



DURA CORE™



FEATURING
GORE Magnet Wire

Rugged and Reliable

Motors Designed for Extreme Environments

DOWNHOLE DURABILITY. SURFACE CONFIDENCE.

Introducing DuraCORE™ featuring GORE Magnet Wire

The Reliable Choice for Harsh Environments

From spud to TD, downhole environments punish every component in the BHA. In HPHT wells, where bottomhole temps (200 C or 400 F) push 260°C (500°F) and pressures hit 30,000 psi, conventional motors fail fast. DuraCORE is purpose-built to thrive in those conditions (add GORE Magnet Wire specs).

Engineered for HFTO and stick-slip resilience, DuraCORE shrugs off 20 G lateral and axial vibration at 2,000 Hz while withstanding bit bounce and half-sine shocks up to 500 G's. Every joint, winding, and seal is qualified for the full survivability envelope through rigorous downhole simulation — the same standards used for MWD and LWD tools.

Whether you're drilling into tight formations or running extended-reach laterals, DuraCORE's run-life keeps your rig time productive and your wellbore integrity intact. Pull and inspect after weeks in hole, and you'll find it ready to go back in.



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Windings has been designing, engineering, and manufacturing custom electromagnetic solutions for some of the harshest, and most demanding environmental conditions for over 60 years.



Figure 1: DynaQual's Pressure Vessel

DuraCORE Proven by Test Results

DuraCORE Series Motors were rigorously tested through DynaQual Labs in Houston, TX. Following tests under the simulated severe service conditions DynaQual concluded that all the DuraCORE motors tested showed no signs of defects, flooding, implosion, or failure. The test units were returned to our facilities in New Ulm where they underwent further analysis and evaluation. All parts were found to be fully functional and meeting all product specifications.

Results

- Winding Temperature Rated Up to **260° C**
- Pressure Operated up to **30,000 psi**
- **Shock** tested and passed at **500G's**
- **Vibration** tested and passed at **20G's** at **2,000Hz**

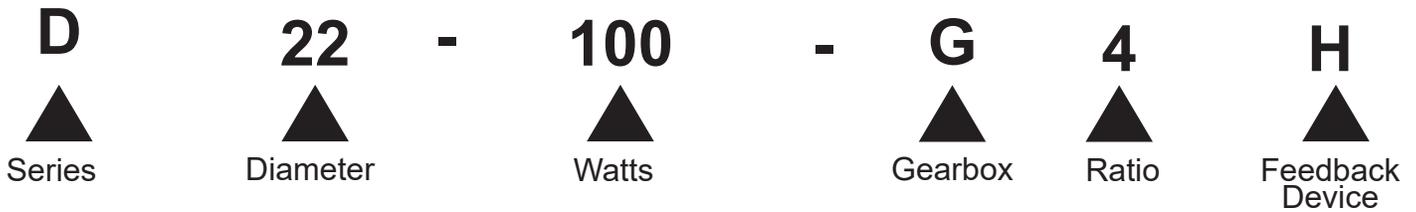
Resistant

- Resistance to hydrolysis & corrosive chemicals

Reliable

- Passed DynaQual's temperature, pressure, shock, and vibration testing in simulated severe service conditions while operating
- Internal analysis and evaluation following testing found all tested parts to be fully functional and meeting all product specifications
- Field tests confirm motors with GORE Magnet Wire consistently outperforms motors with regular polyimide wire

