AC Servo Driver

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

Wizard
Step by step setup interface
AC Servo Driver

- 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 force commutation
- Step by step phasing progress prompt

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

- 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

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
- Velocity: 3m/s
- Acceleration: 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.

Ordering Information

TC1- | B | 9 | P | /230- | H | R | E
---|---|---|---|---|---|---|---
 | | | | | | | (Note1)

- CANopen
- EtherCAT

- No Resistor
- Brake Resistor
- No heatsink
- Passive heatsink
- Heat sink with fan

AC supply: 230VAC

Continuous current (Amps):
B, 20 (A-type only)
3, 9 (B-type only)

Servo Driver

Scripting
- Script could program motor motion with a user-friendly interface.
## Product Overview

**TC1-B**

- **Controller port:**
  - 3x Digital inputs
  - 3x Digital outputs
  - Pulse C.m.d. input
  - Encoder buffered input

- **Feedback port:**
  - 6x Digital inputs
  - 1x Digital output
  - Encoder input
  - 1x 0~5V analog input

- **General port:**
  - 2x ±10V Analog input
  - 1x Pulse trigger output
  - 3x Digital inputs
  - 2x Digital outputs

- **USB Serial port**

## Specification

### Model

<table>
<thead>
<tr>
<th>Model</th>
<th>TC-1-B (3/2)</th>
<th>TC-1-B (3/2)</th>
<th>TC-1-B (3/2)</th>
<th>TC-1-B (3/2)</th>
<th>TC-1-B (3/2)</th>
<th>TC-1-B (3/2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage and Phase</td>
<td>100-230 VAC</td>
<td>100-230 VAC</td>
<td>100-230 VAC</td>
<td>100-230 VAC</td>
<td>100-230 VAC</td>
<td>100-230 VAC</td>
</tr>
<tr>
<td>DC Bus Peak Voltage (VDC)</td>
<td>390</td>
<td>390</td>
<td>390</td>
<td>390</td>
<td>390</td>
<td>390</td>
</tr>
<tr>
<td>Frequency (Hz)</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
<td>50 to 60</td>
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</tbody>
</table>

### Input Power

<table>
<thead>
<tr>
<th>Power Rating (W)</th>
<th>1125</th>
<th>1125</th>
<th>1125</th>
<th>1125</th>
<th>1125</th>
<th>1125</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Range</td>
<td>24 VDC</td>
<td>24 VDC</td>
<td>24 VDC</td>
<td>24 VDC</td>
<td>24 VDC</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Peak power output (VA)</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Peak current output (A)</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Cont. current output (A)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

### Feedback position encoding

- Yes

### Encoder/Input

- Type: Digital
- Work Frequency: Max. 20 Mega counts/s
- Count range: 32 counts
- Analog (A/B, Quad): Amplitude: 2Vp-p
- Work Frequency: 10 kHz
- Loop Frequency: 5 kHz
- Command input: Serial, Fieldbus, ±10 V Analog, internal software
- Command input: Serial, Fieldbus, ±10 V Analog, internal software
- Output filter: 20 kHz, 4096 Cnt/Period Interpolation
- Counter range: -2^31 to 2^31 - 1 counts/second
- Analog input: x1 (±10 V differential), x1 (±10 V Single-end)
- ADC resolution: 12 bit

### Position control

- Pulse command frequency: 5 kHz
- Command input: Pulse command (A/B, Step/Dcc, CW/CCW), Serial, Fieldbus, ±10 V Analog, internal software
- Trajectory generator: Trapezoidal with S-curve filter
- Count range: ±2^31 to 2^31 - 1 counts
- Analog input: x1 (±10 V), x2 (±10 V), x3 ( ±5 V)

### Autotuner

- Yes

### Gain switch function

- Yes

### Software protection

- Dynamic brake, motor power-on, over/under position, over/under velocity, Voltage/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 134 x 53
- 200 x 134 x 53
- 200 x 134 x 53
- 200 x 134 x 53
- 200 x 134 x 53

