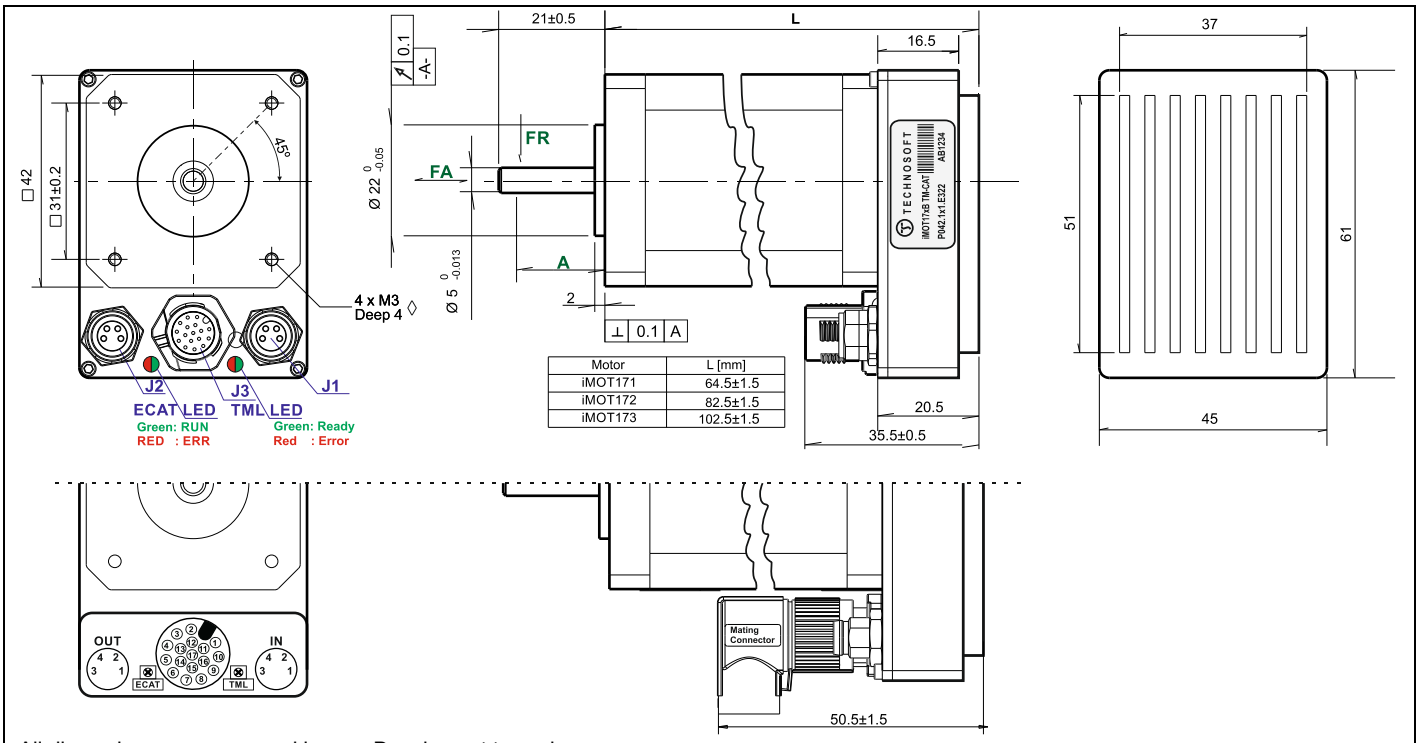


Motor	L [mm]
iMOT171	64.5±1.5
iMOT172	82.5±1.5
iMOT173	102.5±1.5

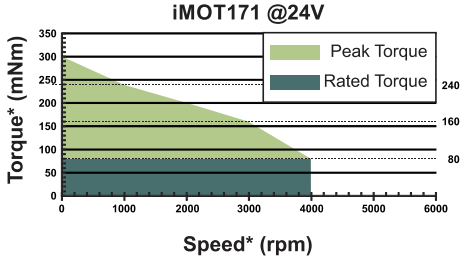
All dimensions are expressed in mm; Drawing not to scale.
◊ Use the front plate (with 4x M3x4 threaded holes) for earth connection.
Represented mating connector corresponds with J3 from the Mating cables section.