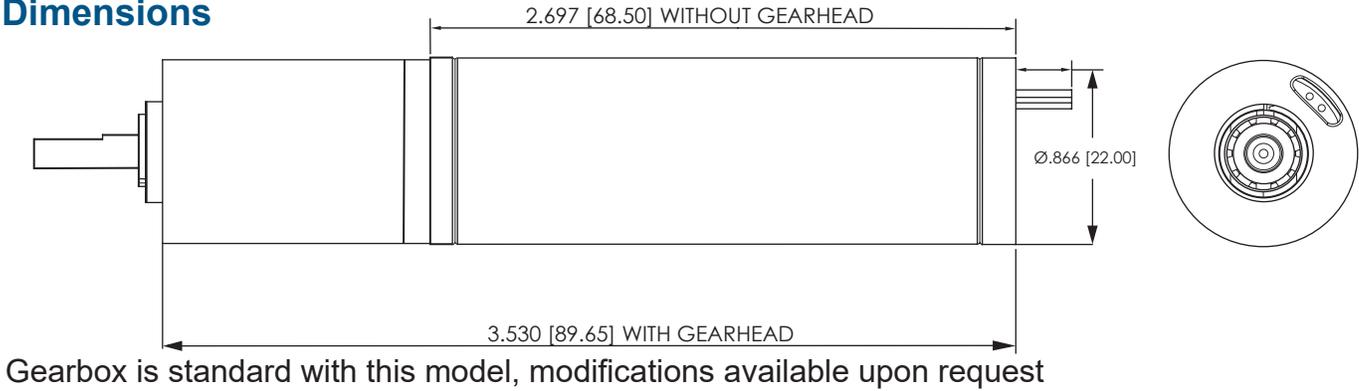
Part Number Sequence



Code	Description			
Standard Series				
D	Downhole Series Motors			
Diameters				
22	22 mm			
32	32 mm			
42	42 mm			
65	65 mm			
Power				
100	100W, Available in the D22			
500	500W, Available in the D32			
800	800W, Available in the D42			
2400	2400W, Available in the D65			
Gearbox Option				
G	The G indicates that the product is equipped with a gearbox			
Gearbox Ratios				
Available Ratios	D22	D32	D42	D65
3.5			X	X
4	X			
12.08				
12.25			X	X
16	X	X		
49			X	X
64	X	X		
256		X		
Feedback Device				
H	H Indicates the option to add a Hall Sensor			
R	R Indicates the option to add a Resolver			

