



直得科技股份有限公司
CHIEFTEK PRECISION Co., LTD.



AC Linear Motor Servo Driver

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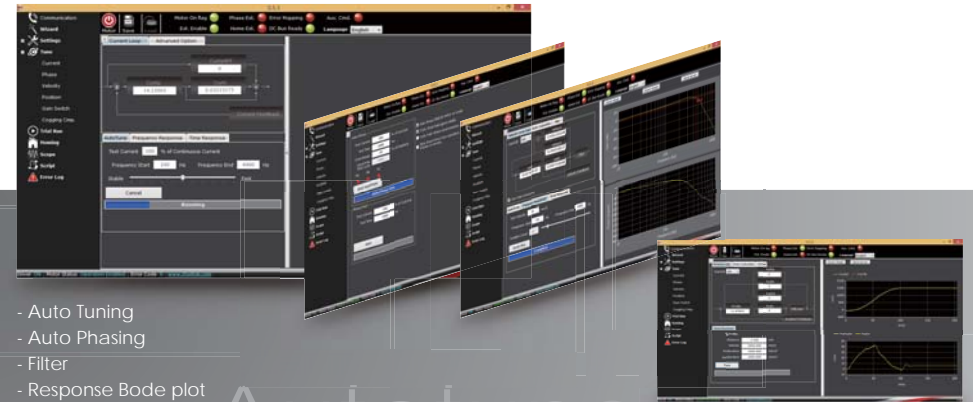
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TC

SERIES

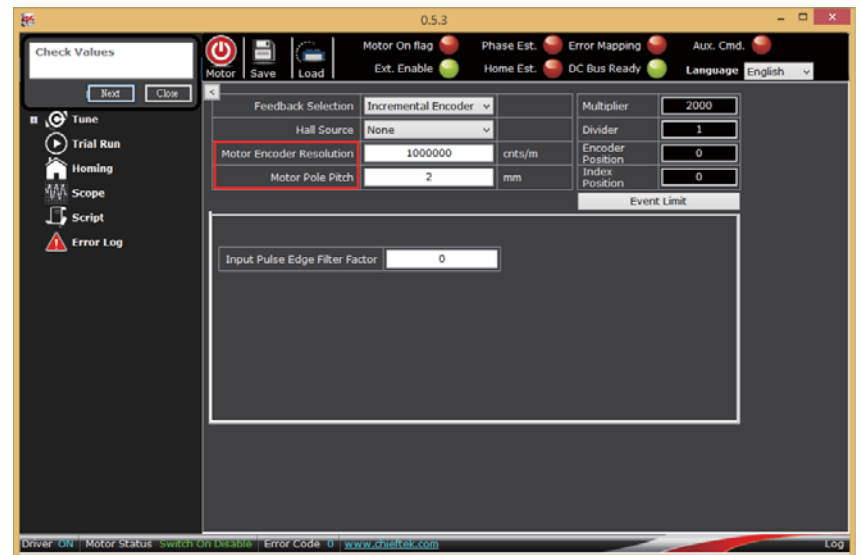
AC Servo Driver



- Auto Tuning
- Auto Phasing
- Filter
- Response Bode plot
- Time response plot

Autotune

Wizard Step by step setup interface



Auto tune



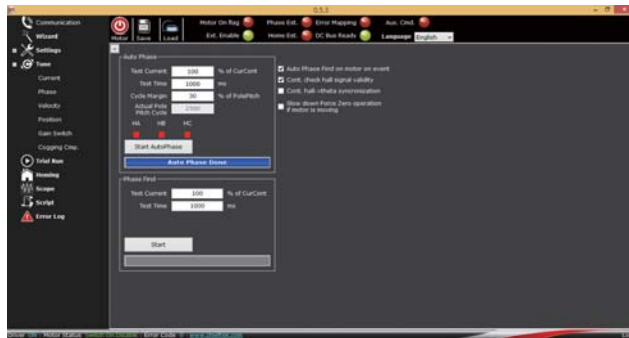
- Auto tuning
- Visualized control loop
- User-friendly interface
- Highly efficient tuning algorithm
- Short tuning time
- Can tune for stable or fast system response

Auto tune(position)



