High Speed Counter
for the Smart Distributed System

HSC-6010-1 1203 **TECHNICAL DATA**

Description

The Holjeron High Speed Counter module can count pulsed inputs up to a 30 KHz frequency, and quadrature counts to 10 KHz. The module also provides a preset that is compared to the actual count. Upon preset the module can be configured to function in a number of ways.

The High Speed Counter module also allows for the configuration of pre-travel setpoints. Pre-travel points are reported on the Smart Distributed System network as they occur, allowing the user to know when a process is nearing the preset.

There is also a physical output on the High Speed Counter that can be linked to the state of the preset. The state of the output will change in less than one millisecond when the preset state changes, providing for direct control of an actuator in an application.

Specifications

Part Number	High Speed Counter for SDS		HSC-SDS102
Electrical	SDS Voltage Range		11-25 VDC
	Current Consumption		50 mA plus inputs
	Data Rates		125, 250, 500 and 1000 kbps
Inputs	Type	Inputs A & B	Pull-up, Pull-down or TTL
		Reset	Pull-Up
	Voltage		10-30 vdc
	Current		20 mA
Outputs	Type		Relay
	Voltage		24-240 VAC/DC
	Current		1 Amp at 115 VAC
Environmental	Temperature	Storage	-30° to 70° C (-22° to 158° F)
		Operating	0° to 60° C (32° to 140° F)
	Humidity		5-95% RH, non-condensing
	Vibration		2G at 10 to 500 Hz
	Shock		10G
Physical	Dimensions		3.82" H x 3.25" W x 0.89" W
	Weight		8 oz
	Color		Light Gray
	Case Material		Polycarbonate and ABS
	Mounting		DIN rail or back panel mount
	Terminations		Captive screws, finger-safe
	Indication	Power	Green
		I/O Power	Green
		Error	Red
		Output	Green
		Reset	Green
		Inputs 2)	Green

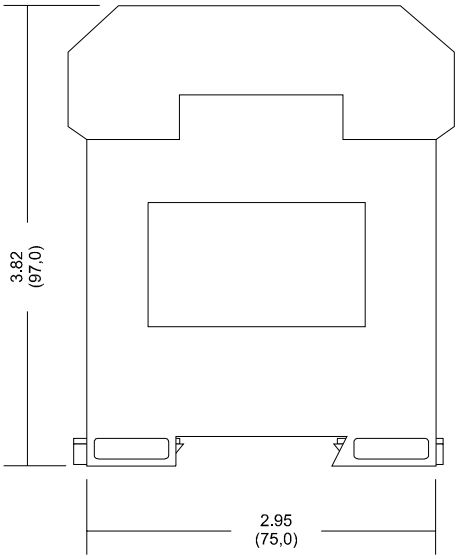
Warranty/Remedy

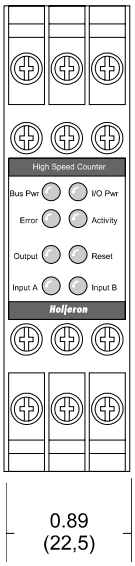
Seller warrants its products to be free from defects in design, material and workmanship under normal use and service. Seller will repair or replace without charge any such products it finds to be so defective on its return to Seller within 18 months after date of shipment by Seller. **The foregoing is in lieu of all other expressed or implied warranties (except title), including those of merchantability and fitness for a particular purpose.** The foregoing is also purchaser's sole remedy and is in lieu of all other guarantees, obligations, or liabilities or any consequences incidental, or punitive damages attributable to negligence or strict liability, all by way of example.

While Holjeron provides application assistance, personally and through our literature, it is up to the customer to determine the suitability of the product in the application.