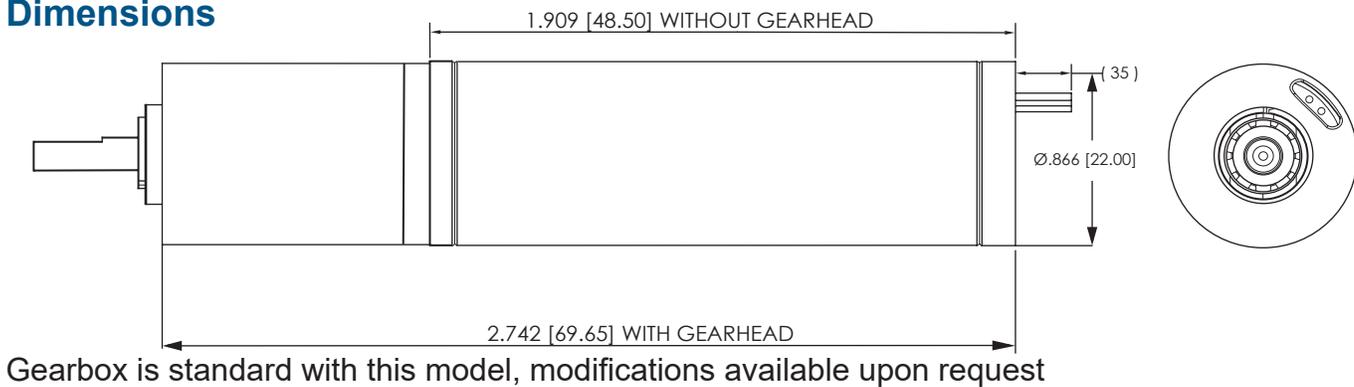
D22-100

Dimensions



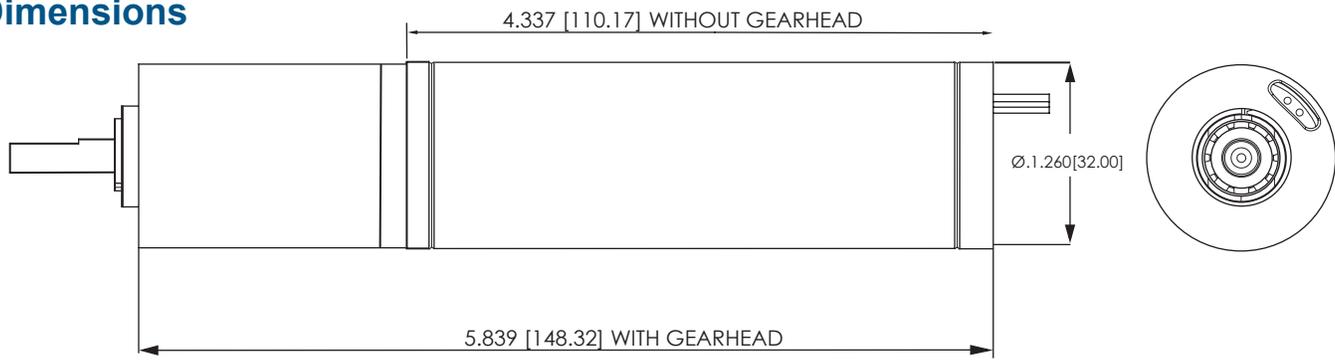
D22-40

Dimensions



D32-500

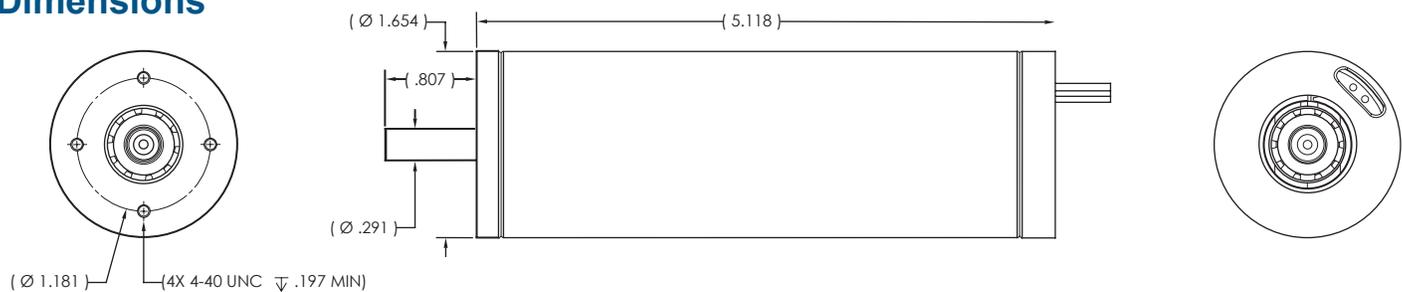
Dimensions



Gearbox is standard with this model, modifications available upon request

D42-800

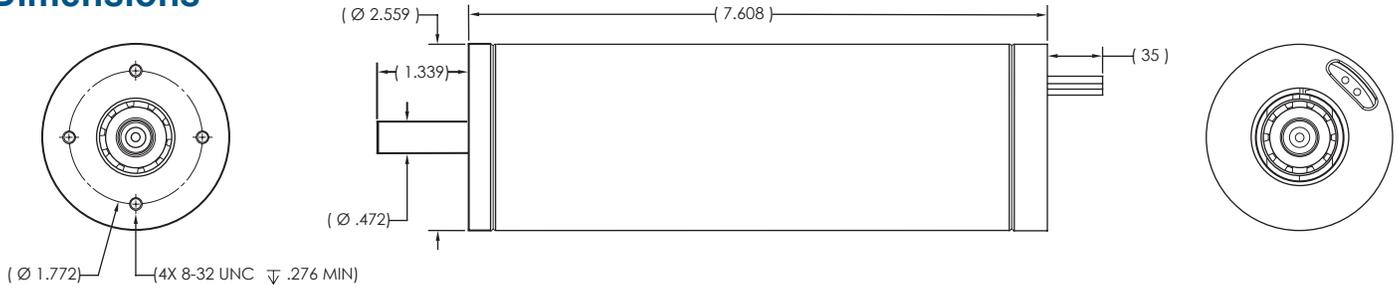
Dimensions



Dimensions in inches. Modifications available upon request

D65-2400

Dimensions



Modifications available upon request

Nominal Specifications

Size	Power	Torque	Speed	Voltage
<i>Diameter (\varnothing)</i>	<i>Watts (W)</i>	<i>Newton Meters (Nm)</i>	<i>Revolutions per Minute (RPM)</i>	<i>Volts (V)</i>
D22	100	0.1	10,000	48
D32	500	0.41	12,000	48
D42	800	1	7,800	300
D65	2400	4.5	5,500	400

Speed torque curves and further data available upon request. Please contact us for more details.

DURACORE™



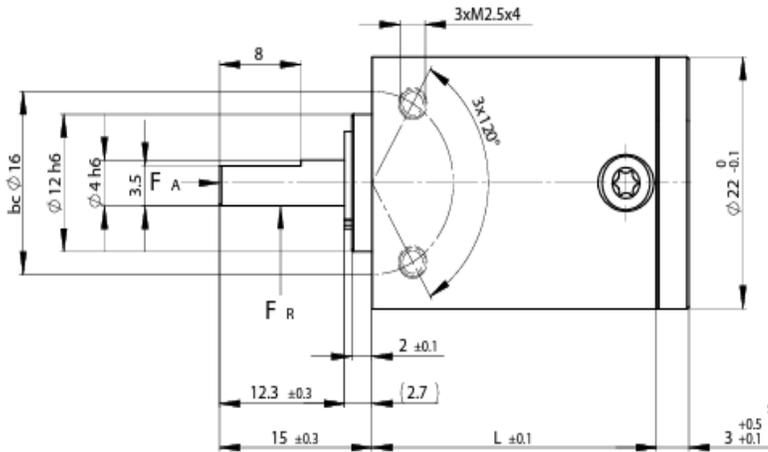
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Gearbox & Feedback Device Details

