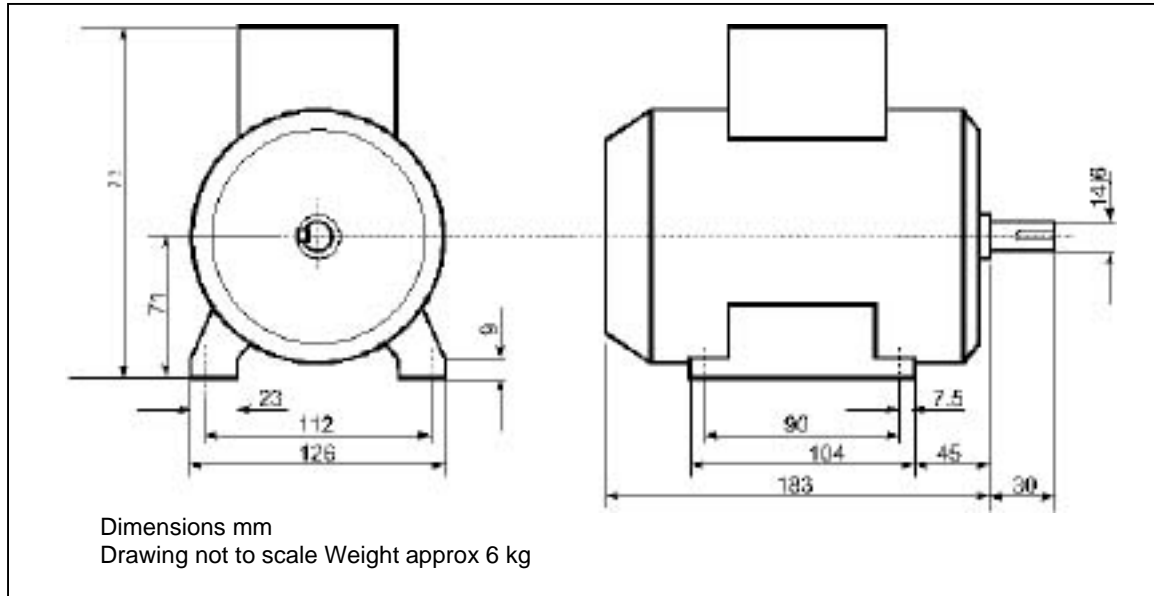




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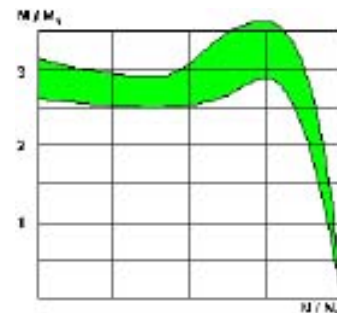
ASYNCHRONOUS MOTOR - Sieber FOR EVALUATION WITH MCK24x/24xx/28x or IMDM15/ISDM15

Specifications



Specifications		Δ connection
Rated Power at 50 Hz	W	370
Rated Torque	Nm	1.3
Rated Speed	rpm	2820
Rated Current (230 V)	A	1.7
Starting Current	A	4.56
Power Factor	cos φ	0.83
Efficiency	%	71
Starting Torque	Nm	3.9
Maximum Torque	Nm	4.55
Rotor Inertia	kgm ²	3.5×10^{-4}
Nr. of pole pairs	-	1
Statoric phase resistance	Ohms	24.6
Rotoric phase resistance	Ohms	16.1
Magnetising inductance	H	1.46
Electrical time constant	s	1.62×10^{-3}

This asynchronous motor is intended to assist your design and test asynchronous motor control algorithms. It complements the ACPM750 3-phase inverter and the MCK24x/MCK24xx/MCK28x or the IMDM15/ISDM15 intelligent power amplifiers based on the TMS320F240/243/2406/2408 or TMS320LC2812 DSP controllers from Texas Instruments. The motor is provided with an incremental encoder for position / speed control.

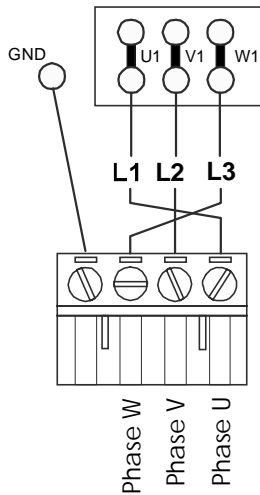


The motor is supplied only with the purchase of a Technosoft Professional Development kit!