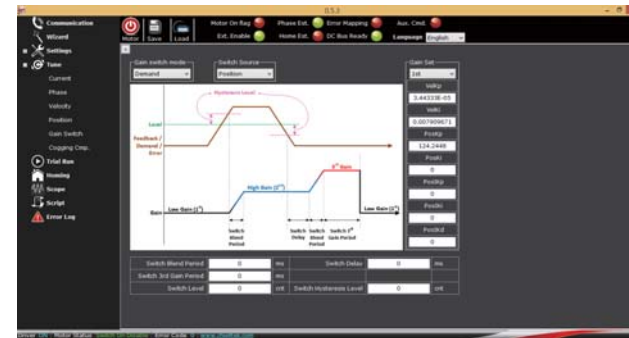
- Fast control loop up to 5k Hz
- Can test 3 groups of gain set
- Feedforward signal path
- Easy to fine tune
- Input response with profile position

Auto phasing



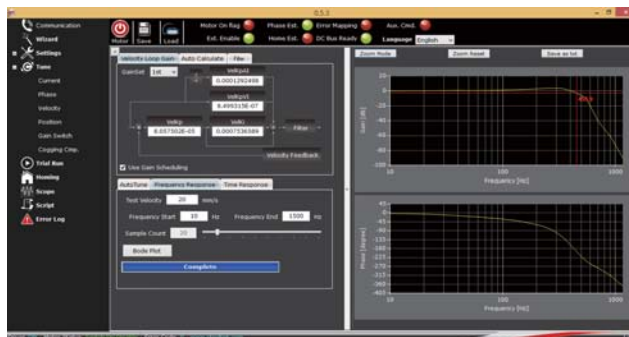
- Auto phasing
- Hall sensor or forcecommutation
- Step by step phasing progress prompt

Gain switch



- 3 groups of position and velocity gains can be switched
- Gain-switch rule: Demand, Feedback, Error, Target, and Digital input
- Easy to fine tune for different application

Auto tune(velocity)



- Fast control loop up to 10k Hz
- Can test 3 groups of gain set
- Easy to fine tune
- Feedforward signal path
- Response Bode plot
- Bandwidth label
- Input response test with step/sine/triangle
- 3 filters on force output

Gain switch Test

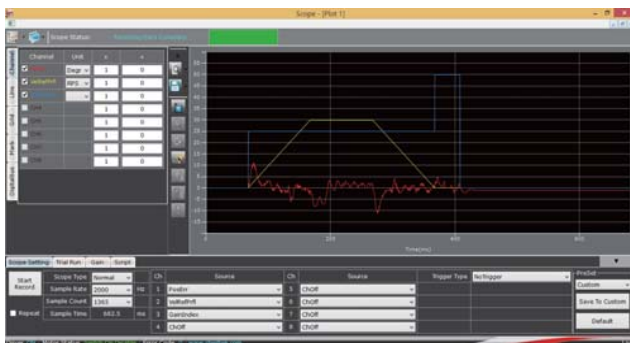
- Distance:0.6m
- Velocity:3m/s
- Acceleration:3g
- Deceleration:3g



- Performance without Gain-switch
- Yellow: velocity profile
- Red: Position Error [+ - 35 count]

Gain switch Test

- Distance:0.6m - Acceleration:3g
- Velocity:3m/s - Deceleration:3g



Performance with Gain-switch
Yellow: velocity profile
Red: Position Error [± 11 count]

Scope



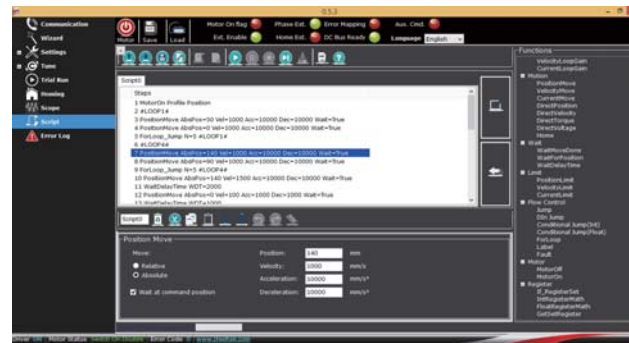
- Scope provides a real time monitor of driver information.
- User could inspect motion detail without an oscilloscope.

Homing



- Setup interface provides 35 kinds of homing methods.
- Also, the vivid animations explain how a homing method is performed.

Scripting



Script could program motor motion with user-friendly interface.

