High Speed Counter

Datasheet

A-HSC

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1. PREFACE

1.1. ABOUT THIS DOCUMENT

This document contains the technical data for the High Speed Counter module.

1.2. INTRODUCTION TO THE HIGH SPEED COUNTER

This manual describes the installation, operation, and diagnostics of the Aparian High Speed Counter (A-HSC) module. The High Speed Counter, (hereafter referred to as the **module**) provides 8 high speed digital inputs for counter and frequency measurements, as well as 4 digital outputs, 4 analog inputs and 1 analog output.

The module can be configured to be either an EtherNet/IP target, a Modbus (TCP/RTU) client or a Modbus (TCP/RTU) server.

Primary Interface:
The module can use one of four Primary Interface modes:

EtherNet/IP Target
Here a remote EtherNet/IP device (e.g. a Logix controller) establishes a Class 1 connection to the module. Direct I/O data, diagnostics and counter values are exchanged using the input and output data assembly.

Modbus Server
Direct I/O data, diagnostics and counter values will be written to, or read from, the module's internal Modbus Registers (Holding or Input Registers). These registers can be accessed by a remote Modbus Client using Modbus TCP or Modbus RTU (RS232 or RS485).

Modbus Client
Direct I/O data, diagnostics and counter values will be written to, or read from, the module's internal Modbus Registers (Holding or Input Registers). The Modbus Auxiliary Map can then be used to configure the Modbus data exchange between multiple remote Modbus Server devices and the module's internal Modbus registers via Modbus TCP or Modbus RTU (RS232 or RS485).

The High Speed Counter is configured using the Aparian Slate application. This program can be downloaded from www.aparian.com free of charge.

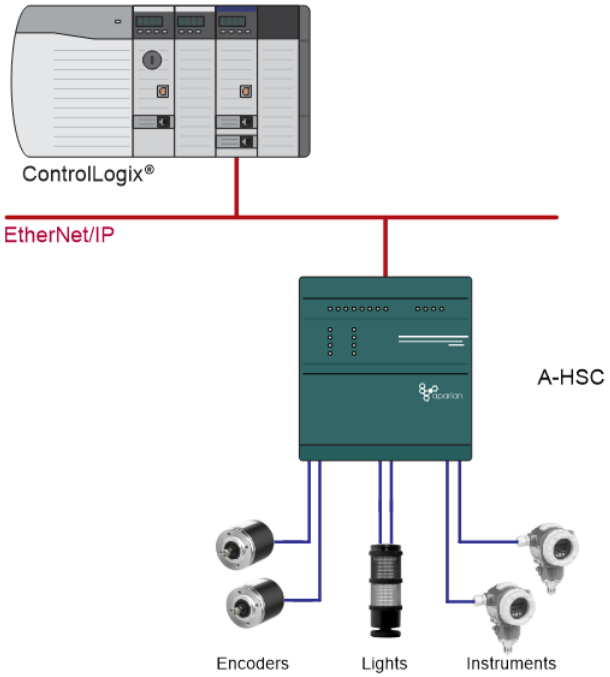

Figure 1.1. – Example of A-HSC owned by Logix via EtherNet/IP

The module also provides a range of statistics, Modbus packet capture functions, and internal Modbus and Data table reads to simplify the diagnostic process for remote diagnosis.

The module has two Ethernet ports and supports Device-Level-Ring (DLR) architectures.

1.3. FEATURES

- Module has various Primary Interfaces:
  - EtherNet/IP Target (Class 1 connection)
  - Modbus Server (TCP)
  - Modbus Client (TCP)
- 8 Isolated Digital Inputs (24V / 5V) capable of 1 MHz
- 4 Isolated Digital Solid-State Relay Outputs
- 4 Analog Inputs (Current / Voltage)
- 1 Analog Current Output
- Multiple Encoder options
- Sequence of Events
- Slate software provides a Modbus packet capture utility for better diagnosis of issues.
- Dual Ethernet ports which support Device-Level-Ring (DLR).
- Small form factor – DIN rail mounted.

1.4. ARCHITECTURE

The figures below provide an example of the typical network setup for connecting via either EtherNet/IP or Modbus.