Specification subject to change without prior notice



Motor Connections



The motor is a dual voltage three phase type
 Δ - 230VAC
 Y - 380VAC

To connect to the ACPM750 power module (230VAC), use the shown D connection.

Connection table

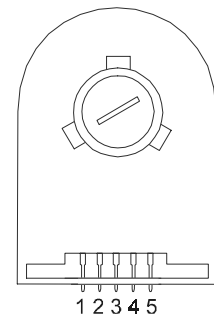
Motor wire	ACPM750 Connector J11	IMDM15 / ISDM15 Connector J14
Phase U	Pin 3	Pin 5
Phase V	Pin 2	Pin 6
Phase W	Pin 1	Pin 7
Earth	Pin 4	Pin 8

Encoder

Encoder - Type HEDS5640		
Resolution	lines	500
Output type	channels	2, quadrature
Supply voltage	V	5V +/- 10%
Supply current	mA	17 to 40
Output (TTL compatible)	mA	3.8

Encoder Connection

Function	J4 connector on ACPM750	J18 connector on IMDM15 / ISDM15
1 GROUND	Pin 1	Pin 1
2 NC/Z	Pin 2	NC
3 Channel A	Pin 3	Pin 6
4 Vcc	Pin 4	Pin 2, Pin 4
5 Channel B	Pin 5	Pin 8



Notes:

1. For all the kits except the MCK240 (see note 2 below), connect the encoder cable to the connector J4 of the ACPM750 inverter, respectively to the J18 connector of the IMDM15 drive.
2. For MCK240 kits, connect the encoder cable to the encoder connector of the DSP module.



Two Channel Optical Encoder HEDS-5640

Features

- Two Channel Quadrature Output with Optional Index Pulse
- No Signal Adjustment Required
- 40°C to 100°C Operating Temperature
- TTL Compatible
- Single 5 V Supply

Description

The encoder assembled on the motor is the HEDS-5640, a high performance, low cost, two and three channel optical incremental encoders. These encoders emphasize high

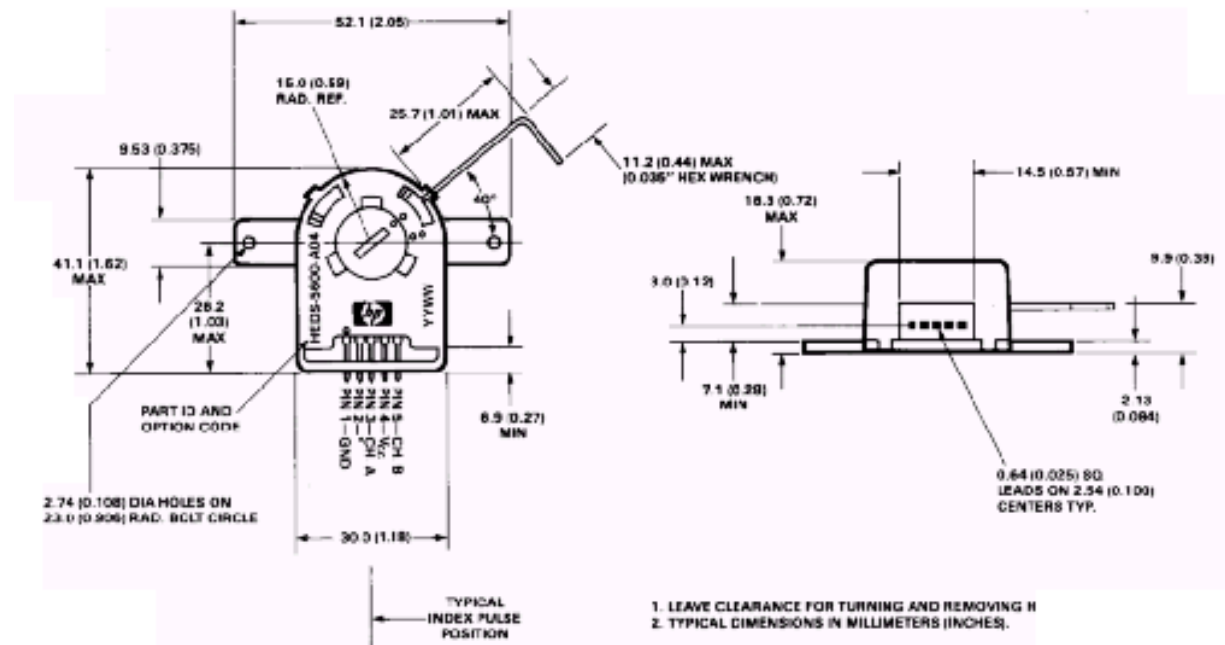
reliability, high resolution, and easy assembly.

