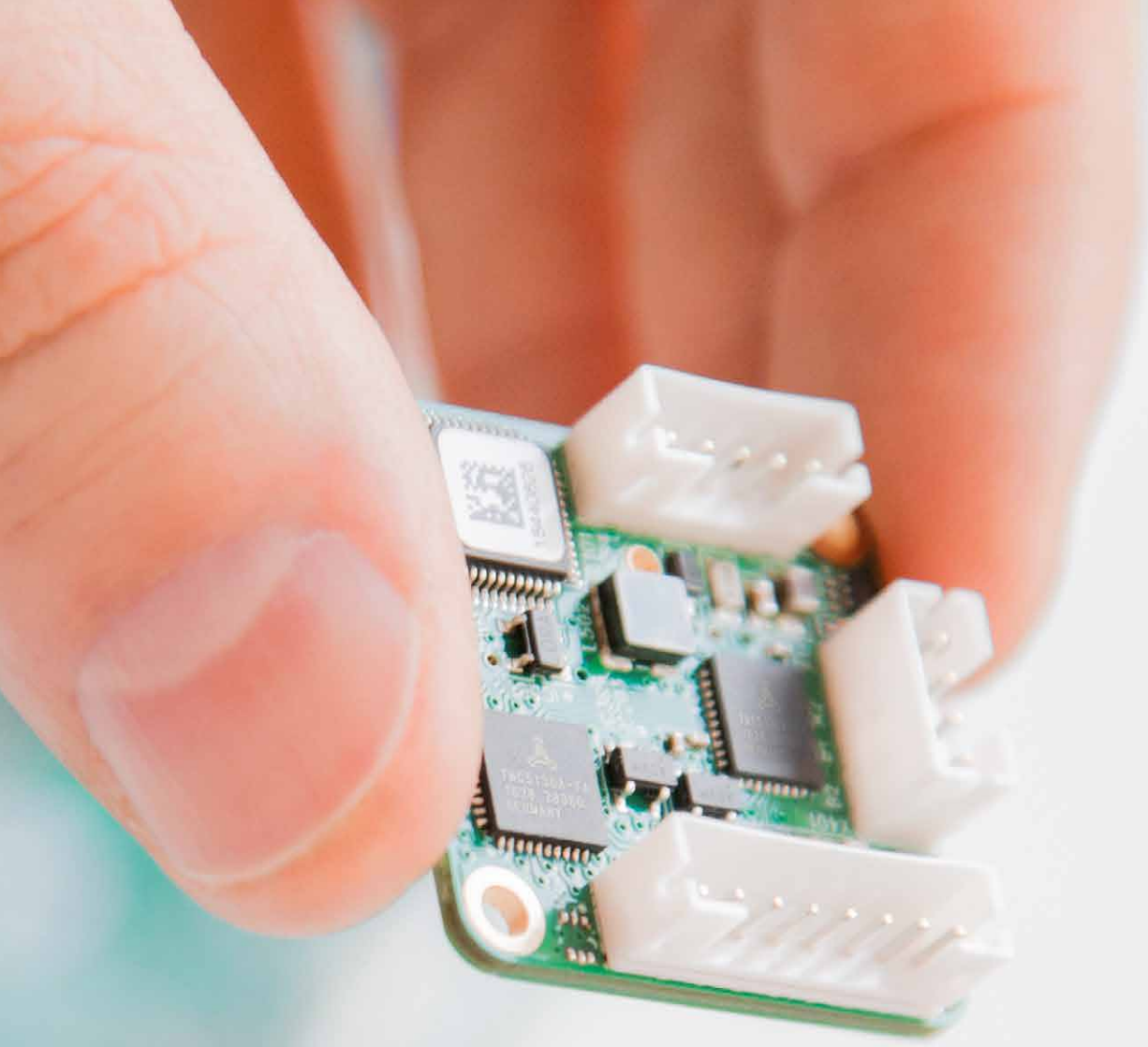


Product Guide 2020

Embedded Modules

We transform
digital information
into **physical motion.**

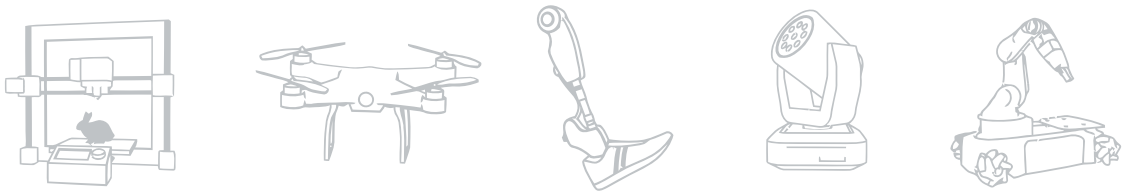
TRINAMIC
MOTION CONTROL

About Us

Decades of Experience Embodied in Dependable Building Blocks

Trinamic is the global leader in embedded motor and motion control. We are proud of our unique culture that unites precision German engineering, the pursuit of perfection, and a hands-on, real-world approach to technology and physical motion. Our long history has taught us how to optimize performance, drive miniaturization, and turn key motor characteristics into competitive advantages for your application.

