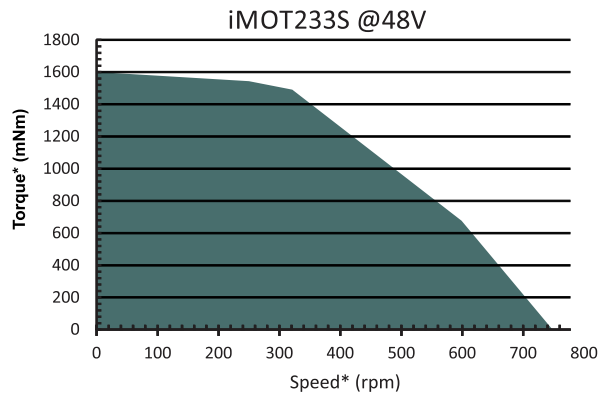
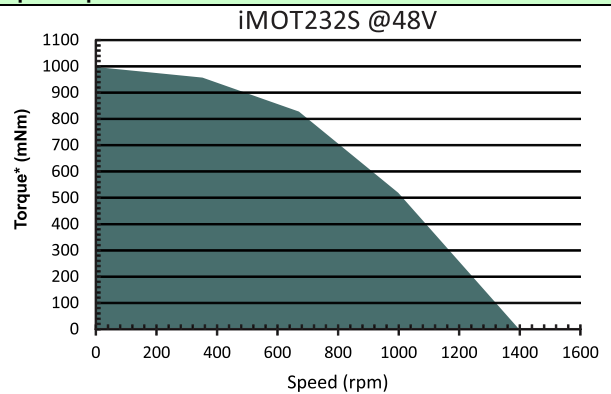


## Features

- Fully digital intelligent 2 phase step motor with embedded motion controller, drive and absolute position sensor
- Available in 2 motor lengths, offering 1000 and 1600 mNm of continuous torque
- Motor supply: 12.5-48V; Logic supply 12.5-36V; Rated current 2.8 A
- No load speed of 750 and 1400 rpm at 48V
- 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
- 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
- Standalone operation with stored motion sequences
- Communication:
  - TMLCAN and CANopen (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 devices:
  - Integrated absolute position sensor offering a resolution of 4096 bits / 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<sup>2</sup>ROM for TML motion programs and data storage

## Torque – Speed characteristic



\* All values ±10% at 20°C

## Mating Connector

Connector	Producer	Part No.	Description	Wire Gauge
J1,J4	MOLEX	43045-0400	MICROFIT RECEPTACLE HOUSING, 2x2 WAY	AWG 20..24
J2	MOLEX	43045-1000	MICROFIT RECEPTACLE HOUSING, 2x5 WAY	AWG 20..24
J3	MOLEX	43045-0600	MICROFIT RECEPTACLE HOUSING, 2x3 WAY	AWG 20..24
J1,J2,J3,J4	MOLEX	43030-0007	CRIMP PIN, MICROFIT, 5A	AWG 20..24

## Ordering Information

Part Number	Description
P036.222.E120	iMOT232S XM-CAN Intelligent Step Motor, CAN
P036.232.E120	iMOT233S XM-CAN Intelligent Step Motor, CAN
P034.001.E002	EasyMotion Studio Software
P040.001.Exxx	TML_LIB Motion Library
P038.040.C089	Complete cable set 100 cm
P038.040.C069	Housing & crimp pins set

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Connector J1 & J4 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; Internally connected to all GND pins.
3	Can-Hi	I/O	CAN-Bus positive line (dominant high)
4	Can-Lo	I/O	CAN-Bus negative line (dominant low)

Connector J2 Description			
Pin	Name	Type	Description
1	Enable	I	5-36V digital PNP/NPN input. Enable input
2	GND	-	Return ground for I/O pins; Internally connected to all GND 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; Internally connected to all GND 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

Connector J3 Description			
Pin	Name	Type	Description
1	232RX	I	RS-232 Data Reception
2	GND	-	Return ground; Internally connected to all GND pins.
3	GND	-	Return ground; Internally connected to all GND pins.
4	232TX	O	RS-232 Data Transmission
5	+V <sub>LOG</sub>	I	Positive terminal of the logic supply: 12.5 to 36V <sub>DC</sub>
6	+V <sub>MOT</sub>	I	Positive terminal of the motor supply: 12 to 48V <sub>DC</sub>

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 (V<sub>LOG</sub>) = 24VDC, motor supply (V<sub>MOT</sub>) = 48VDC ;
- Supplies start-up / shutdown sequence: -any-