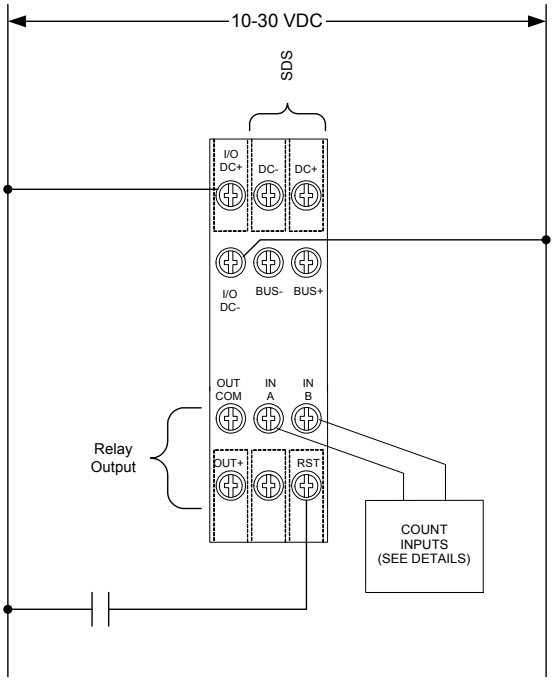
All information contained herein, including illustrations, specifications and dimensions, is believed to be reliable as of the date of publication, but is subject to change without notice.

Dimensions

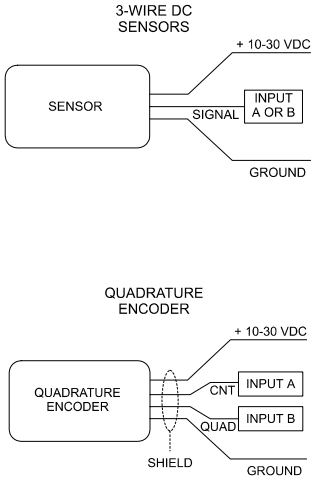




Wiring



Sensor and Encoder Detail



Configuration

The High Speed Counter can be configured using several tools. The information below summarizes the configuration tools available and hardware requirements for each tool.

Honeywell hand-held activator

The Honeywell activator does not supply enough power by itself. The SDS bus must have external power applied.

PC Control

Requires a Honeywell PC Interface Card with separate bus power.

Holjeron Device Manager for SDS

Requires an HSIM Portable (RS-232 to CAN converter) that connects to the serial port of a personal computer. The bus OR the HSIM Portable must have power.

Quick Start

The following steps are a guide to help the commissioning process to ensure the product will function as desired. Default values are shown in bold typeface.

Set the address of the device. All units are shipped from the factory as **address 126**.

Note: Set the address before attaching a High Speed Counter to a complete bus. Otherwise, the entire bus will be configured with devices at address 126.

Operation

The High Speed Counter functions much like a stand-alone batch counter. Count inputs can increment or decrement a count value, which is compared to a preset value. The specific actions that are taken when the count reaches the preset value are configured in attributes.

The High Speed Counter also has pre-travel setpoints and an over-travel setpoint whose status is reported over the SDS network.

Input Variable

Attribute 18 functions as the input attribute for the High Speed Counter. Whenever an event is generated that reports the state of inputs, the data in attribute 18 will be passed.

Input Variable Bit Definitions

Bit	Description
0	Count is at zero.
1	Count is ≥ the preset value.
2	Count is ≥ the overtravel value
3	Count is ≥ the pretravel 1 value.
4	Count is ≥ the pretravel 2 value.
5	Count is ≥ the pretravel 3 value.
6	The reset is enabled.
7	The physical output is enabled.

Most systems will require a High Speed Counter to generate an event whenever one or more inputs change state. This requires the **Unsolicit Mode (attribute 6)** be enabled by setting its value to **1**. Other options are to disable change of value events (Unsolicit Mode = 0) or use the Cyclic Timer (Attribute 10) by setting it to some non-zero value. The Cyclic Timer will transmit the input variable on an interval equal to the value in the Cyclic Timer attribute times 10 milliseconds (0.01 seconds).

Input Type and Mode

Configure the inputs by setting the **Input Type (Attribute 74)** to the signal being used and the **Input Mode (Attribute 75)** to the counting functionality desired.