Amplify Your Product With Trinamic Technologies



"Electric motors are such an essential part of everyday life that consumption of these devices has continued to rise in recent years. The growing expanse of the middle class, coupled with increases in household automation and the number of electric motor-driven products around the home, are major drivers of growth."

Bryan Turnbough, analyst with IHS.

The trend towards automating all aspects of the human environment has resulted in an explosion in the deployment of controlled motion systems. But only when digital information can be transformed into perfect physical motion, previously infeasible use cases suddenly become possible, driving the 4th Industrial Revolution: robotics, IoT, 3D printers, prosthetics, lab automation, and light electric vehicles, to name just a few.

Nevertheless, efficiently turning digital information into physical motion requires more than just transferring data into movement. Motor control technology needs to be easy-to-implement. It demands flexibility to support evolving device capabilities. It requires learning capabilities to turn repetitive automation into intelligent movement. And it needs to fit increasingly small form factors to handle new use cases.

Trinamic achieves these critical requirements by making the most advanced motion control as easy as 1-2-3. Our developer toolkits place decades of motor experience at the engineer's fingertips and our hardware building blocks remove complexity to ensure that even engineers without motion control experience can easily optimize motor designs and results to drive innovation faster.

Why do the most forward-thinking companies on the planet repeatedly choose Trinamic?

Of course, some choose us because of superior product features. However, the majority of our customers selects us because our sole focus on motion control provides access to deep application knowledge, enabling our customers to be the market leader.

Innovation Made by Trinamic

Over the past twenty years, Trinamic has created a broad portfolio of products and solutions that focus on transforming digital information into precise and efficient physical motion – ranging from microstepping to StealthChop™, and Field Oriented Control in hardware to Trinamic's own integrated development environment.

Striving for perfection, Trinamic regularly adds new, innovative motion control products and solutions to their offering.

Integrated solution with motion controller and driver in a single device. It combines a flexible hardware ramp generator for automatic target positioning with the industry's most advanced stepper motor driver.

cDriver™

Highly integrated and energy-efficient, the small form factor enables miniaturized and scalable systems for cost-effective solutions. A cDriver™ reduces the learning curve to a minimum while giving best-in-class performance.

A sensorless load measurement for stepper motors, StallGuard™ gives cost-effective real-time feedback on the load angle. It is the world's first sensorless load detection implemented in a standard stepper motor driver.

StallGuard™

Eliminating the need for reference or limit switches with sensorless homing, it reduces the cost and complexity of applications where precise referencing is required. The high-resolution feedback of StallGuard2™ also allows for a continuous condition monitoring of the system.

CoolStep™ sensorless load-dependent current control is based on the StallGuard™ load values. It always drives the motors at their optimum current and therefore enables to drive the motors in the most energy-efficient way.

CoolStep™

Without the need for any sensors, CoolStep™ eliminates the security current margin, boosts the motor, and avoids stall and step loss to improve reliability of the entire system.

StealthChop™ delivers exceptionally quiet stepper motor performance. Motors operating at low speed exhibit a phenomenon known as magnetostriction, which causes an audible high-pitch noise.

StealthChop™

Based on the current feedback, the chip regulates the voltage modulation to minimize current fluctuation. StealthChop™ applications have achieved noise levels of 10dB and more below classic current control.

Using SpreadCycle™, the microstep current sine wave is always well-formed with a smooth zero-crossing. Drivers with SpreadCycle eliminate the spike in the current waveform caused by the motor's back EMF.

SpreadCycle™

Stepper motors can be driven very fast without resonance effects with SpreadCycle. This reduces vibrations and improves efficiency as no energy is wasted to resonances.

The SixPoint™ ramping profile allows for faster positioning. It adds a freely configurable start/stop frequency to a linear motion profile plus a reduced acceleration value at high velocity.

SixPoint™

Advanced ramping profiles reduce the jerk at the end of a standard acceleration ramp. This makes it perfect for high-speed positioning and handling jerk-sensitive goods or objects with extensive inertia.

The Trinamic Motion Control Language is a programming language dedicated to motion control. It uses simple commands for positioning and setting all parameters of the motion controller, accelerating application development.