Ordering Information

TC1-	B	9	P	/230 -	H	R	E
							<input type="checkbox"/> : CANopen ^(Note1) <input type="checkbox"/> : EtherCAT
							<input type="checkbox"/> : No Resistor ^(Note1) R : Brake Resistor
							<input type="checkbox"/> : No heatsink ^(Note1) H : Passive heatsink F : Heatsink with fan
							AC supply: 230VAC
							<input type="checkbox"/> : Normal <input type="checkbox"/> : Extended peak current ^(Note2)
							Continuous current (Amps): 8, 20 (A-type only) 3, 9 (B-type only)
							<input type="checkbox"/> : A-type <input type="checkbox"/> : B-type
Servo Driver							

Product Overview TC1-B



LM-Ironcore



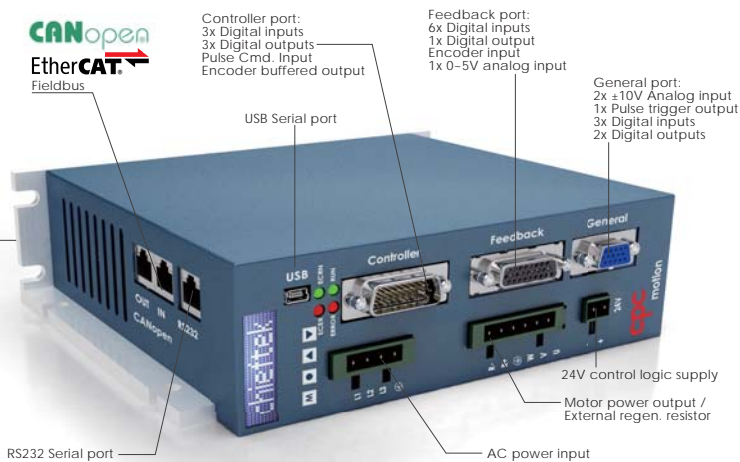
LM-Ironless



DD Motor

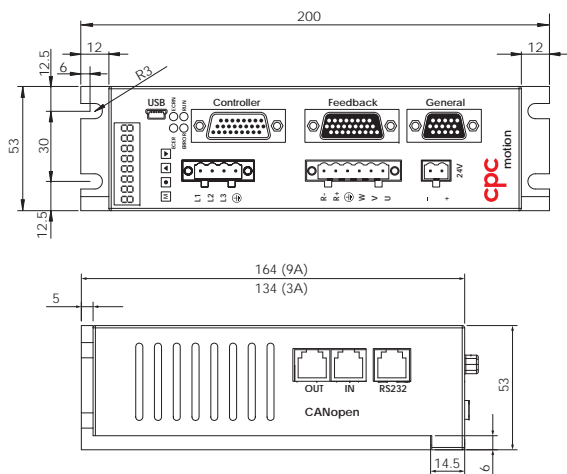


Linear motor Stage



EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

Dimension



Specification

Model		TC1-B3/230	TC1-B3/230-E	TC1-B9/230	TC1-B9/230-E	TC1-B9P/230	TC1-B9P/230-E	
Input Power	Voltage and Phase	1Φ 230 VAC		3Φ 230 VAC				
	DC Bus Peak Voltage (VDC)	390						
	Frequency (Hz)	50 to 60						
	Power Rating (W)	1125			3375			
Control Logic Power	Voltage Range (VDC)	24 VDC						
	Current (A)	> 0.5						
Peak power output (kW)		1.3		4.4		6.6		
Peak current output (A)		6		20		30 ^(Note2)		
Cont. current output (A)		3		g ^(Note3)		g ^(Note3)		
Regenerative resistor	Resistance (Ohm)	60 (option)						
	Continuous dissipation (Watt)	100 (option)						
	Pulse Braking Energy	5000 (option)						
Regenerative resistor switch cont. current (A)		10			20			
Fieldbus (DS402 V3.0)		CANopen	EtherCAT	CANopen	EtherCAT	CANopen	EtherCAT	
DS402 Operation modes		PP, PV, PT, HM, CST, CSV, CSP						
Serial bus		RS232						
Motor type		Linear/Rotary PMSM						
Encoder Input	Digital	Type	A/B Incremental (RS422 signaling)					
		Work Frequency	Max. 20 Mega counts/s					
		Count Range	±2 ³¹ counts					
	Analog (sin / cos)	Amplitude	1V _{P-P}					
		Work Frequency	100 kHz, 4096 Cnt/Period Interpolation					