Input Type (Attribute 74)

Value	Input Type
0	**TTL (floating)**
1	Sinking (pull-up)
2	Sourcing (pull-down)

Input Mode (Attribute 75)

Value	Input Type
0	**Input A: Count Up, Input B: Disabled**
1	Input A: Count Up, Input B: Direction (0=Up, 1=Down)
2	Input A: Count Up, Input B: Count Down (anti-coincidence)
3	Input A: Count Up, Input B: Count Up (anti-coincidence)
4	Quadrature X1

Once the inputs have been configured, the inputs can be tested by monitoring **Count Data (Attribute 80)**. The value in Count Data should change if the inputs to the High Speed Counter change state. With the quadrature option the counter will increment when falling edge of input A occurs when input B is low and will decrement when the rising edge of input A occurs when input B is high.

Preset and Over-Travel Values

When the inputs are working correctly, the **Preset Value (Attribute 62)**, the **Over-travel Value (Attribute 70)** and the three **Pre-travel Values (Attributes 71-73)** can be configured.

The values in these attributes affect the state of the **Input Variable (Attribute 18)**. The bits in the Input Variable will be on when the condition they represent is true. Only the Preset State (bit 1) effects the state of the physical output on the High Speed Counter module. The Pre-Travels are provided to give the user increased flexibility, such as slowing down a conveyor, before reaching the setpoint. The Reset On and Output On provide information about the state of the High Speed Counter.

Once the Preset and Pre-travels are configured their functionality can be verified by monitoring the Input Variable (Attribute 18) while changing the state of the inputs.

Output Variable

After configuring the Preset and Pre-travel values, the output and reset operations should be set up. This is done by setting the **Output Initiation Mode (Attribute 76)**, the **Reset Mode (Attribute 77)**, the **Output Termination Mode (Attribute 78)**, and possibly the **Output Time Delay (Attribute 79)**.

Attribute 34 contains the information for the outputs. Whenever the host controller changes the state of an output it is writing to attribute 34.

Output Variable Bit Definitions

Bit	Description
0	Reset the counter.
1	Controls the state of the physical output.

Output Initiation Mode

The **Output Initiation Mode (attribute 76)** determines what condition changes the output from the normal state to an energized state. Note that the normalized state can be inverted from open to closed by changing the **Output NO/NC (Attribute 60)** to a value of 1.

Output Initiation Mode (Attribute 76)

Value	Initiation Mode
0	**Initiate output when count equals preset**
1	Initiate output when count equals 0.
2	Initiate on leading edge of manual output. The output state is controlled strictly by the second bit of the Output Variable (Attribute 34).

Reset Mode

The **Reset Mode (attribute 77)** sets under what condition the Count Data (Attribute 80) will be initialized. Resets, if not in one of the auto reset modes, can be initiated from the physical reset input, or from the first bit in the Output Variable (Attribute 34).

Reset Mode (Attribute 77)

Value	Reset Mode
0	**Reset and hold at 0 as long as reset is maintained.**
1	Reset to 0 on leading edge of reset.
2	Reset and hold at preset as long as reset is maintained.
3	Reset to preset on leading edge of reset.
4	Auto reset to 0 at end of output time delay.
5	Auto reset to preset at end of output time delay.
6	Auto reset to 0 when count equals preset.
7	Auto reset to preset when count equals 0.
8	Auto reset to 0 when count equals over-travel.
9	Auto reset to preset when count equals over-travel.

Output Termination Mode

The **Output Termination Mode (Attribute 78)** determines what causes the physical output to return to a normal state.

Output Termination (Attribute 78)

Value	Reset Mode
0	**Terminate on boundary, as specified by the Output Initiation Mode (Attribute 76).**
1	Terminate at start of manual reset (physical input or output variable second bit).
2	Terminate at end of manual reset (physical input or output variable second bit).
3	Terminate after time delay (see attribute 79).

If the Output Termination Mode is set to 3 (terminate after time delay), the **Output Time Delay (Attribute 79)** must be set to some value other than **0**. The value entered is in 10 millisecond (0.01 second) increments.

After setting the output modes monitoring upper two bits in the Input Variable (Attribute 18) and the Count Data (Attribute 80) will show whether the output is configured properly for a given application.

Diagnostics

The Diagnostics Register (attribute 9) is a single byte and contains only the minimum diagnostics required for the Smart Distributed System.