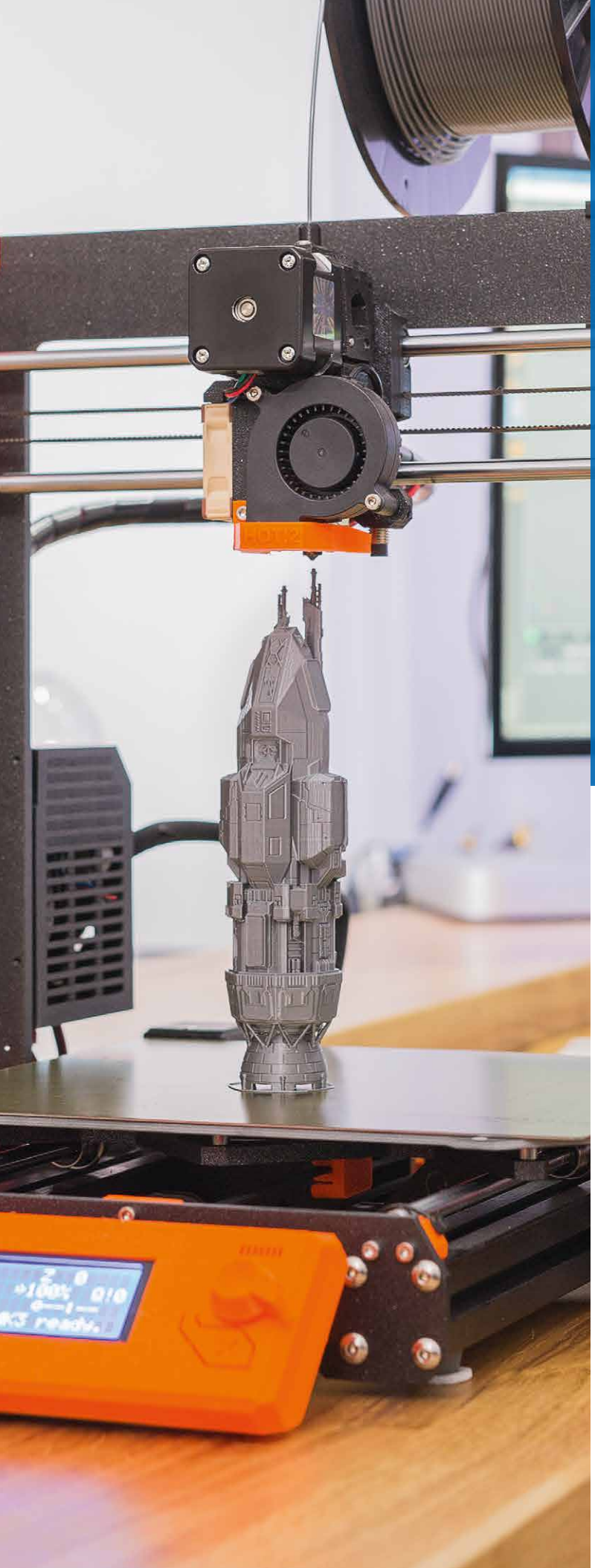
TMCL™

At the same time, it offers a comprehensive command set for all necessary motor control parameters. Supported by the TMCL-IDE, the integrated development environment, it allows quick integration into your own firmware.

Thanks to smooth, precise, and exceptionally quiet motor control, 3D printing matured into a technology that's accessible to consumers around the world.

Small Motors Are Ubiquitous!

However, they're only a small part of the motors around us. With industry-leading motion control that seamlessly blends into the environment, Trinamic provides best-in-class solutions for prosthetics, home automation, and portable devices of the future.



Wherever reliable positioning is required, Trinamic's dependable hardware building blocks form the system's foundation.

What is Your Application?

Trinamic's microsystems are suitable for all applications requiring controlled motion. Their products set the performance standard for applications like digital manufacturing, IoT, medical devices, robotics, and lab automation.

Trinamic enables today's engineers to quickly and reliable develop highly precise drives that work efficiently, smoothly, and quietly.

Need a Custom Solution?

Simply visit our website and let us know your requirements. Our engineers will design the best possible solution for you.