Absolute	Type	BiSS-C, Tamagawa, EnDat 2.2, SSI						
Feedback position error mapping		Yes						
Current control	Loop Frequency	20 KHz						
	PWM modulation	SVPWM						
	Command input	Serial, Fieldbus, ±10 V Analog, internal software						
Velocity control	Loop Frequency	10 KHz						
	Command input	Serial, Fieldbus, ±10 V Analog, internal software						
	Output filter	x3 (Low-pass or Notch)						
Counter range		-2, 147, 483, 648 to 2, 147, 483, 647 counts/second						
Position control	Loop Frequency	5 KHz						
	Command input	Pulse command (A/B, Step/Dir, CW/CCW), Serial, Fieldbus, ±10 V Analog, internal software						
	Trajectory generator	Trapezoidal with S-curve filter						
Counter range		-2, 147, 483, 648 to 2, 147, 483, 647 counts						
Analog Input	Input type	x1 (±10 V differential), x1 (±10 V Single-end)						
	ADC resolution	12 bit						
Pulse command frequency	RS422	Max. 10 MHz						
	5V single-end	Max. 1 MHz						
	24V single-end	Max. 50 KHz						
Total Digital Inputs		x12 (5-24 V)						
Total Digital Outputs (open-collector)		x3 (24V, 400 mA), x3 (24 V, 200 mA)						
High speed Position compare output		x1 (RS422)						
Autotuner		Current/Velocity/Position loop gain, motor phasing setup, sin/cos encoder calibration						
Gain switch function		Yes						
Control panel		x1 (8 digit character LCD)			x4 push buttons			
Software protection		Dynamic brake, motor over-current, over/under-position, over-velocity, Virtual/physical position limit switch, missing hall signal, external fault trigger						
Hardware protection		Drive over-temperature (analog), 5V output short circuit, motor over-temperature (analog)						
Dimensions (LxHxW)(mm)		200 x 134 x 53			200 x 164 x 53 (excluding optional heatsink)			
Weight (Kg)		1.2			1.6 (excluding optional heatsink)			
Operating temperature		10-40 °C						

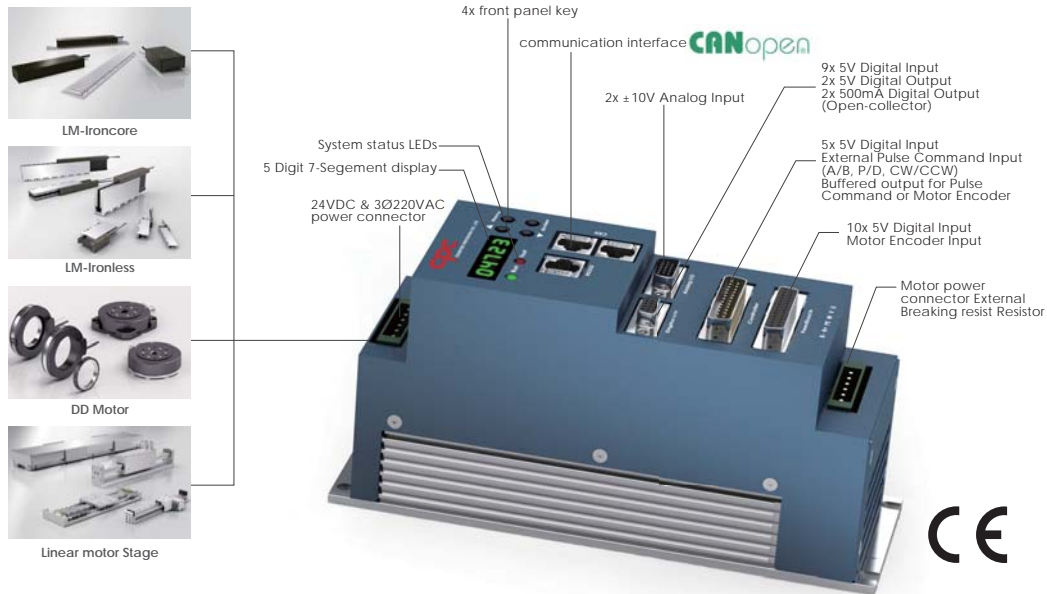
Note 1: Only applicable for the TC1-B series.