Each encoder contains a lenses LED source, an integrated circuit with detectors and output circuitry, and a code wheel that rotates between the emitter and detector IC. The outputs of the HEDS-5500/5600 are two square waves in quadrature. The HEDS-5540 and 5640 have a third channel index output in addition to the two-quadrature channels. This index output is a 90 electrical degree, high true index pulse, which is generated once for each full rotation of the code wheel. The HEDS series utilizes

metal code wheels, while the HEDM series utilizes a film code wheel allowing for resolutions to 1024 CPR. The HEDM series is not available with a third channel index. These encoders may be quickly and easily mounted to a motor. For larger diameter motors, the HEDS-5600/5640 uses external mounting ears. The quadrature signals and the index pulse are accessed through five 0.025-inch square pins located on 0.1-inch centers.

Dimensions

HEDS-5600/5640



*Note: For the HEDS-5600 and HEDM-5600, Pin #2 is a No Connect. For the HEDS-5640, Pin #2 is CH. I, the index output.



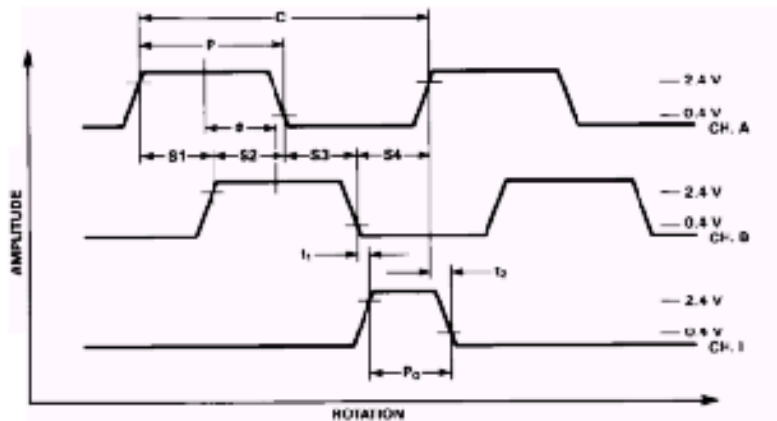
Absolute Maximum Ratings

Parameter	HEDS-55XX/56XX	HEDM-550X/560X
Storage Temperature, T_S	-40°C to 100°C	-40°C to +70°C
Operating Temperature, T_A	-40°C to 100°C	-40°C to +70°C
Supply Voltage, V_{CC}	-0.5 V to 7 V	-0.5 V to 7 V
Output Voltage, V_O	-0.5 V to V_{CC}	-0.5 V to V_{CC}
Output Current per Channel, I_{OUT}	-1.0 mA to 5 mA	-1.0 mA to 5 mA
Vibration	20 g, 5 to 1000 Hz	20 g, 5 to 1000 Hz
Shaft Axial Play	± 0.25 mm (± 0.010 in.)	± 0.175 mm (± 0.007 in.)
Shaft Eccentricity Plus Radial Play	0.1 mm (0.004 in.) TIR	0.04 mm (0.0015 in.) TIR
Velocity	30,000 RPM	30,000 RPM
Acceleration	250,000 rad/sec ²	250,000 rad/sec ²

Output Waveforms

Direction of Rotation: When the code wheel rotates in the counter-clockwise direction (as viewed from the encoder end of the motor), channel A will lead channel B. If the code wheel rotates in the clockwise direction, channel B will lead channel A. **Index Pulse Width (P_0):** The number of electrical degrees that an index output is high during one full shaft rotation. This value is nominally 90° or 1/4 cycle.