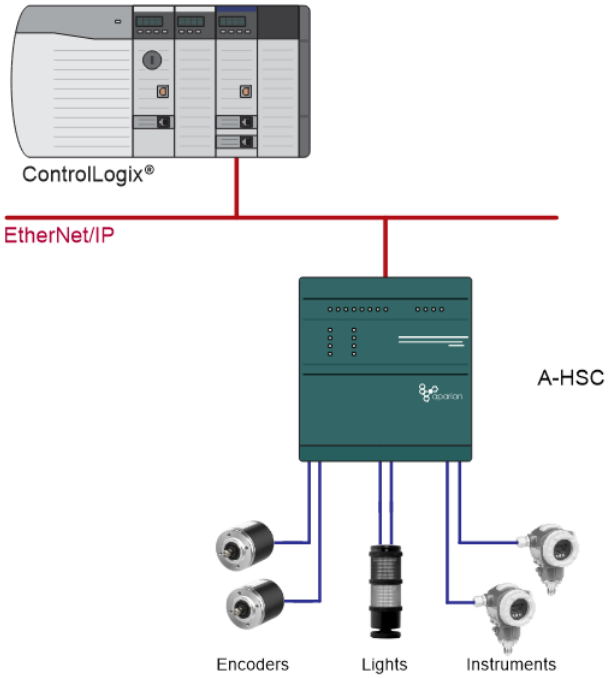

Figure 1.2. – Example of connecting to a Logix Controller

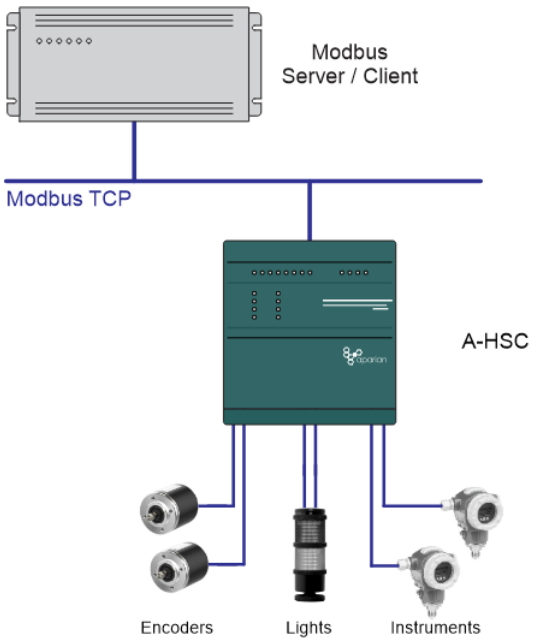

Figure 1.3. - Example of connecting to a Modbus TCP Client or Server

1.5. ADDITIONAL INFORMATION

The following documents contain additional information that can assist the user with the module installation and operation.

Resource	Link
Slate Installation	http://www.aparian.com/software/slate
High Speed Counter User Manual High Speed Counter Datasheet Example Code & UDTs	https://www.aparian.com/products/HSC
Ethernet wiring standard	www.cisco.com/c/en/us/td/docs/video/cds/cde/cde205_220_420/installation/guide/cde205_220_420_hig/Connectors.html

Table 1.1. - Additional Information

1.6. SUPPORT

Technical support is provided via the Web (in the form of user manuals, FAQ, datasheets etc.) to assist with installation, operation, and diagnostics.

For additional support the user can use either of the following:

Resource	Link
Contact Us web link	https://www.aparian.com
Support email	support@aparian.com

Table 1.2. – Support Details

2. TECHNICAL SPECIFICATIONS

2.1. DIMENSIONS

Below are the enclosure dimensions as well as the required DIN rail dimensions. All dimensions are in millimeters.