CUSTOMS.TRINAMIC.COM

Single-Axis Stepper Self-Sensing

						
PRODUCT	**TMCM-1210**	**TMCM-1021**	**TMCM-1043**	**TMCM-1140**	**TMCM-1240**	**TMCM-1141**
Number of axes	1	1	1	1	1	1
Motor type	Stepper	Stepper	Stepper	Stepper	Stepper	Stepper
Phase current (RMS)	0.6A	0.7A/ 1.4A	1.1A	2A	2A	1.1A / 2.0A
Motor supply voltage	7V...30V	9V...28V	9V...28V	9V...28V	10V...30V	9V...28V
Max. microstep resolution	256	256	256	256	256	256
Interface: RS485	✓	✓	-	✓	✓	✓
Interface: CAN	-	-	-	✓	✓	-
Interface: USB	-	-	-	✓	✓	✓
Interface: S/D	-	(GP in)	✓	-	✓	✓
MicroPlyer™ [µSteps]	16 to 256	-	16 to 256	16 to 256	any to 256	16 to 256
Bus protocol	TMCL	TMCL	(TMCL)**	TMCL / CANopen	TMCL / CANopen	TMCL
StallGuard2™	✓	✓	-	✓	✓	✓
CoolStep™	✓	✓	-	✓	✓	✓
SpreadCycle™ chopper	✓	✓	✓	✓	✓	✓
StealthChop™	✓	-	-	-	✓	-
Encoder interface	-	-	-	✓	✓	-
SensOstep™ encoder resolution	4096	1024	-	1024	1024	-
Ramp generator	SixPoint™	trapezoidal	-	trapezoidal	SixPoint™	trapezoidal
Reference inputs	L/R*	HLR*	-	HLR (PU)*	H (PU) LR(I)*	HLR (PU)*
General purpose IN (digital)	1x 5/24V	3x 5/24V	-	3x 5/24V	2x 5/24V	3x 5/24V
General purpose IN (analog)	-	1x 0-6.6V, 12 bit	-	1x 0-10V, 12 bit	1x 0-10V, 12 bit	1x 0-10V, 12 bit
General purpose OUT (digital)	-	2x OD, 100mA	2	1x 5V, 1x OD, 1A	1x OD, 100mA	2x OD, 100mA
Board dimensions	20 x 20mm²	28 x 28mm²	37 x 37mm²	37 x 37mm²	37 x 37mm²	37 x 37mm²
Motor mountable	NEMA 8	NEMA 11	NEMA 17	NEMA 17	NEMA 17	NEMA 17
Product status	active	active	active	active	active	active

*H = HOME | LR = STOP_L + STOP_R | PU = internal pull-up (programmable) | I = isolated

**parametrization only

Single-Axis Stepper Self-Sensing






TMCM-1241	TMCM-1160	TMCM-1260	TMCM-1161	TMCM-1180	TMCM-1181	PRODUCT
1	1	1	1	1	1	**Number of axes**
Stepper	Stepper	Stepper	Stepper	Stepper	Stepper	**Motor type**
3A	2.8A	6A	2.8A	5.5A	6.4A	**Phase current (RMS)**
10V...30V	9V...51V	12V...54V	10V...30V	18V...55V	11V...28V	**Motor supply voltage**
256	256	256	256	256	256	**Max. microstep resolution**
✓	✓	✓	✓	✓	✓	**Interface: RS485**
✓	✓	✓	-	✓	-	**Interface: CAN**
✓	✓	✓	✓	✓	✓	**Interface: USB**
✓	✓	✓	(GP in)	✓	(GP in)	**Interface: S/D**
any to 256	16 to 256	any to 256	16 to 256	16 to 256	16 to 256	**MicroPlyer™ [µSteps]**
TMCL / CANopen	TMCL / CANopen	TMCL / CANopen	TMCL	TMCL / CANopen	TMCL	**Bus protocol**
✓	✓	✓	✓	✓	✓	**StallGuard2™**
✓	✓	✓	✓	✓	✓	**CoolStep™**
✓	✓	✓	✓	✓	✓	**SpreadCycle™ chopper**
✓	-	✓	-	-	-	**StealthChop™**
✓	✓	✓	-	✓	-	**Encoder interface**
1024	1024	1024	1024	256	1024	**SensOstep™ encoder resolution**
SixPoint™	trapezoidal	SixPoint™	trapezoidal	trapezoidal	trapezoidal	**Ramp generator**
H (PU) LR(I)*	HLR (PU)*	H (PU) LR(I)*	HLR (PU)*	HLR (PU)*	HLR (PU)*	**Reference inputs**
2x 5/24V	3x 5/24V	2x 5/24V	3x 5/24V	3x 5/24V	-	**General purpose IN (digital)**
1x 0-10V, 12 bit	1x 0-10V, 12 bit	1x 0-10V, 12 bit	1x 0-10V, 12 bit	2x 0-10V, 12 bit	2x 0-10V, 12bit	**General purpose IN (analog)**
1x OD, 100mA	2x OD, 1A	1x OD, 100mA	2x OD, 100mA	2x OD, 1A	2x OD, 100mA	**General purpose OUT (digital)**
39 x 39mm²	60 x 60mm²	60 x 60mm²	60 x 60mm²	86 x 86mm²	86 x 86mm²	**Board dimensions**
NEMA 17	NEMA 23/24	NEMA 23/24	NEMA 23/24	NEMA 34	NEMA 34	**Motor mountable**
active	active	active	active	active	active	**Product status**

*H = HOME | LR = STOP_L + STOP_R | PU = internal pull-up (programmable) | I = isolated

