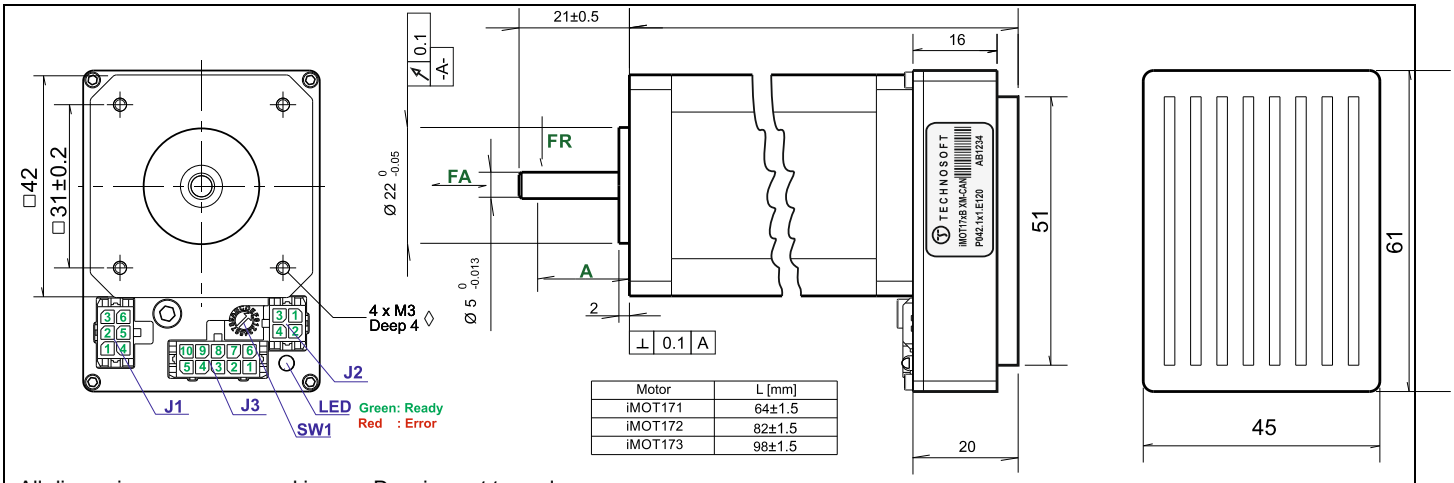


Motor	L [mm]
iMOT171	64±1.5
iMOT172	82±1.5
iMOT173	98±1.5

All dimensions are expressed in mm; Drawing not to scale.
◊ Use the front plate (with 4x M3x4 threaded holes) for earth connection.

Features

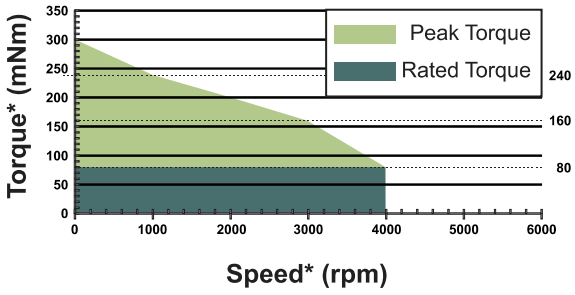
- Fully digital intelligent brushless servo motor with embedded motion controller, drive and absolute position sensor
- Available in 3 motor lengths, offering 80, 160 and 240 mNm of continuous torque
- Motor supply: 12-48V; Logic supply 12-36V
- Cost effective positioning system, due to compactness and 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:
  - TMLCAN and CANopen (CiA 301 v4.2 and CiA 402 v3.0) protocols selectable by hardware pin
- Digital and analogue I/Os:
  - 5 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^{2}ROM for TML motion programs and data storage

Mating Connectors

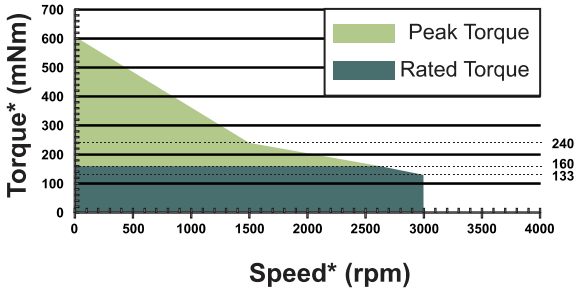
Connector	Producer	Part No.	Description	Wire Gauge
J1	MOLEX	43045-0600	MICROFIT RECEPTACLE HOUSING, 2x3 WAY	AWG 20..24
J2	MOLEX	43045-0400	MICROFIT RECEPTACLE HOUSING, 2x2 WAY	AWG 20..24
J3	MOLEX	43045-1000	MICROFIT RECEPTACLE HOUSING, 2x5 WAY	AWG 20..24
J1, J2, J3	MOLEX	43030-0007	CRIMP PIN, MICROFIT, 5A	AWG 20..24

