

# SGDV-OCA01A - EtherCAT Network Module for Sigma-5

## Introduction

The SGDV-OCA01A is an add-on board, compatible with Sigma-5 series command option attachable type amplifiers SGDV – xxx x E x A. It provides a real-time Ethernet interface for an EtherCAT communication network with the communication protocol CANopen (CoE = CAN over EtherCAT). The CoE interface enables the user to achieve very high-speed synchronous distributed control with a high level of reliability. CANopen is a higher-layer protocol commonly used in the automation industry. The specification of this protocol is maintained and developed by the CiA organization ([www.can-cia.org](http://www.can-cia.org)).

EtherCAT is an open real-time Ethernet network supported by the EtherCAT Technology Group (<http://www.ethercat.org>).

## EtherCAT (CoE) network module features

The EtherCAT network module offers a wide range of functions based on the IEC 61158 Type12, IEC 61800-7 CiA 402 Drive Profile and supports the functions:

- Profile Position mode
- Homing mode
- Interpolated Position mode
- Profile Velocity mode
- Torque Profile mode
- Cyclic Sync Position mode
- Cyclic Sync Velocity mode
- Cyclic Sync Torque mode
- Communication rate of up to 100 Mbps
- 2 Standard RJ45 connectors
- 4 LEDs for status indication

The EtherCAT network module is conform to:

- EtherCAT Technology Group Specifications
- CiA Specifications
- Safety Standard UL508

- Material Compliance UL94V-0
- RoHS Directive 2002/95/EC
- WEEE Directive 2002/96/EC
- Low Voltage Directive 73/23/EEC
- EMC Directive 89/336/EEC

## General Specification

Applicable SERVOPACK		Σ-V Series SGD□-□□□□E1□ SERVOPACK (For rotational servomotor) Σ-V Series SGD□-□□□□E5□ SERVOPACK (For linear servomotor)		
Placement		Attached to the SERVOPACK		
Power Specification	Power Supply Method	Supplied from the control power supply of the SGD□ SERVOPACK.		
Operating Conditions	Surrounding Air/Storage Temperature	0°C to +55°C / -20°C to +85°C		
	Ambient/Storage Humidity	90% RH or less (with no condensation)		
	Vibration/Shock Resistance	4.9 m/s <sup>2</sup> / 19.6 m/s <sup>2</sup>		
	Protection Class/ Pollution Degree	Protection class: IP10, Pollution degree: 2 An environment that satisfies the following conditions. <ul style="list-style-type: none"> <li>• Free of corrosive or explosive gases</li> <li>• Free of exposure to water, oil or chemicals</li> <li>• Free of dust, salts or iron dust</li> </ul>		
	Altitude	1000 m or less		
	Others	Free of static electricity, strong electromagnetic fields, magnetic fields or exposure to radioactivity		
I/O Signals	Sequence Input	Input Signals which can be allocated	Number of Channels	7 channels
			Functions	The signal allocation and positive/negative logic can be modified. Forward run prohibited (P-OT), reverse run prohibited (N-OT), probe 1 latch signal (SI4), probe 2 latch signal (SI5), home switch input signal (SI6), general-purpose input signal (/SI0, SI3)
	Sequence Output	Fixed Output	Servo alarm (ALM)	
		Output Signals which can be allocated	Number of Channels	3 channels
			Functions	The signal allocation and positive/negative logic can be modified. Positioning completion (/COIN), speed coincidence detection (/V-CMP), servomotor rotation detection (/TGON), servo ready (/S-RDY), torque limit detection (/CLT), speed limit detection (/VLT), brake (/BK), warning (/WARN), near (/NEAR)

## Communication Specification

EtherCAT Communication	Applicable Communication Standards	IEC 61158 Type12, IEC 61800-7 CiA402 Drive Profile
	Physical Layer	100BASE-TX (IEEE802.3)
	Fieldbus Connection	CN11A (RJ45): EtherCAT Signal IN CN11B (RJ45): EtherCAT Signal OUT
	Cable	CAT5 STP 4 pair Note: Cables are automatically recognized by the AUTO MDIX function.
	SyncManager	SM0: Mailbox output, SM1: Mailbox input SM2: Process data outputs, SM3: Process data inputs
	FMMU	FMMU0: Mapped to the process data output (RxPDO) area. FMMU1: Mapped to the process data input (TxPDO) area. FMMU2: Mapped to the mailbox status
	EtherCAT Commands (Data Link Layer)	APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, FRMW Note: APRW, FPRW, BRW, LRW Commands are not supported.
	Process Data	Variable PDO mapping
	Mailbox (CoE)	Emergency Message, SDO Request, SDO Response, SDO information Note: TxPDO/RxPDO and Remote TxPDO/RxPDO are not supported.
	Distributed Clocks	Free-run, DC mode (Can be selected.) Supported DC cycle: 125 $\mu$ s to 4 ms (every 125- $\mu$ s cycle)
	Slave Information IF	256 bytes (For reading only)
LED Indicator	EtherCAT Link/Activity indicator (L/A) $\times$ 2 EtherCAT RUN indicator (RUN) $\times$ 1 EtherCAT ERR indicator (ERR) $\times$ 1	
CiA402 Drive Profile	<ul style="list-style-type: none"> <li>• Homing mode</li> <li>• Profile position mode</li> <li>• Interpolated position mode</li> <li>• Profile velocity mode</li> <li>• Profile torque mode</li> <li>• Cyclic synchronous position mode</li> <li>• Cyclic synchronous velocity mode</li> <li>• Cyclic synchronous torque mode</li> <li>• Touch probe function</li> <li>• Torque limit function</li> </ul>	