Single-Axis Stepper Self-Sensing




PRODUCT	TMCM-1070	TMCM-1270	TMCM-1076	TMCM-1276
Number of axes	1	1	1	1
Motor type	Stepper	Stepper	Stepper	Stepper
Phase current (RMS)	1.2A	1.2A	3A	3A
Motor supply voltage	9V...26V	9V...26V	10V..30V	10V...30V
Max. microstep resolution	256	256	256	256
Interface: RS485	-	-	-	-
Interface: CAN	-	✓	-	✓
Interface: USB	-	-	-	-
Interface: S/D	✓	-	✓	-
MicroPlyer™ [µSteps]	any to 256	-	any to 256	-
Bus protocol	TMCL**	TMCL / CANopen	TMCL**	TMCL / CANopen
StallGuard2™	-	✓	✓	✓
CoolStep™	(✓)	✓	✓	✓
SpreadCycle™ chopper	✓	✓	✓	✓
StealthChop™	✓	✓	✓	✓
Encoder interface	-	✓***	-	-
Ramp generator	-	SixPoint™	-	SixPoint™
Reference inputs	-	HLR*	-	HLR (PU)*
General purpose IN (digital)	-	3x 5V TTL	-	3x 5V TTL
General purpose IN (analog)	-	1x	-	1x
General purpose OUT (digital)	-	-	-	-
Board dimensions	42 x 42mm²	42 x 42mm²	60 x 60mm²	60 x 60mm²
Motor mountable	NEMA 17	NEMA 17	NEMA 23/24	NEMA 23/24
Product status	active	active	active	active

*H = HOME | LR = STOP_L + STOP_R | PU = internal pull-up

** parametrization only

***encoder or digital input

StepRocker™ Family

TMCM-1110 StepRocker	TMCM-1111 StepRocker Servo	TMCM-1211 StepRocker	TMCM-1316 StepRocker Servo	PRODUCT
1	1	1	1	**Number of axes**
Stepper	Stepper	Stepper	Stepper	**Motor type**
2.8A	1A, 2.8A	1.2A, 3.1A, 6.0A	1.2A, 3.1A, 6.0A	**Phase current (RMS)**
10V...30V	10V..30V	10V...30V	10V..30V	**Motor supply voltage**
256	256	256	256	**Max. microstep resolution**
✓	✓	✓	✓	**Interface: RS485**
(✓)	(✓)	(✓)	(✓)	**Interface: CAN**
✓	✓	✓	✓	**Interface: USB**
16 to 256	-	any to 256	-	**MicroPlyer™ [µSteps]**
TMCL	TMCL	TMCL	TMCL	**Bus protocol**
✓	✓	✓	✓	**StallGuard2™**
✓	✓	✓	✓	**CoolStep™**
✓	✓	✓	✓	**SpreadCycle™ chopper**
-	-	✓	✓	**StealthChop™**
✓	✓	✓	✓	**Encoder interface**
-	✓	-	✓	**Closed-loop position control**
-	-	-	-	**Field oriented control**
trapezoidal	linear, S-Shaped	SixPoint™	linear, S-Shaped, SixPoint™	**Ramp generator**
3LR (PU)*	HLR (PU)*	HLR (PU)*	HLR (PU)*	**Reference inputs**
3x 5V TTL	3x 5V TTL	3x 5V TTL	3x 5V TTL	**General purpose IN (digital)**
1x 0-10V, 12 bit	1x 0-10V, 12 bit	1x 0-10V, 12 bit	1x 0-10V, 12 bit	**General purpose IN (analog)**
2x OD, 100mA	2x OD, 100mA	2x OD, 100mA	2x OD, 100mA	**General purpose OUT (digital)**
85 x 55mm²	85 x 55mm²	85 x 55mm²	85 x 55mm²	**Board dimensions**
active	active	active	active	**Product status**

*H = HOME | LR = STOP_L + STOP_R | PU = internal pull-up

Multi-Axis Stepper Self-Sensing

						
PRODUCT	**TMCM-3110**	**TMCM-3212**	**TMCM-3213**	**TMCM-3214**	**TMCM-3215**	**TMCM-3230**
Number of axes	3	3	3	3	3	3
Motor type	Stepper	Stepper	Stepper	Stepper	Stepper	Stepper
Phase current (RMS)	2.8A	3A	3A	6.5A	6.5A	1.0A
Motor supply voltage	9V...52V	12V...53V	12V...53V	18V...53V	18V...53V	9V...28.5V
Max. microstep resolution	256	256	256	256	256	256
Interface: RS485	✓	✓	-	✓	-	✓
Interface: CAN	✓	✓	-	✓	-	✓
Interface: USB	✓	✓	✓	✓	✓	✓
Interface: EtherCAT	-	-	✓	-	✓	-
Interface: S/D	3x IN	-	-	-	-	-
MicroPlyer™ [µSteps]	16 to 256	any to 256	any to 256	any to 256	any to 256	any to 256
Bus protocol	TMCL / CANopen	TMCL / CANopen	CoE	TMCL / CANopen	CoE	TMCL / CANopen
StallGuard2™	✓	✓	✓	✓	✓	✓
CoolStep™	✓	✓	✓	✓	✓	✓
SpreadCycle™ chopper	✓	✓	✓	✓	✓	✓
StealthChop™	-	✓	✓	✓	✓	✓
DcStep™	-	✓	✓	✓	✓	-
ABN encoder interface	3	3	3	3	3	-
Ramp generator	trapezoidal	SixPoint™	SixPoint™	SixPoint™	SixPoint™	SixPoint™
Reference inputs	3LR (PU)*	3HLR (PU)*	3HLR (PU)*	3HLR (PU)*	3HLR (PU)*	3LR (PU)*
General purpose IN (digital)	6x 5/24V	4x 5-24V (opt)	4x 5-24V (opt)	4x 5-24V (opt)	4x 5-24V (opt)	8x 5V
General purpose IN (analog)	2x 0-10V, 12 bit	4x 0-10V (opt)	4x 0-10V (opt)	4x 0-10V (opt)	4x 0-10V (opt)	8x 0-5V (opt)
General purpose OUT (digital)	6x OD,100mA + 2x OD,1A	4x OD,1A	4x OD,1A	4x OD,1A	4x OD,1A	8x 5V TTL
Board dimensions	100 x 130mm²	215 x 100mm²	215 x 100mm²	215 x 100mm²	215 x 100mm²	80 x 50mm²
Product status	active	active	active	active	active	active