Torque – Speed characteristic

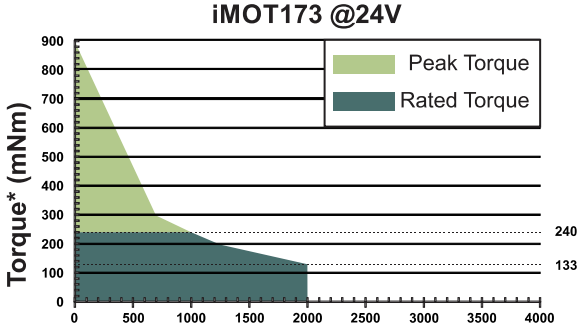
iMOT171 @24V



iMOT172 @24V



iMOT173 @24V



*All values are ±10%

Connector J1 Description			
Pin	**Name**	**Type**	**Description**
1	**232RX**	I	RS-232 Data Reception
2	**GND**	-	Return ground for RS-232 pins
3	**GND**	-	Negative return (ground) of the power supply
4	**232TX**	O	RS-232 Data Transmission
5	**+V_{LOG}**	**I**	Positive terminal of the logic supply and digital I/Os functionality: 12 to 36V_{DC}
6	**+V_{MOT}**	**I**	Positive terminal of the motor supply: 12 to 48V_{DC}

Connector J2 Description			
Pin	**Name**	**Type**	**Description**
1	**CANopen**	**I**	Connect to GND to enable CANopen protocol; Leave unconnected for TMLCAN protocol
2	**GND**	-	Return ground for CAN-Bus
3	**Can-Hi**	**I/O**	CAN-Bus positive line (dominant high)
4	**Can-Lo**	**I/O**	CAN-Bus negative line (dominant low)

Connector J3 Description			
Pin	**Name**	**Type**	**Description**
1	**Enable**	**I**	5-36V digital PNP/NPN input. Enable input
2	**GND**	-	Return ground for I/O pins
3	**IN0**	**I**	5-36V general-purpose digital PNP/NPN input
4	**IN3/LSN**	**I**	5-36V digital PNP/NPN input. Negative limit switch input
5	**OUT1**	-	5-36V 0.5A, general-purpose digital output, NPN open-collector/TTL pull-up
6	**IN1**	I	5-36V general-purpose digital PNP/NPN input
7	**GND**	-	Return ground for I/O pins
8	**IN2/LSP**	**I**	5-36V digital PNP/NPN input. Positive limit switch input
9	**OUT0**	**O**	5-36V 0.5A, general-purpose digital output, NPN open-collector/TTL pull-up
10	**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

SW1 Axis ID selection switch	
Position	**Description**
0	H/W Axis ID 255
1..F	HW Axis ID 1 to 15

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-;

Operating Conditions		Min.	Typ.	Max.	Units
Ambient temperature[1]		0		+40	ºC
Ambient humidity	Non-condensing	0		90	%Rh
Altitude / pressure[2]	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

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

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			

Logic Supply Input (+V_{LOG})			Min.	Typ.	Max.	Units
Supply voltage	Nominal values		12.5	24	36	V_{DC}
	Absolute maximum values, drive operating but outside guaranteed parameters		5.3		39	V_{DC}
	Absolute maximum values, continuous		0		42	V_{DC}
	Absolute maximum values, surge (duration ≤ 10ms) †		0		+45	V
Supply current	No Load on Digital Outputs	+V_{LOG} = 12.5V		80	200	mA
		+V_{LOG} = 24V		47	120	
		+V_{LOG} = 36V		36	100	

Motor Supply Input (+V_{MOT})		Min.	Typ.	Max.	Units
Supply voltage	Nominal values	12	24	48	V_{DC}
	Absolute maximum values, continuous	-0.5		50	
	Absolute maximum values, surge (duration ≤ 8ms)	-1		55	
Supply current	Idle		1	5	mA
	Operating	-13.6	±4	+13.6	A

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[3]
Bandwidth (-3dB)	Software selectable	0		250	Hz
ESD protection	Human body model	±5			kV

[1] Operating temperature can be extended up to **+TBDºC** with reduced current and power ratings.
[2] iMOT172S XM-CAN 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.
[3] "FS" stands for "Full Scale"

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

CAN-Bus		Min.	Typ.	Max.	Units
Compliance		ISO11898, CiA-301v4.2, CiA 402v3.0			
Bit rate	Software selectable	125		1000	Kbps
Bus length	1Mbps			25	m
	500Kbps			100	
	≤ 250Kbps			250	
Resistor	Between CAN-Hi, CAN-Lo	none on-board			
Node addressing	Software	1 ÷ 127 (CANopen); 1- 255 (TMLCAN)			
ESD protection	Human body model	±15			kV

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		400	kHz
Minimum pulse		-15	1.2	0.9	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		6	8	
	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		6	8	
	Hysteresis		0.5		

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

Environmental Characteristics			Min.	Typ.	Max.	Units
Size (Length x Width x Height)		iMOT171B	64 x 61 x 45			mm
			~2.52 x 2.4 x 1.78			inch
		iMOT172B	82 x 61 x 45			mm
			~3.23 x 2.4 x 1.78			inch
		iMOT173B	98 x 61 x 45			mm
			~3.86 x 2.4 x 1.78			inch
Weight	Without mating connectors	iMOT171B	395			g
		iMOT172B	515			
		iMOT173B	720			
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.