### Fieldbus

- CANopen
- EtherCAT
- EtherCAT
- EtherCAT
- EtherCAT
- EtherCAT

### Motor type

- Linear/Rotary PMSM

### Encoder Input

- Type: Digital
- Work Frequency: Max. 20 Mega counts/s
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- Analog (A/B, Quad): Amplitude: 2Vp-p
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- Count range: ±2^31 to 2^31 - 1 counts
- Analog input: x1 (±10 V), x2 (±10 V), x3 ( ±5 V)

### Autotuner

- Yes

### Gain switch function

- Yes

### Control panel

- x1: 8 digit character LCD
- x2: push buttons

### Software protection

- Dynamic brake, motor power-on, over/under position, over/under velocity, Voltage/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
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- 200 x 134 x 53
- 200 x 134 x 53
- 200 x 134 x 53

### Weight (Kg)

- 1.2
- 1.2
- 1.2

### Operating temperature

- 10 to 40°C

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**Note:**

1. Only applicable to the TC-1-B series.
2. Only applicable to the TC-1-B9 series.
3. Additional heatsink required to ensure continuous operation at rated output.
4. The arrangement is suitable for applications where the motor mostly operates in short, high current bursts.
5. Additional heatsink required to ensure continuous operation at rated output.
TC SERIES
AC Servo Driver

**Product Overview**
- Auto Phasing
- Current Filter
- Oscilloscope
- Anti-Cogging
- S-curve Profile
- Auto Gain Switch
- Scripting

**Dimension**

**Specification**

<table>
<thead>
<tr>
<th>Model</th>
<th>TC1-8/230</th>
<th>TC1-20/230</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input Power</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage and Phase</td>
<td>50-230 V AC</td>
<td>70-230 V AC</td>
</tr>
<tr>
<td>DC Bus Peak Voltage (V)</td>
<td>390</td>
<td>390</td>
</tr>
<tr>
<td>Frequency (Hz)</td>
<td>50 to 60</td>
<td>50 to 60</td>
</tr>
<tr>
<td>Power Rating (W)</td>
<td>3000</td>
<td>7500</td>
</tr>
<tr>
<td><strong>Control Logic Power</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage Range (VDC)</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Current (A)</td>
<td>20/3</td>
<td>20/3</td>
</tr>
<tr>
<td>Peak power output (kW)</td>
<td>4.4</td>
<td>12</td>
</tr>
<tr>
<td>Peak current output (A)</td>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>Cont. current output (A)</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>Regenerative resistor</td>
<td>Resistance (Ohm)</td>
<td>20</td>
</tr>
<tr>
<td>Continuous dissipation (Watt)</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Pulse energy capacity (joule)</td>
<td>2500</td>
<td>10000</td>
</tr>
<tr>
<td>Regenerative resistor switch cont. current (A)</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

**Feedback position interchanging**
- Yes

**Current control**
- Loop Frequency
  - PWM modulation: 20 kHz
  - Command input: Serial, Fieldbus, ±10 V Analog, internal software

**Velocity control**
- Loop Frequency
  - Command input: Serial, Fieldbus, ±10 V Analog, internal software
  - Output filter: ±10 V differential (optional)
  - Counter range: -2, 147, 483, 648 to 2, 147, 483, 647 counts/second

**Position control**
- Loop Frequency
  - Command input: Pulse command (A/B, Step, Dir, CW/CCW), Serial, Fieldbus, ±10 V Analog, internal software
  - Trajectory generator 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
- RS422
  - Max: 10 MHz
- 5V single-end
  - Max: 1 MHz
- 24V single-end
  - -
- Total/Digital Inputs: 22 (5-3.3 V)
- Total/Digital Outputs (open collector): 22 (24 V, 500 mA) / 4 (24 V, 20 mA)
- High-speed Position compare output: -
- Total/Analog Inputs: 2 (±10 V differential)

**Autotuner**
- Current/Velocity/Position loop gain, motor phasing setup, sin/cos encoder calibration
- Yes

**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, external fault trigger

**Hardware protection**
- Drive over-temperature (on/off), motor over-temperature (on/off)

**Dimensions (LxHxW)(mm)**
- 210 x 135 x 76
- 210 x 135 x 94

**Weight (Kg)**
- 1.6
- 3.7

**Operating temperature**
- 10-40°C