*H = HOME | LR = STOP_L + STOP_R | PU = internal pull-up (programmable)





TMCM-6110	TMCM-6210	TMCM-6211	TMCM-6212	TMCM-6213	PRODUCT
6	6	6	6	6	**Number of axes**
Stepper	Stepper	Stepper	Stepper	Stepper	**Motor type**
1.1A	0.7A	0.7A	1.1A	1.1A	**Phase current (RMS)**
9V...28V	10.5V...27V	10.5V...27V	11V...35V	11V...35V	**Motor supply voltage**
256	256	256	256	256	**Max. microstep resolution**
✓	✓	-	✓	-	**Interface: RS485**
✓	✓	-	✓	-	**Interface: CAN**
✓	✓	✓	✓	✓	**Interface: USB**
-	-	✓	-	✓	**Interface: EtherCAT**
-	-	-	-	-	**Interface: S/D**
16 to 256	16 to 256	16 to 256	16 to 256	16 to 256	**MicroPlyer™ [µSteps]**
TMCL	TMCL / CANopen	CoE	TMCL / CANopen	CoE	**Bus protocol**
✓	✓	✓	✓	✓	**StallGuard2™**
✓	✓	✓	✓	✓	**CoolStep™**
✓	✓	✓	✓	✓	**SpreadCycle™ chopper**
-	✓	✓	✓	✓	**StealthChop™**
-	✓	✓	✓	✓	**DcStep™**
-	6	6	6	6	**ABN encoder interface**
trapezoidal	SixPoint™	SixPoint™	SixPoint™	SixPoint™	**Ramp generator**
6LR (PU)*	6HLR (PU)*	6HLR (PU)*	6HLR (PU)*	6HLR (PU)*	**Reference inputs**
6x 5/24V	4x 5-24V (opt)	4x 5-24V (opt)	4x 5-24V (opt)	4x 5-24V (opt)	**General purpose IN (digital)**
2x 0-10V	4x 0-10V (opt)	4x 0-10V (opt)	4x 0-10V (opt)	4x 0-10V (opt)	**General purpose IN (analog)**
6x OD,100mA + 2x OD,1A	4x OD,1A	4x OD,1A	4x OD,1A	4x OD,1A	**General purpose OUT (digital)**
100 x 130mm²	215 x 100mm²	215 x 100mm²	215 x 100mm²	215 x 100mm²	**Board dimensions**
active	active	active	active	active	**Product status**

*H = HOME | LR = STOP_L + STOP_R | PU = internal pull-up (programmable)

**StealthChop2™

Single-Axis Stepper Servo

		
PRODUCT	**TMCM-1310**	**TMCM-1311**
Number of axes	1	1
Motor type	Stepper	Stepper
Phase current (RMS)	3A	3A
Motor supply voltage	9V...51V	9V...51V
Max. microstep resolution	256	256
Interface: RS232	-	-
Interface: RS485	-	✓
Interface: CAN	-	✓
Interface: USB	✓	✓
Interface: EtherCAT	✓	-
Bus protocol	CoE	TMCL / CANopen
StallGuard2™	✓	✓
CoolStep™	✓	✓
SpreadCycle™	✓	✓
StealthChop™	-	-
Field oriented control	✓	✓
Closed-loop position control	✓	✓
Encoder interface	✓	✓
Ramp generator	linear	linear
Reference inputs	LR*	LR*
General purpose IN (digital)	6x 5-24V	6x 5-24V
General purpose IN (analog)	2x 0-10V	2x 0-10V
General purpose OUT (digital)	6x OD, 100mA + 2x OD, 1A	6x OD, 100mA + 2x OD, 1A
Board dimensions	110 x 110mm²	110 x 110mm²
Product status	active	active