Note 2: Only applicable for the TC1-B series. Current sensor with a wider input range is used at the cost of additional signal noise and reduced resolution. This arrangement is suitable for applications where the motor mostly operates in short, high current bursts.

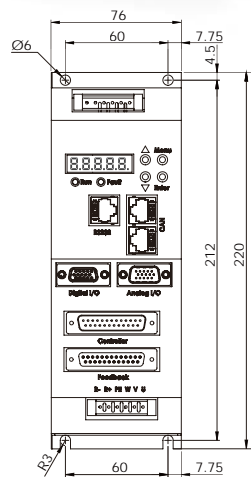
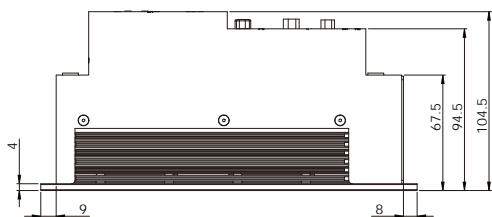
Note 3: Additional heatsink required to ensure continuous operation at rated output.

Product Overview TC1

- Auto Phasing
- Auto Tuning
- Auto Gain Switch
- Current Filter
- Oscilloscope
- S-curve Profile
- Anti-Cogging
- Scripting



Dimension



Specification

Model		TC1-8/230	TC1-20/230
Input Power	Voltage and Phase	3Φ 230 VAC	
	DC Bus Peak Voltage (V)	390	
	Frequency (Hz)	50 to 60	
	Power Rating (W)	3000	7500
Control Logi Power	Voltage Range (VDC)	24	
	Current (A)	20.5	
Peak power output (kW)		4.4	12
Peak current output (A)		20	60
Cont. current output (A)		8	20
Regenerative resistor	Resistance (Ohm)	60	25
	Continuous dissipation (Watt)	100	200
	Pulse energy capacity (Joule)	2500	10000
Regenerative resistor switch cont. current (A)		20	
Fieldbus (DS402 V3.0)		CANopen	
DS402 Operation modes		PP, PV, PT, HM, CST, CSV, CSP	
Serial bus		RS232	
Motor type		Linear/Rotary PMSM	
Encoder Input	A/B/Z (RS422)	20 MCnt/s	
	Sin/Cos (1V _{pp})	-	
	SSI (RS422)	-	
	BISS	-	
Feedback position error mapping		Yes	
Current control	Loop Frequency	20 KHz	
	PWM modulation	SVPWM	
	Command input	Serial, Fieldbus, ±10 V Analog, internal software	
Velocity control	Loop Frequency	10 KHz	
	Command input	Serial, Fieldbus, ±10 V Analog, internal software	
	Output filter	x3 (Low-pass or Notch)	
Counter range		-2, 147, 483, 648 to 2, 147, 483, 647 counts/second	
Position control	Loop Frequency	5 KHz	
	Command input	Pulse command (A/B, Step/Dir, CW/CCW), Serial, Fieldbus, ±10 V Analog, internal software	
	Trajectory generator	Trapezoidal with S-curve filter	
Counter range		-2, 147, 483, 648 to 2, 147, 483, 647 counts	
Analog Input	Input type	±10 V differential	
	ADC resolution	12 bit	
Pulse command frequency	RS422	Max. 10 MHz	
	5V single-end	Max. 1 MHz	
	24V single-end	-	
Total Digital Inputs		x22 (3.3-5 V)	
Total Digital Outputs (open-collector)		x2 (24 V, 500 mA), x6 (24 V, 20 mA)	
High speed Position compare output		-	
Total Analog Inputs		x2 (±10 V differential)	
Autotuner		Current/Velocity/Position loop gain, motor phasing setup, sin/cos encoder calibration	
Gain switch function		Yes	
Control panel		x1 (5 digit 7-segment LED)	x4 push buttons
Software protection		Dynamic break, motor over-current, over/under-position, over-velocity, Virtual/physical position limit switch, missing hall signal, externa fault trigger	
Hardware protection		Drive over-temperature (on/off), motor over-temperature (on/off)	
Dimensions (LxHxW)(mm)		220 x 105 x 76	270 x 195 x 94
Weight (Kg)		1.6	3.7
Operating temperature		10-40 °C	