

# Galil Motion Control

EtherCAT<sup>®</sup>

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## EDD – 3701x

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## Product Description

The EDD-3701x is Galil's EtherCAT single axis smart drive. This device is a motor amplifier that operates in an EtherCAT distributed system. These devices have a daisy chain topology using standard CAT5 Ethernet cables. The EDD-3701x can interface with Galil masters (DMC-500x0 and DMC-52xx0) for sophisticated applications or with TwinCAT® for very simple applications.

EtherCAT drives can be connected over large distances on an entire factory floor, allowing the motor wiring to be localized. The EtherCAT protocol has true deterministic control of its Ethernet packet.

For most EtherCAT systems the process to get a system up and running is not user-friendly and has a steep learning curve. Galil has simplified the setup process which leads to fast and easy system integration. Using Galil's EtherCAT masters and drives is as easy as using Galil's standard digital motion controllers.

The configuration of the EDD-3701x is done using the Galil's GDK software. Simply connect to a PC via EDD-3701x's USB port, follow the GDK configuration tool process, and start moving motors.

The EDD-3701x series has the ability to control brushed, brushless, steppers, and microstepping motors. Each drive not only can control a motor, but also has 8 digital inputs, 4 digital outputs, 2 analog inputs, and 1 analog output. All I/O information from these drives are accessible by the EtherCAT master.



## Features

- Single-axis EtherCAT drive with optional servo or stepper motor drive in compact enclosure:
  - EDD-37012 — 3 Phase Brushed/brushless sine drive; 10 A cont., 15 A peak, 20-80 V<sub>DC</sub>
  - EDD-37016 — Stepper drive; 1.4 A/phase, 12-30 V<sub>DC</sub>
  - EDD-37017 — Microstep drive; 6 A/phase, 20-80 V<sub>DC</sub> and 2 Phase Brushless sine drive; 10 A cont., 15 A peak, 20-80 V<sub>DC</sub>
- Cyclic Synchronous Position mode (CSP) and Cyclic Synchronous Torque mode (CST)
- Two daisy-chainable EtherCAT ports:
  - One USB port (used for configuration).
- Encoder feedback up to 15 MHz. Quadrature standard; SSI, and BiSS options. Main and auxiliary encoder inputs
- PID compensation with velocity and acceleration feedforward, integration limits, notch filter and low-pass filter
- Optically isolated forward and reverse limit inputs and homing input
- 8 uncommitted, isolated digital inputs and 4 digital isolated outputs
- High speed position latch and output compare (pulse on position)
- 2 uncommitted analog inputs and 2 analog outputs
  - 16-bit analog input option available
- Dimensions:
  - EDD-37012/37016/37017-BOX: 3.9"×5.0×1.5"
- Custom hardware and firmware options available

Motion Controller	
Processor	RISC-Based with DSP functions
Communication	Two EtherCAT Ports
	- One USB Port for configuration and communication with the host PC.

Environmental	
Operational temperature	0 – 70 deg C
Humidity	20 – 95 % RH, non-condensing



Configurable Filter Features
Proportional
Torque limit
Backlash compensation
Integral
Offset
Profile filtering
Derivative
Feed-forward acceleration
Low-pass filter (Pole)
Notch
Dual-loop feedback mode
Feed-forward velocity

General Purpose I/O			
I/O	Quantity	Voltage	Details
Opto-isolated inputs	8	5-24 V <sub>DC</sub>	Can be configured for use as high-speed latch (position capture).
Opto-isolated outputs	4	5-24 V <sub>DC</sub> , 12-24 V <sub>DC</sub> optional	4mA Sinking default (500mA Sourcing options available). Can be configured as brake output.
Analog Inputs	2	± 10 V <sub>DC</sub>	12-bit, 16-bit optional
Analog Outputs	2	± 10 V <sub>DC</sub>	

Power and Mechanical				
Controller	Supply Voltage	Amplifier/Motor Type	Current Spec	Dimensions
EDD-37012	20-80 V <sub>DC</sub>	PWM; Brushed or Brushless Servos	10 A continuous, 15 A peak	BOX: 3.9" x5.0" x1.5"
EDD-37016	12-30 V <sub>DC</sub>	Stepper; Two-Phase Steppers	1.4 A/phase	
EDD-37017	20-80 V <sub>DC</sub>	Micro-Stepper or PWM; 2-Phase Steppers or 2-Phase Brushless	Bipolar Stepper: 6 A/phase 2-Phase Brushless: 10 A continuous, 15 A peak	

Feature Specific I/O Local Axes			
I/O	Quantity	Description	Details
Reverse/Forward Limit Switches	2	5-24 V <sub>DC</sub> opto-isolated	
Home Input	1	5-24 V <sub>DC</sub> , opto-isolated	
Quadrature Encoder Inputs	2	+/-12 V <sub>DC</sub> or TTL	15 MHz input max
Hall inputs	1	3x 0-5 V <sub>DC</sub> TTL inputs	
Abort	1	5-24 V <sub>DC</sub> opto-isolated	
Reset	1	5-24 V <sub>DC</sub> opto-isolated	
Electronic lock-out	1	5-24 V <sub>DC</sub> opto-isolated	
Output compare	1	0-5 V <sub>DC</sub> TTL	Also known as pulse on position
Error out	1	0-5 V <sub>DC</sub> TTL	

# Ordering Options

The EDD-3701x part number modifies each of these boards. The “X”, (EDD -3701X) modifies the amplifier board. Also, the EDD -3701x has several additional configuration options that can be added to the “Y” place holder. Note, several Y options can be added by placing a comma between options.

Amplifier Board/Power Type Options	
EDD-3701X, where X is	Description
2	Amplifier: 800W sine drive Power: 20-80 V <sub>DC</sub>
6	Amplifier: 1.A stepper drive Power: 12-30 V <sub>DC</sub>
7	Amplifier: Servo and stepper drive Power: 20-80 V <sub>DC</sub>

Additional Options	
EDD-3701x(Y), where Y is	Description
HSNK	500mA sinking outputs
4-20mA	4-20mA analog inputs
TRES	Encoder Input Termination Resistors
SR90	Shunt regulator
HALLF	Filtered Hall Sensor inputs
ISCNTL	Isolate controller and AMP power
2PB	2-phase brushless servo *Only with the EDD-37017
16	Adds ±10 V <sub>DC</sub> configurable 16-bit analog inputs

Cables and Accessories		
Image	Part Number	Description
	GDK   Galil Design Kit	Galil's newest generation software package for Galil Motion controllers, PLCs, and drives
	PSR-12-24	12A-24 V <sub>DC</sub> Power supply
	PSR-6-48	6A-48 V <sub>DC</sub> Power Supply
	BLM-N23-50-1000-B	Nema 23 Brushless Motor with 1000 line/rev encoder
	CABLE-15-1M	15-pin HD male D to discrete wires-1 meter
	CABLE-15-2M	15-pin HD male D to discrete wires-2 meter
	CABLE-44M-1M	44-pin HD male D to discrete wires-1 meter
	CABLE-9-PIN-D	RS232 female to female straight through cable
	ICS-48015-M	15-pin D HD male to screw term
	ICS-48044-M	44-pin D HD male to screw terminals