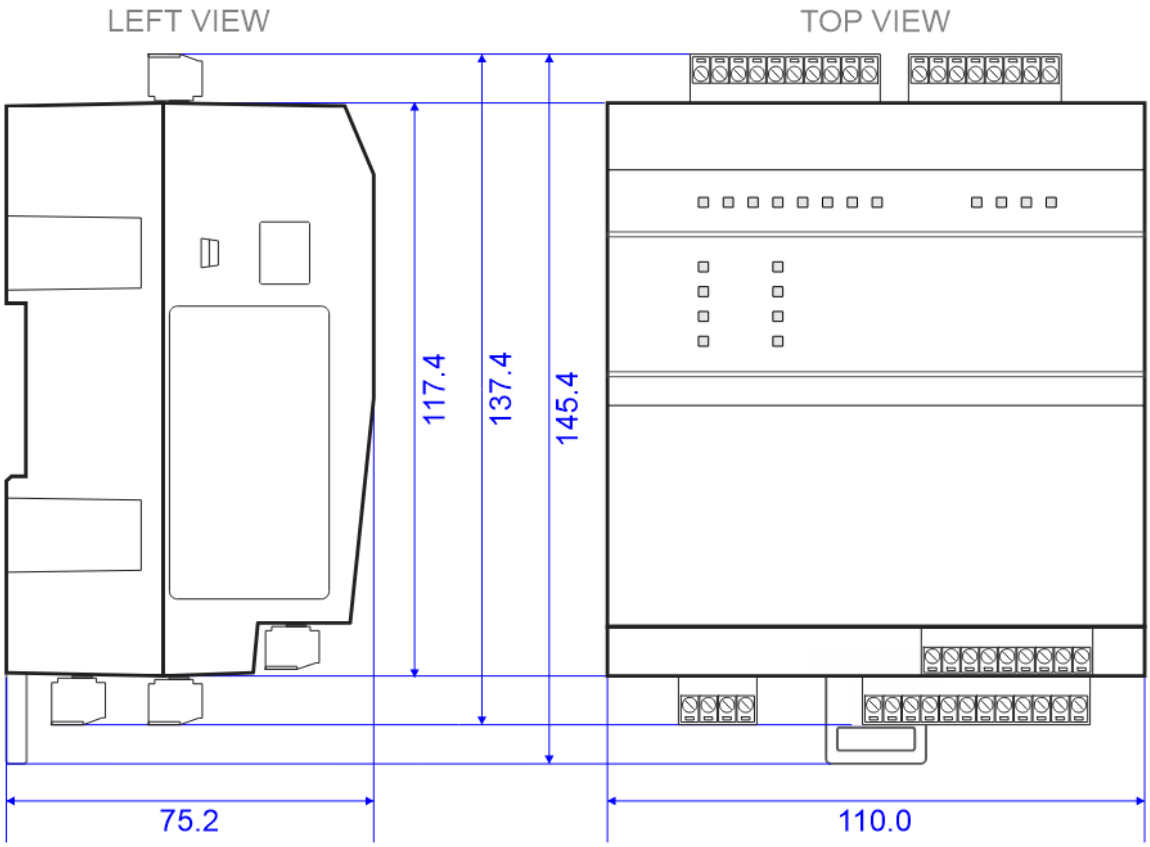

Figure 2.1 – High Speed Counter enclosure dimensions

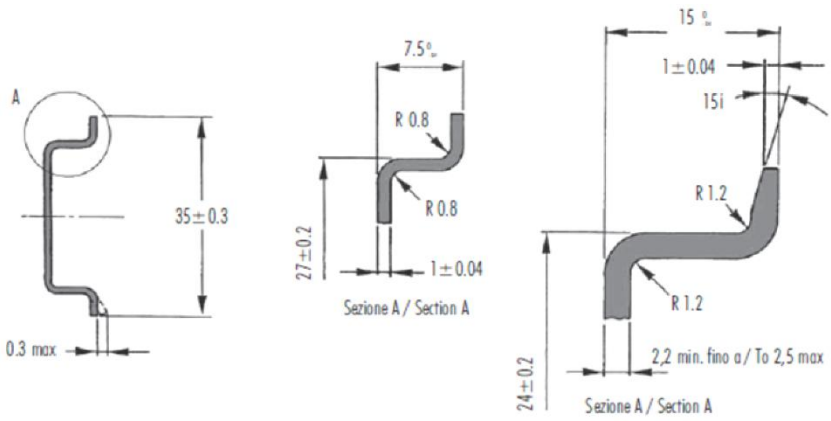

Figure 2.2 - Required DIN dimensions

2.2. ELECTRICAL

Specification	Rating
Power requirements	Input: 10 – 32 VDC (Class 2)
Power consumption	3.8 W (Max.) Current: 285 mA @ 10 VDC Current: 142 mA @ 24 VDC
Connector	4-way terminal Tightening Torque: 0.22 – 0.25 Nm
Dual Power Input	Yes, individually monitored
Conductors	24 – 18 AWG
Enclosure rating	IP20, NEMA/UL Open Type
Temperature	-20 – 70 °C
Earth connection	Yes, terminal based
Emissions	IEC61000-6-4
ESD Immunity	EN 61000-4-2
Radiated RF Immunity	IEC 61000-4-3
EFT/B Immunity	EFT: IEC 61000-4-4
Surge Immunity	Surge: IEC 61000-4-5
Conducted RF Immunity	IEC 61000-4-6

Table 2.1 - Electrical specification

2.3. DIGITAL INPUTS

Specification	Rating
Connector	10-way terminal Tightening Torque: 0.22 – 0.25 Nm
Organization	2 banks of 4 inputs each Each bank with individual reference.
Isolation	1000 V RMS
Input Voltage Selection	Software controlled: 24V Mode or 5V Mode
Maximum Input Voltage	32 VDC
Input Threshold Voltage	24V Mode:

	9.5 VDC typical @ 25 °C 5V Mode: 3.4 VDC typical @ 25 °C
Input Current	24V Mode: 2.9 mA @ 12 VDC 4.8 mA @ 24 VDC 4.9 mA @ 32 VDC 5V Mode: 2.2 mA @ 5 VDC
Maximum Input Frequency	1 MHz (50% duty cycle)

