure head at discharge point as required

Step 6 – Energy requirement

Approx. energy requirement, HP = (Q x H) / (75 x Ep)

Ep – Pump efficiency value in fraction, which varies with product HP and pipe size

Select an appropriate pump model or stage for the given total head, H and discharge, Q referring to the product performance chart. Best efficiency point (declared duty point) is always preferred. If the HP of the selected pump model is less than the sanctioned HP, then we may proceed with the same. If not, assumed or calculated Q has to be reduced and above steps are to be repeated.

In case of bore well submersible pump sets, correct product series is to be decided based on the required pumping rate Q before selecting a suitable pump model and number of stages.

SELECTION OF PUMPS FOR PARALLEL CONNECTIONS

Requirement of parallel connections arises when the required discharge rate is not met with the available pump models. In this case two or more pumps with almost matching pressure head should be selected. Following factors are to be considered for parallel operations.

a. Pumps of similar head characteristics are to be selected

b. No pump should operate at its shut off head or above maximum permissible head

c. No pump should operate below recommended head range as this leads to cavitation

SELECTION OF PUMPS FOR SERIES CONNECTIONS

Requirement of series connections arises when the required total head is not met with the available pump models. In this case two or more pumps with almost matching discharge rate should be selected. Series installations of pumps are to be spaced in such a way that neither the pump gets overloaded or ends up with discharge cavitation.

OTHER FACTORS AFFECTING THE PUMP PERFORMANCE (after installation)

1. Suction head variation
2. Dynamic water level i.e., draw down variation
3. Condition of existing pipe line including inner roughness / amount of sedimentation and the life
4. Recharge rate of water source
5. Frequency and voltage conditions

Cable selection

Va – Actual voltage available in the field (Volts)
Vr – Rated voltage of the motor (Volts)
La – Actual cable length from starter to motor terminal (metre)
HP – Power of the selected motor
I – Full load current of the selected motor [For SD motors, it is I /√3 times the FL current] (Amperes)
Lc – Calculated equivalent cable length (Vr x La) / Va (metre)

Refer to cable selection chart and select appropriate cable size for the given I and Lc values.

Follow the same procedure for selecting suitable wire / cable size for mail line to starter.

Single Phase Centrifugal Monoblocs - HCS / SCH / STH

PRODUCT FEATURES

- Easy installation and low operating cost.
- Improved efficiency and minimal maintenance by having the set operated on a common shaft.
- Dynamically balanced rotors and impellers ensure vibration free performance and enhanced life.
- Aluminium pressure die-cast rotors press-fitted onto precision machined motor shafts.
- Easy handling with an eye bolt.
- Deep groove ball bearings packed with right quantity of special grease ensure long life.
- Rigorous quality control testing at every stage of manufacturing ensures higher efficiency.
- Squirrel cage motor of TEFC type designed to operate in a wide voltage range 180 - 240 V, 50 Hz, AC power supply.

MATERIAL OF CONSTRUCTION

Part Name	Material	Part Name	Material
Impeller	AISI 304 / Gunmetal / CI FG 200	Mechanical seal	Carbon / Ceramic
Casing	CI FG 180	Motor body	CI FG 180
Sleeve	AISI 410 (1.5 / 2.0 hp)	Shaft	AISI 410 / 45C8
Flanges	CI FG 180	Winding wire	Enameled copper

APPLICATIONS

Domestic and community water supply | Water supply to high-rise buildings, housing complexes, bungalows and industries | Cattle and poultry farms | Irrigation of farms | Dairies | Cooling water circulating systems | Fire fighting systems | Fountains

PERFORMANCE CHART

TARO "HCS SERIES" - SINGLE PHASE CAPACITOR START & RUN HIGH SPEED CENTRIFUGAL MONOBLOCS

Approximate performance values of HCS series at 220 V (-15% to +6%), 2900 rpm, 50 Hz AC power supply

Model Name	Motor Rating		Pipe Size (mm)			TOTAL HEAD VALUES																														
					Metres	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30	32	34	36	40				
	kW	HP	Suc.	Del.	Feet	20	23	26	30	33	36	39	43	46	49	52	56	59	62	66	69	72	75	79	82	85	89	92	98	105	112	118	131				
HCS 3025	0.37	0.5	25	25	DISCHARGE VALUES IN L/M		68.0	67.6	67.2	66.7	66.2	65.6	65.0	64.0	63.0	61.0	56.0	44.0	28.0																		
HCS 4025S ⍋	0.37	0.5	25	25		76.8	76.8	76.2	76.2	75.6	75.6	75.0	75.0	74.4	73.2	72.0	69.6	66.0	60.0	51.6	40.2	27.6														
HCS 4025DS ⍋ ✉	0.37	0.5	25	25		82.8	82.2	81.0	79.8	78.6	76.2	73.8	69.6	64.2	57.0	49.2	40.2	31.2	21.0																	
HCS 4040 DS ♦	0.37	0.5	40	40		281	272	261	247	228	199	154																								
HCS 7025	0.75	1	25	25											75.6	75.0	74.4	73.8	73.2	72.5	71.4	70.1	68.4	66.0	63.0	58.8	54.0	48.6	37.2	23.4						
HCS 7030 H	0.75	1	30	25											181	181	179	178	176	173	169	164	155	144	124	98.4	67.8									
HCS 7040 ⍋ ✉	0.75	1	40	40					377	356	332	305	271	228	174																					