Features

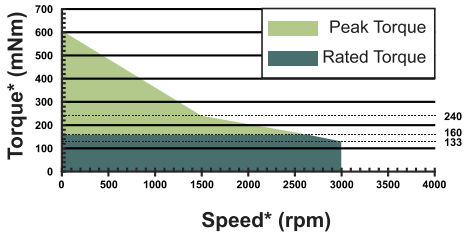
- Fully digital intelligent brushless servo motor with embedded motion controller, drive and absolute position sensor
- Available in 3 motor lengths, offering 80, 160 and 240 mNm of continuous torque
- Motor supply: 12-48V; Logic supply 15-36V
- Cost effective positioning system, due to compactness and elimination of motor wiring
- Advanced motion control capabilities (PVT, S-curve, electronic cam)
- Motion programming via TML (Technosoft Motion Language) or motion libraries for Visual C / VB / LabVIEW / Linux and PLC
- Standalone operation with stored motion sequences
- Communication:
  - RS-232 serial communication for drive commissioning
  - Dual 100Mbps EtherCAT® ports that supports CAN application protocol over EtherCAT® (CoE) in conformance with CiA 402 device profile.
- Digital and analogue I/Os:
  - 4 digital programmable inputs, 5-24V, PNP/NPN
  - 2 digital outputs, 24V/TTL, NPN/0.5A
  - 1 analogue input: 12 bits resolution, 0-5V
- Feedback device:
  - Absolute single-turn position sensor offering a resolution of 4096 counts / revolution
- Protections:
  - Over-current, over-temperature, short circuit
  - Over and undervoltage, i2t, control error
- 16 h/w addresses selectable by hex switch
- 2.5K × 16 SRAM for data acquisition
- 4K × 16 E^2ROM for TML motion programs and data storage

Torque – Speed characteristic

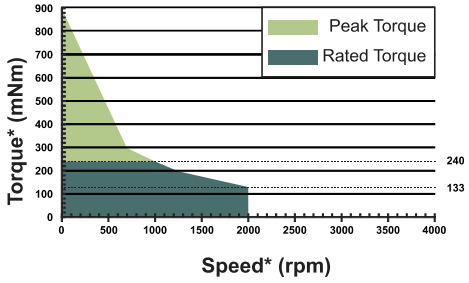
iMOT171 @24V



iMOT172 @24V



iMOT173 @24V



*All values are ±10%

Mating Cables

Connector	Producer	Part No.	Description	Image
J1&J2	Murr Elektronik	7000-89771	Motor-to-motor, 4 pin male to male	
	Murr Elektronik	7000-08821	Motor-to-wire, 4 pin male	
	Murr Elektronik	7000-89781	Motor-to-RJ45, 4 pin male to 8 pin RJ45	
J3	Phoenix Contact	SAC-17P-1,5-35T/FR SH SCO - 1430323	Motor to wire (female) shielded cable, 90º angled, 17 pins	

Connector J1&J2 Description

Pin	Name	Description
1	Rx/Tx+	Receive/Transmit Positive Corresponds to pin 3 on RJ45/8P8C Ethernet plug
2	Tx/Rx+	Transmit/ Receive Positive Corresponds to pin 1 on RJ45/8P8C Ethernet plug
3	Tx/Rx-	Receive/Transmit Positive Corresponds to pin 2 on RJ45/8P8C Ethernet plug
4	Rx/Tx-	Receive/Transmit Negative Corresponds to pin 6 on RJ45/8P8C Ethernet plug
SHIELD	Earth	Connected to motor chassis Galvanically isolated from GND, up to 200VDC isolation Capacitively coupled to GND for EMC shielding, with discharge resistor

Connector J3 Description

Pin	Name	Type	Description
1	GND	-	Return ground. Internally connected to all GND pins.
2	$+V_{MOT}$	I	Positive terminal of the motor supply: 12 to 48V_{DC}. Internally connected to all $+V_{MOT}$ pins.
3	$+V_{MOT}$	I	Positive terminal of the motor supply: 12 to 48V_{DC}. Internally connected to all $+V_{MOT}$ pins.
4	OUT0	O	5-36V 0.5A, general-purpose digital output, NPN open-collector/TTL pull-up
5	OUT1	-	5-36V 0.5A, general-purpose digital output, NPN open-collector/TTL pull-up
6	IN3/LSN	I	5-36V digital PNP/NPN input. Negative limit switch input
7	IN2/LSP	I	5-36V digital PNP/NPN input. Positive limit switch input
8	Enable	I	5-36V digital PNP/NPN input. Enable input
9	$+V_{LOG}$	I	Positive terminal of the motor supply: 15 to 36V_{DC}.
10	GND	-	Return ground. Internally connected to all GND pins.
11	GND	-	Return ground. Internally connected to all GND pins.
12	$+V_{MOT}$	I	Positive terminal of the motor supply: 12 to 48V_{DC}. Internally connected to all $+V_{MOT}$ pins.
13	232TX	O	RS-232 Data Transmission
14	232RX	I	RS-232 Data Reception
15	IN0	I	5-36V general-purpose digital PNP/NPN input
16	ANLG	I	Analogue input, 12-bit, 0-5V. Used to read an analogue position/speed reference or feedback , or used as general purpose analogue input
17	GND	-	Return ground. Internally connected to all GND pins.