Output Waveforms



Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Temperature HEDS Series	T_A	-40		100	°C	
Temperature HEDM Series	T_A	-40		70	°C	non-condensing atmosphere
Supply Voltage	V_{CC}	4.5	5.0	5.5	Volts	Ripple < 100 mV _{p-p}
Load Capacitance	C_L			100	pF	2.7 kΩ pull-up
Count Frequency	f			100	kHz	Velocity (rpm) x N/60
Shaft Perpendicularity Plus Axial Play (HEDS Series)				± 0.25 (± 0.010)	mm (in.)	6.9 mm (0.27 in.) from mounting surface
Shaft Eccentricity Plus Radial Play (HEDS Series)				0.04 (0.0015)	mm (in.) TIR	6.9 mm (0.27 in.) from mounting surface
Shaft Perpendicularity Plus Axial Play (HEDM Series)				± 0.175 (± 0.007)	mm (in.)	6.9 mm (0.27 in.) from mounting surface
Shaft Eccentricity Plus Radial Play (HEDM Series)				0.04 (0.0015)	mm (in.) TIR	6.9 mm (0.27 in.) from mounting surface

Note: The module performance is guaranteed to 100 kHz but can operate at higher frequencies. 2.7 kΩ pull-up resistors required for HEDS-5540 and 5640.



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Encoding Characteristics

Encoding Characteristics over Recommended Operating Range and Recommended Mounting Tolerances unless otherwise specified. Values are for the worst error over the full rotation.

Part No.	Description	Sym.	Min.	Typ.*	Max.	Units	
HEDS-5500 HEDS-5600 (Two Channel)	Pulse Width Error	ΔP		7	45	$^{\circ}e$	
	Logic State Width Error	ΔS		5	45	$^{\circ}e$	
	Phase Error	$\Delta \phi$		2	20	$^{\circ}e$	
	Position Error	$\Delta \Theta$		10	40	min. of arc	
	Cycle Error	ΔC		3	5.5	$^{\circ}e$	
HEDM-5500 HEDM-5600 (Two Channel)	Pulse Width Error	ΔP		10	45	$^{\circ}e$	
	Logic State Width Error	ΔS		10	45	$^{\circ}e$	
	Phase Error	$\Delta \phi$		2	15	$^{\circ}e$	
	Position Error	$\Delta \Theta$		10	40	min. of arc	
	Cycle Error	ΔC		3	7.5	$^{\circ}e$	
HEDS-5540 HEDS-5640 (Three Channel)	Pulse Width Error	ΔP		5	35	$^{\circ}e$	
	Logic State Width Error	ΔS		5	35	$^{\circ}e$	
	Phase Error	$\Delta \phi$		2	15	$^{\circ}e$	
	Position Error	$\Delta \Theta$		10	40	min. of arc	
	Cycle Error	ΔC		3	5.5	$^{\circ}e$	
	Index Pulse Width	P_0	55	90	125	$^{\circ}e$	
	CH. I rise after CH. A or CH. B fall	-25°C to +100°C -40°C to +100°C	t_1 t_1	10 -300	100 100	250 250	ns ns
	CH. I fall after CH. B or CH. A rise	-25°C to +100°C -40°C to +100°C	t_2 t_2	70 70	150 150	300 1000	ns ns

Note: See Mechanical Characteristics for mounting tolerances.

*Typical values specified at $V_{CC} = 5.0$ V and 25°C.

Electrical Characteristics

Part No.	Parameter	Sym.	Min.	Typ.*	Max.	Units	Notes
HEDS-5500 HEDS-5600	Supply Current	I_{CC}		17	40	mA	
	High Level Output Voltage	V_{OH}	2.4			V	$I_{OH} = -40$ μ A max.
	Low Level Output Voltage	V_{OL}			0.4	V	$I_{OL} = 3.2$ mA
	Rise Time Fall Time	t_r t_f			200 50	ns ns	$C_L = 25$ pF $R_L = 11$ k Ω pull-up
HEDS-5540 HEDS-5640 HEDM-5500 HEDM-5600	Supply Current	I_{CC}	30	57	85	mA	
	High Level Output Voltage	V_{OH}	2.4			V	$I_{OH} = -200$ μ A max.
	Low Level Output Voltage	V_{OL}			0.4	V	$I_{OL} = 3.86$ mA
	Rise Time Fall Time	t_r t_f			180 40	ns ns	$C_L = 25$ pF $R_L = 2.7$ k Ω pull-up
HEDM-5500 HEDM-5600	Supply Current	I_{CC}	30	57	85	mA	
	High Level Output Voltage	V_{OH}	2.4			V	$I_{OH} = -40$ μ A max.
	Low Level Output Voltage	V_{OL}			0.4	V	$I_{OL} = 3.86$ mA
	Rise Time Fall Time	t_r t_f			180 40	ns ns	$C_L = 25$ pF $R_L = 3.2$ k Ω pull-up

Electrical Characteristics over Recommended Operating Range.

*Typical values specified at $V_{CC} = 5.0$ V and 25°C.