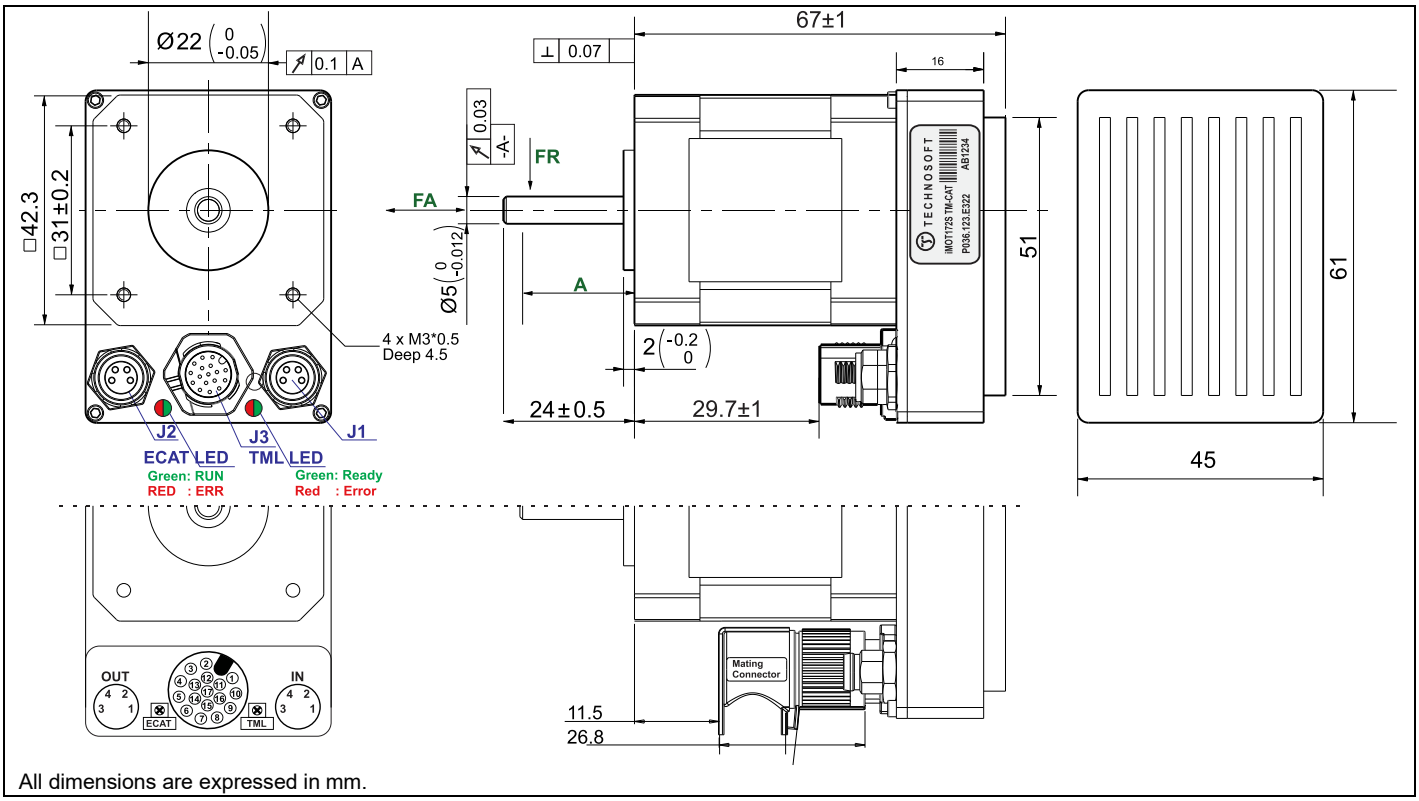
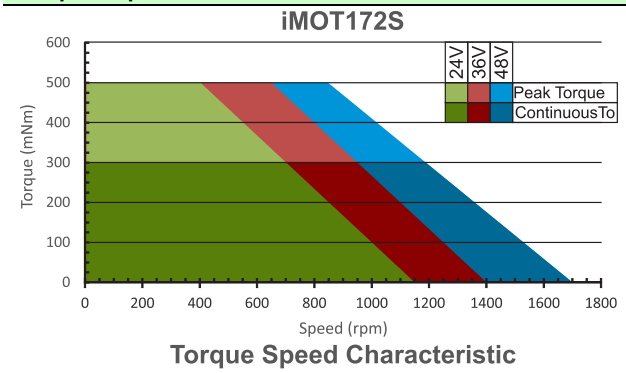


All dimensions are expressed in mm.

Features

- Fully digital intelligent 2 phase stepless motor with embedded motion controller, drive and absolute position feedback, offering a continuous torque up to 300 mNm at 1200rpm.
- Motor supply: 12-48V; Logic supply 15-36V
- No load speed of 1700 rpm at 48V
- Two control options: steples closed loop servo using an absolute feedback sensor; stepper open loop using microstepping and step loss detection based on the feedback sensor
- Separate or combined logic and power supply for safety or reduced wiring requirements
- 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 devices:
  - Integrated absolute position sensor offering a resolution of 4096 bits / revolution
- Protections:
  - IP50 protection degree
  - Over-current, over-temperature, short circuit
  - Over and undervoltage, i2t, control error
- 2.5K × 16 SRAM for data acquisition
- 4K × 16 E^2ROM for TML motion programs and data storage

Torque – Speed characteristic

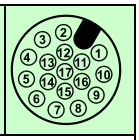


Torque Speed Characteristic

Mating Cables

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

Connector J1&J2 Description			IN J1	OUT J2
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 logic supply and digital I/Os functionality: 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**	EtherCAT® ERROR and RUN indicators combined. Shows the state of the EtherCAT® Status Machine
	red	

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
Step angle	1.8				°
Rated torque	300				mNm
Rated current	3				A
Microstepping resolution in open loop control	02400				Bits/rot
Absolute position feedback in closed loop control	4096				Bits/rot
Rotor inertia	82				gcm^2
Axial – Force **FA**	7				N
Distance **A**	5	10	15	20	mm
Radial-Force **FR**	58	36	26	20	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[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

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		5.9		39	V_{DC}
	Absolute maximum values, continuous		0		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	-0.5		50	
	Absolute maximum values, surge (duration ≤ 8ms)	-1		55	
Supply current	Idle		1	5	mA
	Operating	-13.6	±3	+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 **+65ºC** with reduced current and power ratings.
[2] iMOT172S 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.
[3] "FS" stands for "Full Scale"

Digital Inputs (IN0, 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		

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

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

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)		67 x 61 x 45			mm
		~2.64 x 2.4 x 1.78			inch
Weight	Without mating connectors	413			g
Cleaning agents		Only dry cleaning is recommended			
Protection degree	According to IEC60529, UL508	IP50			-

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

† 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.