LED indicators

LED name	Color	Description
TML LED	green	Motor Ready. Lit after power-on when the drive initialization ends. Turned off when an error occurs.
	red	Motor Error. Turned on when the drive detects an error condition or when Error output is set by software.
ECAT LED	green red	EtherCAT® ERROR and RUN indicators combined. Shows the state of the EtherCAT® Status Machine

Characteristics

All parameters were measured under the following conditions (unless otherwise specified):

- Tamb = 25°C, logic supply (VLOG) = 24VDC, motor supply (VMOT) =48VDC ;
- Supplies start-up / shutdown sequence: -any- ;

Motor and feedback sensor parameters		Value		Units
Rated torque	iMOT171B	80		mNm
	iMOT172B	160		
	iMOT173B	240		
Rated current	iMOT171B	2.9		A
	iMOT172B	3.1		
	iMOT173B	3.6		
Peak current	iMOT171B	8.7		A
	iMOT172B	9.3		
	iMOT173B	13.6		
Absolute single-turn position feedback		4096		Bits/ rot
Rotor inertia	iMOT171B	29		gcm^2
	iMOT172B	59		
	iMOT173B	89		
Axial – Force **FA**		10		N
Distance **A**		20		mm
Radial-Force **FR**		28		N
		Axial	Radial	
Shaft play		0.08	0.02	mm
At load		4.5	4.5	N

Operating Conditions		Min.	Typ.	Max.	Units
Ambient temperature		0		+40	ºC
Ambient humidity	Non-condensing	0		90	%Rh
Altitude / pressure[1]	Altitude (vs. sea level)	-0.1	0 ÷ 2.5	[2]	km
	Ambient Pressure	0 [2]	0.75 ÷ 1	10.0	atm
Magnetic field				20	mT

Storage Conditions		Min.	Typ.	Max.	Units
Ambient temperature		-40		+105	ºC
Ambient humidity	Non-condensing	0		100	%Rh
Ambient Pressure		0		10.0	atm

Logic Supply Input ($+V_{LOG}$)			Min.	Typ.	Max.	Units
Supply voltage	Nominal values		15	24	36	V_{DC}
	Absolute maximum values, drive operating but outside guaranteed parameters		12.5		39	V_{DC}
	Absolute maximum values, surge (duration ≤ 10ms) †		0		+45	V
Supply current	No Load on Digital Outputs	$+V_{LOG}$ = 15V		120	200	mA
		$+V_{LOG}$ = 24V		70	120	
		$+V_{LOG}$ = 36V		50	100	

Motor Supply Input ($+V_{MOT}$)		Min.	Typ.	Max.	Units
Supply voltage	Nominal values	12	24	48	V_{DC}
	Absolute maximum values, continuous	-0.3		50	
	Absolute maximum values, surge (duration ≤ 8ms)	-1		55	
Supply current	Idle		1	5	mA
	Operating	-13.6	±3	+13.6	A

[1] iMOT17x TM -CAT can be operated in vacuum (no altitude restriction), but at altitudes over 2,500m, current and power rating are reduced due to thermal dissipation efficiency.

Digital Inputs (IN0, IN1, IN2/LSP, IN3/LSN, Enable)		Min.	Typ.	Max.	Units
Input voltage	Logic "LOW"		2.2	1.2	V
	Logic "HIGH"	4.8	3.8		
	Hysteresis	0.8	1.6	2.8	
	Absolute maximum, continuous	-36		+36	
	Absolute maximum, surge (duration ≤ 1s)†	-50		50	
	Floating voltage PNP (not connected)		0		
	Floating voltage NPN (not connected)		$+V_{LOG}$		
Input frequency		0		4	kHz
Minimum pulse		-1			ms
ESD protection	Human body model	±15			kV
Mode compliance	Internal 10kΩ resistor to GND	PNP			
Default state	Input floating (wiring disconnected)	Logic LOW			
Input current	Logic "LOW";			0	mA
	Logic "HIGH"; pulled to +24V		2.4	3	
	Hysteresis		0.5		
Mode compliance	Internal 10kΩ resistor to $+V_{LOG}$	NPN/ TTL / CMOS / Open-collector			
Default state	Input floating (wiring disconnected)	Logic LOW			
Input current	Logic "HIGH"			0	mA
	Logic "LOW"; pulled to GND		2.4	3	
	Hysteresis		0.5		