*H = HOME | LR = STOP_L + STOP_R | PU = internal pull-up programmable





TMCM-3312	TMCM-3313	TMCM-3314	TMCM-3315	TMCM-3351	PRODUCT
3	3	3	3	3	**Number of axes**
Stepper	Stepper	Stepper	Stepper	Stepper	**Motor type**
3A	3A	6.5A	6.5A	3A	**Phase current (RMS)**
18V...53V	18V...53V	18V...53V	18V...53V	11V...28V	**Motor supply voltage**
256	256	256	256	256	**Max. microstep resolution**
-	-	-	-	✓	**Interface: RS232**
✓	-	✓	-	✓	**Interface: RS485**
✓	-	✓	-	✓	**Interface: CAN**
✓	✓	✓	✓	✓	**Interface: USB**
-	✓	-	✓	-	**Interface: EtherCAT**
TMCL / CANopen	CoE	TMCL / CANopen	CoE	TMCL / CANopen	**Bus protocol**
✓	✓	✓	✓	✓	**StallGuard2™**
✓	✓	✓	✓	✓	**CoolStep™**
✓	✓	✓	✓	✓	**SpreadCycle™**
✓	✓	✓	✓	✓	**StealthChop™**
-	-	-	-	-	**Field oriented control**
✓	✓	✓	✓	✓	**Closed-loop position control**
3	3	3	3	3	**ABN encoder interface**
SixPoint™, S-Shaped	SixPoint™, S-Shaped	SixPoint™, S-Shaped	SixPoint™, S-Shaped	SixPoint™, S-Shaped	**Ramp generator**
3HLR (PU)*	3HLR (PU)*	3HLR (PU)*	3HLR (PU)*	3LR*	**Reference inputs**
4x 5-24V (opt)	4x 5-24V (opt)	4x 5-24V (opt)	4x 5-24V (opt)	8x 5-24V	**General purpose IN (digital)**
4x 0-10V (opt)	4x 0-10V (opt)	4x 0-10V (opt)	4x 0-10V (opt)	4x 3.3V / 10V	**General purpose IN (analog)**
4x OD, 1A	4x OD, 1A	4x OD, 500mA	4x OD, 500mA	6x OD, 100mA + 2x OD, 1A	**General purpose OUT (digital)**
215 x 100mm²	215 x 100mm²	280 x 100mm²	280 x 100mm²	160 x 100mm²	**Board dimensions**
active	active	active	active	active	**Product status**

*H = HOME | LR = STOP_L + STOP_R | PU = internal pull-up

Single-Axis BLDC

		
PRODUCT	**TMCM-1630-2C** **TMCM-1630-4U**	**TMCM-1633**
Number of axes	1	1
Motor type	BLDC/PMSM	BLDC/PMSM
Motor supply voltage	15V...48V	15V...48V
Continuous output [W]	150W...300W	150W...300W
Rated phase current (RMS)	10A	10A
Interface: RS232	✓	✓
Interface: RS485	- ✓	-
Interface: CAN	✓	✓
Interface: USB	- ✓	-
Interface: S/D	-	-
Interface: EtherCAT	-	-
Bus protocol	TMCL	CANopen
Field oriented control	✓	✓
Current control	✓	✓
Velocity control	✓	✓
Position control	✓	✓
Reference inputs	HLR*	HLR*
General purpose IN (digital)	2x 24V	2x 24V
General purpose IN (analog)	2x 10V	2x 10V
General purpose OUT (digital)	3x OD	3x OD
Hall interface	✓	✓
Encoder interface	✓	✓
Ramp generator	trapezoidal	trapezoidal
Board dimensions	50 x 92mm²	50 x 92mm²
Product status	active	active

*H = HOME | LR = STOP_L + STOP_R | PU = internal pull-up

Single-Axis BLDC Servo

TMCM-1640	PRODUCT
1	**Number of axes**
BLDC/PMSM	**Motor type**
15V...28.5V	**Motor supply voltage**
100W	**Continuous output**
5A	**Rated phase current (RMS)**
-	**Interface: RS232**
✓	**Interface: RS485**
-	**Interface: CAN**
✓	**Interface: USB**
-	**Interface: S/D**
-	**Interface: EtherCAT**
TMCL	**Bus protocol**
✓	**Field oriented control**
✓	**Current control**
✓	**Velocity control**
✓	**Position control**
HLR*	**Reference inputs**
2x 24V	**General purpose IN (digital)**
1x 10V	**General purpose IN (analog)**
1x OD	**General purpose OUT (digital)**
✓	**Hall interface**
✓	**Encoder interface**
trapezoidal	**Ramp generator**
42 x 42mm²	**Board dimensions**
active	**Product status**