Table 2.2 – Digital Input specification

2.4. DIGITAL OUTPUTS

Specification	**Rating**
Connector	8-way terminal Tightening Torque: 0.22 – 0.25 Nm
Organization	4 isolated outputs (normal open)
Isolation	1000 V RMS
Maximum Switching Voltage	32 VDC
Maximum Switching Current	300 mA
Maximum Switching Frequency	100 Hz (50% duty cycle)

Table 2.3 – Digital Output specification

2.5. ANALOG INPUTS

Specification	**Rating**
Connector	12-way terminal (shared with Analog Output) Tightening Torque: 0.22 – 0.25 Nm
Organization	4 inputs with common reference
Isolation	500 VDC (between analog I/O and rest of module)
Input Selection	Software controlled: Current Mode: 0-20 mA

	Voltage Mode: 0-10 VDC
Maximum Input Voltage	11 VDC
ADC Resolution	16 bit
Sampling Rate	10 Hz

Table 2.4 – Analog Input specification

2.6. ANALOG OUTPUT

Specification	**Rating**
Connector	12-way terminal (shared with Analog Output) Tightening Torque: 0.22 – 0.25 Nm
Organization	1 current output with external power
Isolation	500 VDC (between analog I/O and rest of module)
External Voltage	24 VDC
Output Current	0-21 mA
Minimum Load Resistance	200 Ω
DAC Resolution	12 bit
Update Rate	10 Hz

Table 2.5 – Analog Output specification

2.7. ETHERNET

Specification	**Rating**
Connector	RJ45
Conductors	CAT5 STP/UTP
ARP connections	Max 100
TCP connections	Max 100
CIP connections	Max 15
Communication rate	10/100Mbps
Duplex mode	Full/Half
Auto-MDIX support	Yes
Embedded switch	Yes, 2 x Ethernet ports
Device Level Ring (DLR)	Supported

Network Time Protocol (NTP)	Supported

Table 2.6 - Ethernet specification

2.8. SERIAL PORT (RS232)

Specification	Rating
Connector	9-way terminal (shared with RS485, CAN) Tightening Torque: 0.22 – 0.25 Nm
Conductor	24 – 18 AWG
Electrical Isolation	1000 VDC
BAUD	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Parity	None, Even, Odd
Data bits	8
Stop bits	1

Table 2.7 – RS232 Serial Port specification

2.9. SERIAL PORT (RS485)

Specification	Rating
Connector	9-way terminal (shared with RS232, CAN) Tightening Torque: 0.22 – 0.25 Nm
Conductor	24 – 18 AWG
Electrical Isolation	1500 Vrms for 1 minute.
BAUD	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Parity	None, Even, Odd
Data bits	8
Stop bits	1

Table 2.8 – RS485 Serial Port specification

2.10. CAN BUS

Specification	Rating
Connector	9-way terminal (shared with RS232, RS485) Tightening Torque: 0.22 – 0.25 Nm
Conductor	24 – 18 AWG
Electrical Isolation	1500 Vrms for 1 minute.
Supported Baud Rates	125k 250k 500k
CAN Terminator	120 Ω - Software Enabled

Table 2.9 – CAN bus specification

2.11. ETHERNET/IP TARGET

Specification	Rating
Class 1 Cyclic connection count	1
RPI Range	1 – 2000 ms

Table 2.10 – EtherNet/IP Target specification

2.12. MODBUS CLIENT

Specification	Rating
Modes Supported	Modbus TCP, RTU-RS232, RTU-RS485
Max. Modbus Server Devices	20
Max. Modbus Mapping	100
Mapping Ranges	Holding Register 0 – 65535 Input Register 0 – 65535 Input Status 0 – 65535 Coil Status 0 – 65535
Base Offset	Modbus (Base 0) PLC (Base 1)
Configurable Modbus TCP Port	Yes

Data Reformatting Supported	BB AA BB AA DD CC CC DD AA BB DD CC BB AA

Table 2.11 – Modbus Client specification

2.13. MODBUS SERVER

Specification	Rating
Modes Supported	Modbus TCP, RTU-RS232, RTU-RS485
Mapping Ranges	Holding Register 0 – 65535 Input Register 0 – 65535 Input Status 0 – 65535 Coil Status 0 – 65535
Base Offset	Modbus (Base 0) PLC (Base 1)
Configurable Modbus TCP Port	Yes

Table 2.12 – Modbus Server specification

2.14. CERTIFICATIONS

Certification	Mark
CE Mark	CE
RoHS2 Compliant	RoHS2
UL Mark File: E494895	c UL us LISTED CLASS 1, DIV 2, GROUPS A, B, C, D T4
UKCA	UK CA

ATEX	 UL 26 ATEX 3612X Ta: -20°C to +70°C II 3 G Ex ec IIC T4 Gc
ODVA Conformance	EtherNet/IP™

Table 2.13 – Certifications