EARTH Connection		Min.	Typ.	Max.	Units
EARTH to GND	Galvanic isolation	-100		+100	V_{DC}
	Capacitive coupling		200		nF
	Discharge resistor		300		kΩ
EARTH connection	Location	Front plate of motor, using 4x M3x4 threaded holes			
	Connection	Required for EMC compliance and thermal dissipation			

RS-232		Min.	Typ.	Max.	Units
Compliance		TIA/EIA-232-C			
Bit rate	Software selectable	9600		115200	Baud
Short-circuit	232TX short to GND	Guaranteed			
ESD protection	Human body model	±15			kV

Analog Input (ANLG)		Min.	Typ.	Max.	Units
Input voltage	Operational range	0		5	V
	Absolute maximum values, continuous	-8		+12	
	Absolute maximum, surge (duration ≤ 1s)†			±24	
Input impedance	To 0.23V		33		kΩ
Resolution			12		bits
Integral linearity				±2	bits
Offset error			±2	±10	bits
Gain error			±1%	±3%	% FS[1]
Bandwidth (-3dB)	Software selectable	0		250	Hz
ESD protection	Human body model	±5			kV

Digital Outputs (OUT0, OUT1)			Min.	Typ.	Max.	Units
Mode compliance			TTL / CMOS / Open-collector / NPN 24V			
Default state	Not supplied ($+V_{LOG}$ floating or to GND)		High-Z (floating)			
	Normal operation	OUT0	Logic "HIGH"			
Output voltage	Logic "LOW"; output current = 0.5A			0.2	0.8	V
	Logic "HIGH"; output current = 0, no load		2.8	3	3.3	
	Logic "HIGH", external load to $+V_{LOG}$			V_{LOG}		
	Absolute maximum, continuous		-0.5		V_{LOG}+0.5	
	Absolute maximum, surge (duration ≤ 1s)†		-1		V_{LOG}+1	
Output current	Logic "LOW", sink current, continuous				0.5	A
	Logic "LOW", sink current, pulse ≤ 5 s				1	A
	Logic "HIGH", source current; external load to GND; V_{OUT} >= 2.0V				1	mA
	Logic "HIGH", leakage current; external load to $+V_{LOG}$; $V_{OUT} = V_{LOG}$ max = 36V			0.1	0.2	mA
Minimum pulse width			2			µs
ESD protection	Human body model		±15			kV

EtherCAT ports J1 and J2		Min.	Typ.	Max.	Units
Compliance		IEEE802.3, IEC61158			
Transmission line specification	According to TIA/EIA-568-5-A	Cat. 5e.UTP			
J1, J2 pinout	EtherCAT® supports MDI/MDI-X auto-crossover	TIA/EIA-568-A or TIA/EIA-568-B			
Software protocols compatibility		CoE, CiA402, IEC61800-7-301			
Node addressing		1 ÷ 255			-
MAC addressing		none			-
ESD protection	Human body model	±15			KV

Environmental Characteristics			Min.	Typ.	Max.	Units
Size (Length x Width x Height)		iMOT171B	64.5 x 61 x 45			mm
			~2.52 x 2.4 x 1.78			inch
		iMOT172B	82.5 x 61 x 45			mm
			~3.23 x 2.4 x 1.78			inch
		iMOT173B	102.5 x 61 x 45			mm
			~4.02 x 2.4 x 1.78			inch
Weight	Without mating connectors	iMOT171B	405			g
		iMOT172B	525			
		iMOT173B	730			
Cleaning agents			Only dry cleaning is recommended			
Protection degree	According to IEC60529, UL508		IP40			-

Conformity		Min.	Typ.	Max.	Units
EU Declaration		2014/30/EU (EMC), 2014/35/EU (LVD), 2011/65/EU (RoHS), 1907/2006/EC (REACH), 93/68/EEC (CE Marking Directive), EC 428/2009 (non dual-use item, output frequency limited to 590Hz)			

† Stresses beyond values listed under "absolute maximum ratings" may cause permanent damage to the device. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

[1] "FS" stands for "Full Scale"