*H = HOME | LR = STOP_L + STOP_R | PU = internal pull-up

High-Resolution Encoders for Stepper Motors

PRODUCT	TMCS-20-4-8192-AT-01	TMCS-28-5-10000-AT-01 TMCS-28-6.35-10000-AT-01	TMCS-28-5-1024-AT-01 TMCS-28-6.35-1024-AT-01	TMCS-40-6.35-10000-AT-01
Housing diameter	20mm	28mm	28mm	40mm
For shaft diameter	4mm	5mm 6.35mm	5mm 6.35mm	6.35mm
Resolution [lines]	8.192	10.000	1.024	10.000
Resolution [increments]	32.768	40.000	4.096	40.000
Interface	ABN	ABN	ABN	ABN
Level	TTL	TTL	TTL	TTL
ABN incremental	✓	✓	✓	✓
Max. rpm	6000 rpm	6000 rpm	6000 rpm	7500 rpm
Max. frequency	1500 kHz	1500 kHz	1500 kHz	1500 kHz
Product status	active	active	active	active
Evaluation	TMCS-20-KIT	TMCS-28-KIT	TMCS-28-4096-KIT	TMCS-40-KIT

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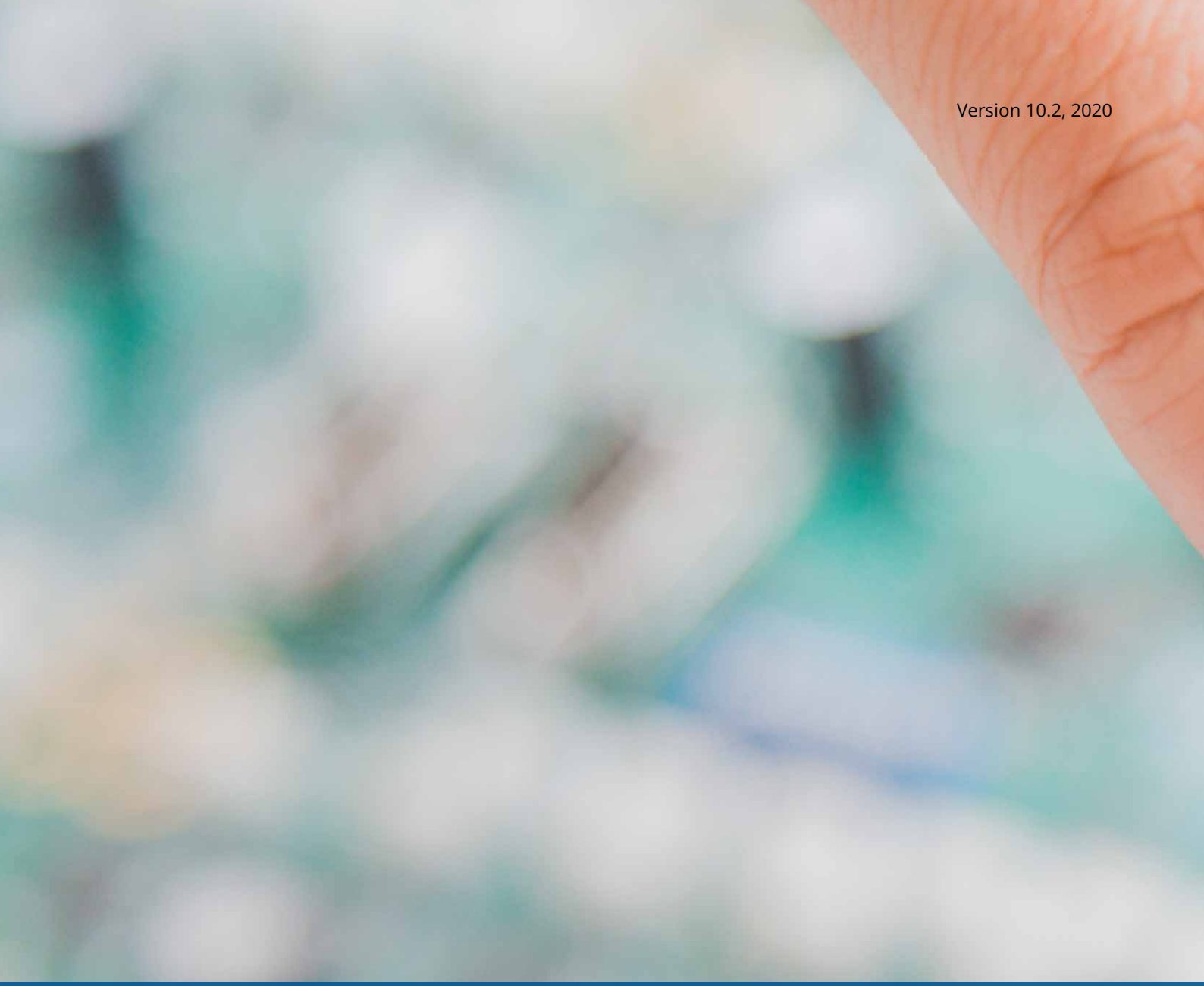

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MOTION CONTROL

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