For Reference Purposes

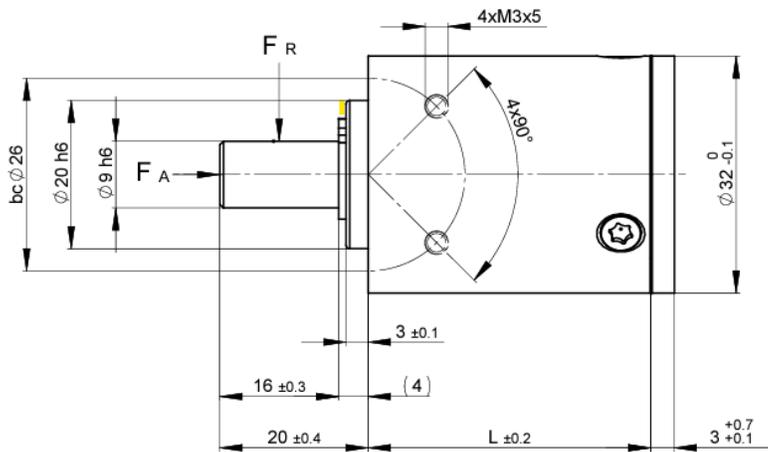


Recommended Gearbox for D22-100 & 40



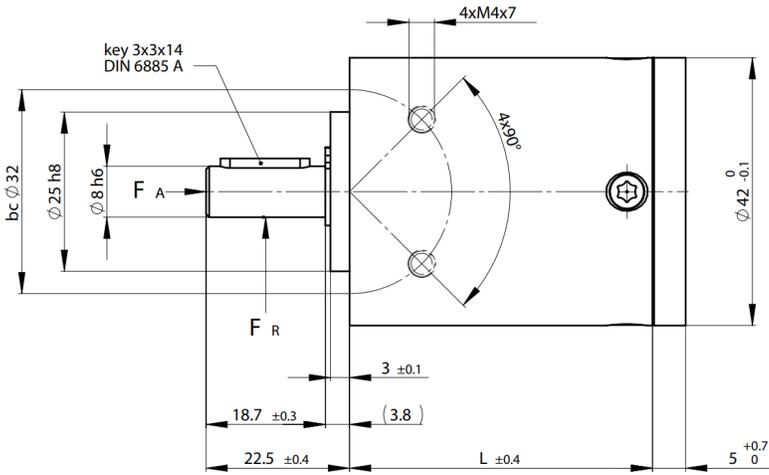
	Stage 1	Stage 2	Stage 3
Ratio $i:1$	4	16	64
L (mm)	21	28	35

Recommended Gearbox for D32-500



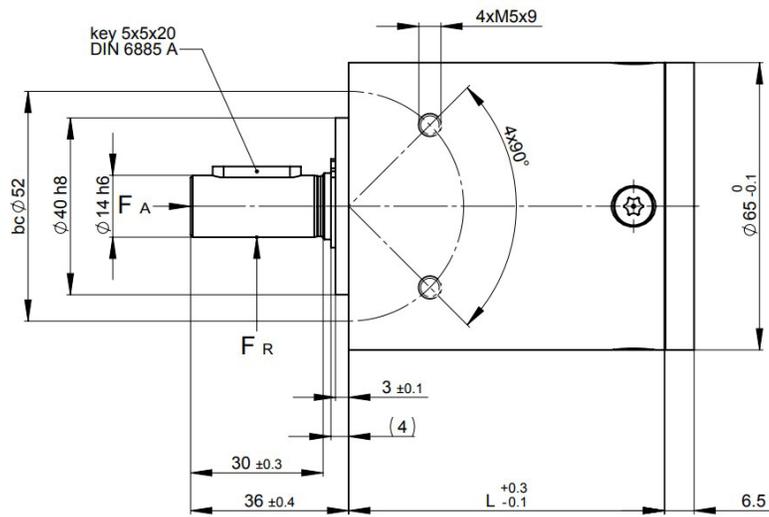
	Stage 1	Stage 2	Stage 3
Ratio $i:1$	16	64	256
L (mm)	29	38	47