Motor and feedback sensor parameters		Value	Units
Step angle		1.8	°
Rated torque	iMOT232	1000	mNm
	iMOT233	1600	
Rated current	iMOT232	2.8	A
	iMOT233	2.8	
Microstepping resolution in open loop control		102400	Bits/rot
Absolute position feedback in closed loop control		4096	Bits/rot
Rotor inertia	iMOT232	275	gcm <sup>2</sup>
	iMOT233	480	
		Axial	Radial
Shaft play	0.08	0.06	mm
At load	450	450	g

Operating Conditions		Min.	Typ.	Max.	Units
Ambient temperature <sup>1</sup>		0		+40	°C
Ambient humidity	Non-condensing	0		90	%Rh
Altitude / pressure <sup>2</sup>	Altitude (vs. sea level)	-0.1	0 ± 2.5	<sup>2</sup>	Km
	Ambient Pressure	0 <sup>2</sup>	0.75 ± 1	10.0	atm

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

Logic Supply Input (+V <sub>LOG</sub> )		Min.	Typ.	Max.	Units
Supply voltage	Nominal values	12.5	24	36	V <sub>DC</sub>
	Absolute maximum values, drive operating but outside guaranteed parameters	5.9		39	V <sub>DC</sub>
	Absolute maximum values, continuous	0		39	V <sub>DC</sub>
Supply current	Absolute maximum values, surge (duration ≤ 10ms) <sup>†</sup>	0		+45	V
	No Load on Digital Outputs	+V <sub>LOG</sub> = 15V	70	200	mA
	+V <sub>LOG</sub> = 24V	47	120		
	+V <sub>LOG</sub> = 36V	36	100		

Motor Supply Input (+V <sub>MOT</sub> )		Min.	Typ.	Max.	Units
Supply voltage	Nominal values	12.5	24	48	V <sub>DC</sub>
	Absolute maximum values, continuous	-0.5		50	V <sub>DC</sub>
	Absolute maximum values, surge (duration ≤ 10ms) <sup>†</sup>	-1		50	V
Supply current	Idle		1	5	mA
	Operating	-13.6	±3	+13.6	

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) <sup>†</sup>			±24	
Input impedance	To 0.23V		33		kΩ
Resolution			12		bits
Integral linearity				±2	bits
Offset error				±10	bits
Gain error			±1%	±3%	% FS <sup>3</sup>
Bandwidth (-3dB)	Software selectable	0		250	Hz
ESD protection	Human body model	±5			kV


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 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	HW rotary HEX switch	1 ÷ 15 and 255 (CANopen/TMLCAN)			
	Software	1 ÷ 127 (CANopen); 1- 255 (TMLCAN)			
ESD protection	Human body model	±15			kV

<sup>1</sup> Operating temperature can be extended up to +65°C with reduced current and power ratings.

<sup>2</sup> iMOT23xS 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.

<sup>3</sup> "FS" stands for "Full Scale"

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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) <sup>†</sup>	-50		50	
	Floating voltage, NPN (not connected)		0		
	Floating voltage, PNP (not connected)		+V <sub>LOG</sub>		
Input frequency		0		400	kHz
Minimum pulse		-15	1.2	0.9	ms
ESD protection	Human body model	±15			kV
Mode compliance	Internal 3.9 kΩ 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 3.9 kΩ resistor to +V <sub>LOG</sub>	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 <sub>LOG</sub> floating or to GND)	High-Z (floating)			
	Normal operation	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 <sub>LOG</sub>		V <sub>LOG</sub>		
	Absolute maximum, continuous	-0.5		V <sub>LOG</sub> +0.5	
	Absolute maximum, surge (duration ≤ 1s) <sup>†</sup>	-1		V <sub>LOG</sub> +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 <sub>OUT</sub> >= 2.0V			1	mA
	Logic "HIGH", leakage current; external load to +V <sub>LOG</sub> ; V <sub>OUT</sub> = V <sub>LOG</sub> 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 )	iMOT232	63 x 58 x 74			mm
		~2.48 x 2.28 x 2.91			inch
	iMOT233	87 x 58 x 74			mm
		~3.43 x 2.28 x 2.91			inch
Weight	Without mating connectors	iMOT232			g
		750			
		iMOT233			
		1100			
Power dissipation	Idle (no load)		1.5		W
	Operating			TBD	
Efficiency			98		%
Cleaning agents	Dry cleaning is recommended	Only Water- or Alcohol- based			
Protection degree	According to IEC60529, UL508	IP20			-

<sup>†</sup> 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.

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