TEXMO "HCS SERIES" - SINGLE PHASE CAPACITOR START & RUN HIGH SPEED CENTRIFUGAL MONOBLOCS

Approximate performance values of HCS series at 220 V (-15% to +6%), 2900 rpm, 50 Hz AC power supply

Model Name	Motor Rating		Pipe Size (mm)			TOTAL HEAD VALUES																														
					Metres	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30	32	34	36	40				
	kW	HP	Suc.	Del.	Feet	20	23	26	30	33	36	39	43	46	49	52	56	59	62	66	69	72	75	79	82	85	89	92	98	105	112	118	131				
HCS 8025	1.1	1.5	30	25	DISCHARGE VALUES IN L/S												5.1	5.0	4.9	4.8	4.7	4.5	4.3	4.0	3.7	3.4	3.0	2.5	1.5								
HCS 8040 H	1.1	1.5	50	40								6.7	6.6	6.2	5.9	5.5	5.2	4.7	4.2	3.5	2.7	1.7														
HCS 8040 ⍋ ◎	1.1	1.5	50	40					6.0	5.7	5.3	4.9	4.4	3.8	3.2	2.5																				
HCS 8050 ⍋ ◎	1.1	1.5	50	50		8.2	7.7	7.2	6.5	5.7	4.7	3.5	1.8																							
HCS 8050 G ✉	1.1	1.5	50	50		7.1	6.7	6.3	5.8	5.3	4.7	3.9	2.9																							

Performance confirming to IS : 9079 and 996

♦ - Extension shaft also available

◎ - STH series also available

✉ - Against batch order

⍋ - ISI marked stes

PRODUCT TYPE KEY

H C S 40 25 D S - High speed Capacitor start Single phase Monobloc (40 - Power code, 25 - Del. size) - Discharge, Small frame

H C S 80 50 G - High speed Capacitor start Single phase Monobloc (80 - Power code, 50 - Del. size) - Gun metal impeller

PERFORMANCE CHART

TEXMO "HCS SERIES" - SINGLE PHASE CAPACITOR START & RUN HIGH SPEED CENTRIFUGAL MONOBLOCS

Approximate performance values of HCS series at 220 V (-15% to +6%), 2900 rpm, 50 Hz AC power supply

Model Name	Motor Rating		Pipe Size (mm)			TOTAL HEAD VALUES																														
					Metres	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30	32	34	36	40
	kW	HP	Suc.	Del.	Feets	20	23	26	30	33	36	39	43	46	49	52	56	59	62	66	69	72	75	79	82	85	89	92	98	105	112	118	131			
HCS 1125 S	1.1	1.5	25	25	DISCHARGE VALUES IN L/S																1.4	1.4	1.37	1.36	1.34	1.33	1.31	1.29	1.24	1.2	1.1	0.9	0.5			
HCS 1140 HS	1.1	1.5	50	40												3.4	3.3	3.2	3.2	3.1	3.0	2.9	2.7	2.5	2.2	1.8	1.4									
HCS 1530 N	1.5	2	40	30								4.0	4.0	3.9	3.9	3.9	3.8	3.8	3.7	3.6	3.6	3.5	3.4	3.3	3.2	3.0	2.8	2.5	1.9	1.2						
HCS 1550 HNF ◎	1.5	2	65	50								5.9	5.8	5.6	5.4	5.1	4.8	4.5	4.1	3.7	3.1															
HCS1550 HHNF₦✉	1.5	2.0	50	50							17.3	17.1	16.9	16.7	16.4	16.0	15.7	15.3	15.0	14.5	13.9	13.2													
HCS 1550 N	1.5	2	50	50					9.2	8.9	8.6	8.2	7.7	7.2	6.5	5.6	4.2																		
HCS 1550 NF◎▲	1.5	2	65	50					9.2	8.9	8.6	8.2	7.7	7.2	6.5	5.6	4.2																		
HCS 1550 DNF ▲	1.5	2	65	50					10.4	10.3	10.0	9.6	9.1	8.5	7.8	7.0	6.1	4.9	3.7																
HCS 1565 N Q ◎	1.5	2	75	65			13.5	13.2	12.8	12.3	11.6	10.5	8.6	5.5																					
HCS 1575 N Q	1.5	2	75	75		16.3	15.2	14.3	13.5	12.5	11.0	8.3	5.0																						
HCS 15100 N Q	1.5	2	100	100		15.4	13.2	10.7	7.5	3.2																									
HCS 2250 H ◎	2.2	3	65	50												6.1	6.1	6.0	6.0	5.9	5.8	5.5	5.1	4.5	3.7	2.8									
HCS 3750 H	3.7	5	65	50																				6.2	6.2	6.1	6.1	6.0	5.8	5.4	4.4	2.8			
HCS 4 ◎	3.7	5	65	50										11.6	11.5	11.4	11.3	11.2	11.1	10.8	10.5	10.1	9.5	8.8	7.8									
HCS 6 ₦	3.7	5	75	65							16.9	16.6	16.3	16.0	15.5	15.1	14.5	13.8	13.0	11.9	10.4	8.3													
HCS 12 ₦	2.2	3	75	65				17.4	16.7	15.9	15.1	14.2	13.1	11.9	10.5	8.9	7.0																		

