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: stepless 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:
  - TMLCAN and CANopen (CiA 301 v4.2 and CiA 402 v3.0) protocols selectable by hardware pin
- 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 E²ROM for TML motion programs and data storage

Torque – Speed characteristic

iMOT172S
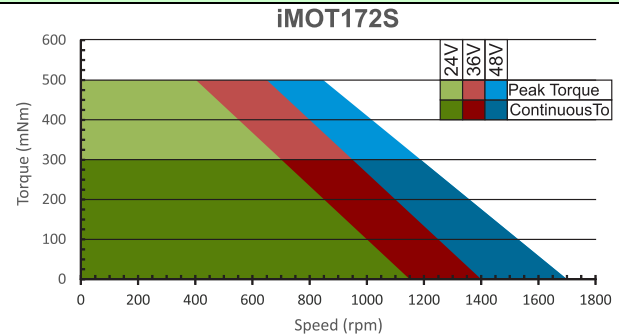
Torque Speed Characteristic

Mating Cables			
Connector	**Producer**	**Part No.**	**Description**
J1	MOLEX	130029-0005	Motor to wire (male) cable, 90º angled, 5 pins
	Phoenix Contact	1575903	
J2	MOLEX	130029-0002	Motor to wire (female) cable, 90º angled, 5 pins
	Phoenix Contact	1575916	
J3	Phoenix Contact	SAC-17P-1,5-35T/FR SH SCO - 1430323	Motor to wire (female) cable, 90º angled, 17 pins
J1 to J2	MOLEX	130030-0070	Motor to Motor (male to female) shielded cable, 90º angled, 5 pins
	Phoenix Contact	1575945	

Connector J1&J2 Description

J1 IN (4 2 / 3 1 / 5) — J2 OUT (2 4 / 1 3 / 5)

Pin	Name	Type	Description
1	GND	-	Return ground for CAN-Bus, Internally connected to all GND pins.
2	CANopen	I	Connect to GND to enable CANopen protocol; Leave unconnected for TMLCAN protocol
3	Can-Hi	I/O	CAN-Bus positive line (dominant high)
4	GND	-	Return ground for CAN-Bus. Internally connected to all GND pins.
5	Can-Lo	I/O	CAN-Bus negative line (dominant low)

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.

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- ;

Environmental Characteristics

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		-

Operating Conditions

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

Motor and feedback sensor parameters

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

Logic Supply Input ($+V_{LOG}$)

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 $\leq$ 10ms) †		0		+45	V
Supply current	No Load on Digital Outputs	$+V_{LOG}$ = 15V		70	200	mA
		$+V_{LOG}$ = 24V		47	120	
		$+V_{LOG}$ = 36V		36	100	

Motor Supply Input ($+V_{MOT}$)

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	V_{DC}
	Absolute maximum values, surge (duration $\leq$ 8ms)	-1		55	V
Supply current	Idle		1	5	mA
	Operating	-13.6	±3	+13.6	A

Analog Input (ANLG)

Analog Input (ANLG)		Min.	Typ.	Max.	Units
Input voltage	Operational range	0		5	V
	Absolute maximum values, continuous	-8		+12	
	Absolute maximum, surge (duration $\leq$ 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

RS-232

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

CAN-Bus		Min.	Typ.	Max.	Units
Compliance			ISO11898, CiA 402v3.0		
Bit rate	Software selectable	125		1000	Kbps
Bus length	1Mbps			25	m
	500Kbps			100	
	$\leq$ 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

---

[1] Operating temperature can be extended up to **+65ºC** with reduced current and power ratings.
[2] iMOT172S TM-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"

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		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 10 kΩ 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

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.

Name	First edition	Document template: P099.TQT.564.0001		Last edition	Visa:
EP	10/31/2015			10/28/2021	

TECHNOSOFT

Title of document	N° document
iMOT172S TM-CAN **PRODUCT DATA SHEET**	P036.121.E320.DSH.10E