Recommended Gearbox for D42-800



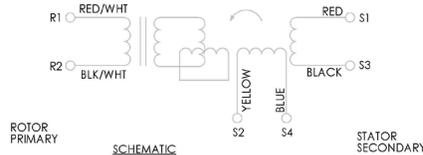
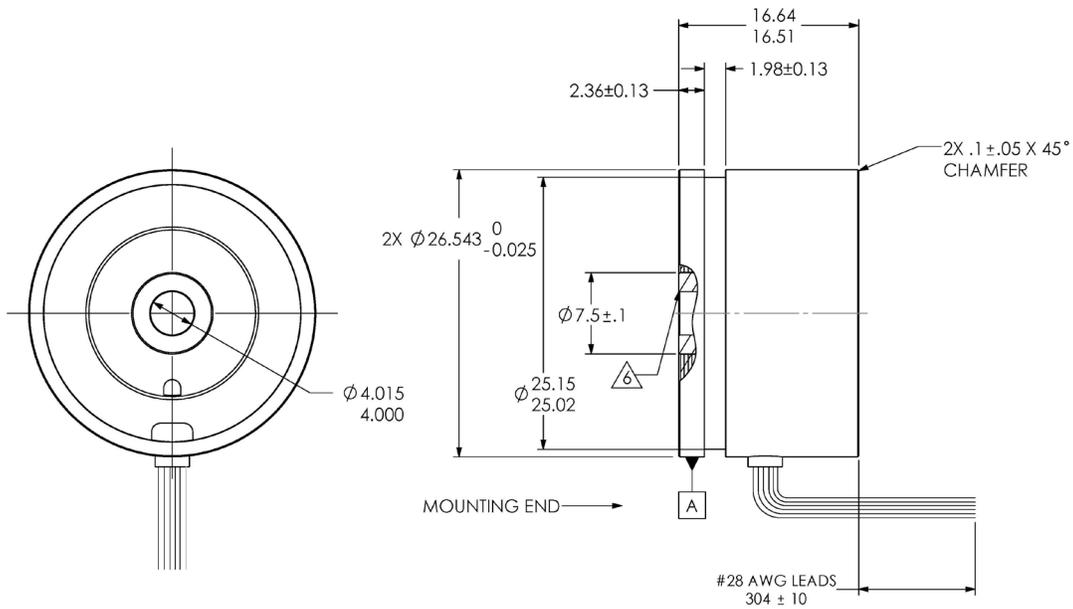
	Stage 1	Stage 2	Stage 3
Ratio i:1	3.5	25	49
L (mm)	35	47.5	60

Recommended Gearbox for D65-2400



	Stage 1	Stage 2	Stage 3
Ratio i:1	3.5	25	49
L (mm)	53.5	71.5	89.5

R - Resolver



ELECTRICAL & MECHANICAL DATA AT 25°C		
VALUES ARE REFERENCE UNLESS OTHERWISE TOLERANCED		
HIPOT TESTING PERFORMED AT 60HZ, 4 SECOND DURATION		
ELEC CYC / MECH CYC	deg/deg	1
EXCITATION FREQUENCY	±1% kHz	10
INPUT VOLTAGE	±5% Vrms	7.0
INPUT CURRENT	Max. mAms	32
INPUT POWER	Watts	.10
IMPEDANCE [ZRO]	Ohms	255
IMPEDANCE [ZRS]	Ohms	220
IMPEDANCE [ZSO]	Ohms	520
IMPEDANCE [ZSS]	Ohms	455
TRANSFORMATION RATIO	±10%	.5
DC RESISTANCE (R1-R2)	±15% Ohms	55.5
DC RESISTANCE (S1-S3, S2-S4)	±15% Ohms	74.5
ERROR	Max. arcminutes	±20
PHASE SHIFT, OPEN CIRCUIT	degrees	-2
NULL VOLTAGE	Max. mVrms	20
HIPOT, LEADS TO CASE, 500VAC	Max. mAms	2
HIPOT, INTERPHASE, 250VAC	Max. mAms	2
TEMPERATURE RANGE	°C	-55 TO +204
WEIGHT	oz	1.3
CONTINUOUS SPEED	Max. KRPM	20

PHASING EQUATION

INCREASING ANGLE
FOR CCW ROTATION AS VIEWED
FROM MOUNTING END

$$E (S1-S3) = KE (R1-R2) \cos \phi$$

$$E (S2-S4) = KE (R1-R2) \sin \phi$$

NOTES:

1. MATCHED SET - DO NOT ISSUE SEPARATELY.
2. ROTOR AND STATOR TO BE MOUNTED AXIALLY FLUSH ± .1.
3. CUSTOMER MUST MAINTAIN SHAFT RUNOUT WITH RESPECT TO DATUM 'A' WITHIN .076 T.I.R.
4. COIL COVERS ARE NOT RATED TO 204° C.
5. HOUSING AND ROTOR SLEEVE MATERIAL: TYPE 17-4PH STAINLESS STEEL.