Performance confirming to IS : 9079 and 996

✉ - Against batch order

◎ - STH series are also available

₦ - STH only available

▲ - ISI marked set

PRODUCT TYPE KEY

H C S 15 50 N - High speed Capacitor start Single phase Monobloc (15 - Power code, 50 - Del. size) Ninety frame

H C S 15 50 D N F - High speed Capacitor start Single phase Monobloc (15 - Power code, 50 - Del. size) - Discharge - Ninety frame Flange

PERFORMANCE CHART

TARO "HCS-R SERIES" - SINGLE PHASE CAPACITOR START & RUN HIGH SPEED CENTRIFUGAL MONOBLOCS

Approximate performance values of HCS-R series at 200 V (-15% to +6%), 2900 rpm, 50 Hz AC power supply

Model Name	Motor Rating		Pipe Size (mm)			TOTAL HEAD VALUES																												
					Metres	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30	32
	kW	HP	Suc.	Del.	Feets	10	13	16	20	23	26	30	33	36	39	43	46	49	52	56	59	62	66	69	72	75	79	82	85	89	92	98	105	
HCS 3025 R ♦⅄	0.37	0.5	25	25	DISCHARGE VALUES IN L/M					93.6	91.2	88.2	85.8	82.2	78.0	73.2	66.0	55.8	40.8																
HCS 4025 R	0.37	0.5	25	25											87.0	81.0	75.0	68.4	60.0	51.0	38.4	20												
HCS 5525 R ⅄	0.55	0.75	25	25											93.6	91.2	88.2	86.4	81.6	78.6	74.4	70.2	65.4	60.0	52.8	42.6	30.0							
HCS 7025 R ⅄	0.75	1	40	40														98.0	95.0	91.8	88.8	85.8	82.8	79.2	76.2	72.6	68.4	64.2	60.0	54.0	49.8	37.2	
HCS 7030 R ⅄	0.75	1	40	40											218	209	199	187	170	145	114	83	52											
HCS 7040 R	0.75	1	40	40								377	356	332	305	271	228	174															
HCS 7050 HRQ ♦	0.75	1	50	50								356	339	322	301	275	246	212	170	117													
HCS 7050 R@Q☼/◎	0.75	1	50	50					430	410	381	330	256	137																			
HCS 7075 R	0.75	1	75	75		600	584	595	534	490	420	322																					

TEXMO "HCS-R SERIES" - SINGLE PHASE CAPACITOR START & RUN HIGH SPEED CENTRIFUGAL MONOBLOCS

Approximate performance values of HCS-R series at 200 V (-15% to +6%), 2900 rpm, 50 Hz AC power supply

Model Name	Motor Rating		Pipe Size (mm)			TOTAL HEAD VALUES																												
					Metres	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30	32
	kW	HP	Suc.	Del.	Feet	10	13	16	20	23	26	30	33	36	39	43	46	49	52	56	59	62	66	69	72	75	79	82	85	89	92	98	105	
HCS 8040 R	1.1	1.5	50	40	DISCHARGE VALUES IN L/S							6.0	5.7	5.3	4.9	4.4	3.8	3.2	2.5																
HCS 8050 RF	1.1	1.5	65	50					8.2	7.7	7.2	6.5	5.7	4.7	3.5	1.8																	
HCS 1175 SR	1.1	2.0	75	75					12.8	11.7	10.5	9.1	7.5	5.6	2.7																		
HCS 1565 NR ₦	1.5	2.0	75	65				16.8	16.1	15.4	14.6	13.9	12.9	11.8	10.4	8.5	6.2	2.8																
HCS 1575 NR ◎	1.5	2	75	75					14.2	13.7	13.1	12.2	10.9	9.0	6.5	3.3																	

Performance confirming to IS : 9079 and 996

♦ - Extension shaft also available

@ - 'F series' with higher size suction flange

☼/◎ - SCH & STH series also available

₦ - STH only available

⅄ - ISI marked sets

PRODUCT TYPE KEY

H C S 70 40 R - High speed Capacitor start Single phase Monobloc (70 - Power code, 40 - Del. size) R - Standard

H C S 70 50 H R Q - High speed Capacitor start Single phase Monobloc (70 - Power code, 50 - Del. size) - High head, R - Standard, Q - Square flange

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