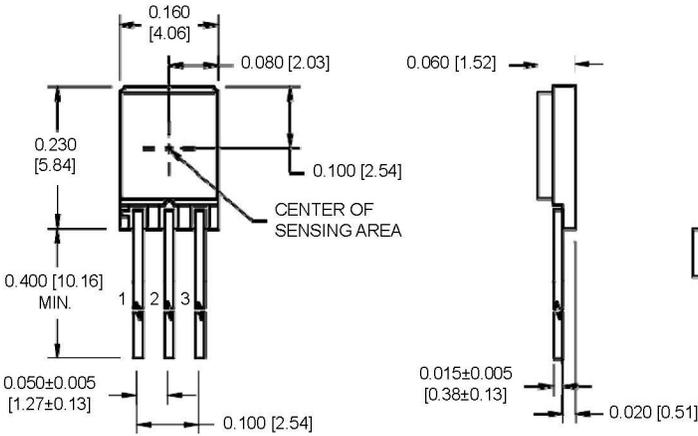
Δ .1 ± .05 X 45° CHAMFER BOTH ENDS OF ROTOR.

H - Hall Sensor

ABSOLUTE MAXIMUM RATINGS

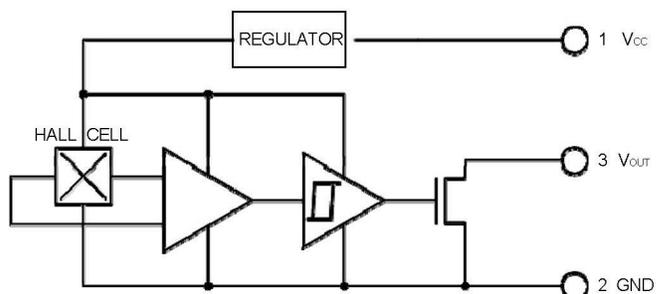
Supply Voltage Range.....	V to 20.0 V
Supply Current (Fault).....	50 mA.
Power Dissipation, @ T _A = 25°C (P _D).....	500 mW
Magnetic Flux Density.....	Unlimited
Output ON Current (I _{SINK}).....	25mA
Storage Temperature.....	-65°C to +200°C
Operating Free-Air Temperature Range.....	-55°C to +200°C
Lead temperature (10 seconds, 1/16" from case).....	+260°C

Package Dimensions



TOLERANCE: ±0.010 [±0.25] UNLESS OTHERWISE SPECIFIED
 ALL DIMENSIONS ARE IN INCHES [MILLIMETERS]

Schematic Diagram



ELECTRICAL CHARACTERISTICS

T_A = 25°C, V_{CC} = 5V unless otherwise specified.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Supply Current	I _{CC}	1.5	2.5	7.0	mA	V _{CC} =15V; B < B _{OP}
Saturation Voltage	V _{OL}			0.4	V	I _{OUT} = 20 mA, B > B _{OP}
Output Leakage	I _{OFF}		0.01	5	µA	B < B _{OP} , V _{OUT} =15V
Output Rise Time	T _r		100	200	ns	V _{CC} = 12V, R _L = 820 Ω, C _L = 20 pF
Output Fall Time	T _f		180	350	ns	V _{CC} = 12V, R _L = 820 Ω, C _L = 20 pF

MAGNETIC CHARACTERISTICS

T_a = 25°C, V_{CC} = 5V

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Operate Point	B _{OP}	10	75	150	Gauss	V _{CC} = 5 V, R _L = 1 KΩ
Release Point	B _{RP}	-100	-50	-10	Gauss	V _{CC} = 5 V, R _L = 1 KΩ
Hysteresis	B _{HYS}	70	100	120	Gauss	V _{CC} = 5 V, R _L = 1 KΩ



INQUIRE ABOUT CUSTOM MOTORS UTILIZING GORE Magnet Wire



For further information, please contact us!

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