Diagnostic Register Bit Definitions

Bit	Name	Description
0	CHKSUM	ROM checksum error
1	WDOG	Output watchdog timer expired
2	BUSOFF	Off us communications error
3	DEVERR	Fatal component error
4	NODE	Missing node detected
5	RSVD	Reserved
6	RSVD	Reserved
7	EPRM	EEPROM error detected

SDS host controllers are equipped to receive a diagnostic event, then automatically obtain the information from the **Diagnostic Register (attribute 9)**. Consult the documentation for the host controller being used to determine how errors are handled.

CHKSUM

A ROM checksum error is generated on power up if there is a memory error test.

WDOG

The WDOG diagnostic occurs whenever the Output Watchdog Timer (attribute 50) times out.

The Output Watchdog Timer is reset whenever the High Speed Counter module receives a message over SDS. If a message is not received in the time entered any point configured as an output will be set to the state for that bit in the Default Output (attribute 51).

The Output Watchdog Timer is entered in increments of 10 milliseconds (0.01 seconds). For example, a value of 100 equals 1 second.

BUSOFF

The CAN controller on the High Speed Counter module counts error messages. Every error message increments a counter by 8, every good message decrements the counter by 1. If the counter reaches 128 then the module will go BUSOFF, and will need to be reset by the host controller.

DEVERR

The DEVERR diagnostic bit will be set if a fatal error is detected within the component.

NODE

The host controller will report the node is missing using the NODE bit.

EPRM

The EPRM error will occur when the microprocessor on the High Speed Counter module is unable to read or write EEPROM.

Attributes

ID	Description	R/W	Data Type	*Size*	*Count*	Default
0	Network Data Descriptor	R	Unsigned	Byte	6	12,01,07,22,81,01 [hex]
1	Baud Rate	R	Unsigned	Byte	1	0 [autobaud]
2	Object Model	R	Unsigned	Byte	5	
3	Vendor Id	R	Unsigned	Word	1	9 [Holjeron]
4	Logical Address	R	Unsigned	Word	1	125
6	Unsolicit Mode	W	Boolean	Undef	1	1 [enabled]
7	Software Version	R	Character	Undef	12	
8	Diagnostic Counter	R	Unsigned	Byte	1	
9	Diagnostic Register	W	Unsigned	Byte	1	
10	Cyclic Timer	W	Unsigned	Word	1	0 [disabled]
11	Serial Number	R	Unsigned	Long	1	
12	Date Code	R	Character	Undef	4	
13	Catalog Listing	R	Character	Undef	32	HSC-SDS102
14	Vendor	R	Character	Undef	32	Holjeron
15	Description	W	Character	Undef	32	High Speed Counter
18	Input Variable	R	Boolean	Undef	8	
34	Output Variable	W	Boolean	Undef	2	00
50	Output Watchdog Timer	W	Unsigned	Word	1	0 [disabled]
51	Default Output	W	Boolean	Undef	2	00
56	Tag Name	W	Character	Undef	32	
60	Input NO/NC	W	Boolean	Undef	8	0000 0000 (N.O.)
62	Preset Value	W	Signed	Long	1	0
70	Overtravel Value	W	Signed	Long	1	0
71	Pretravel 1 Value	W	Signed	Long	1	0
72	Pretravel 2 Value	W	Signed	Long	1	0
73	Pretravel 3 Value	W	Signed	Long	1	0
74	Input Type	W	Unsigned	Byte	1	0
75	Input Mode	W	Unsigned	Byte	1	0
76	Output Initiation Mode	W	Unsigned	Byte	1	0
77	Reset Mode	W	Unsigned	Byte	1	0
78	Output Termination Mode	W	Unsigned	Byte	1	0
79	Output Time Delay	W	Unsigned	Word	1	0
80	Count Data	R	Signed	Long	1	0

Actions

ID	Description	Request Data	Response Data
0	NOOP	---	---
1	Change Address	New logical address	
2	Self Test	---	---
6	Clear All Errors	---	---
8	Enroll Logical Device	Address	Serial Number, Vendor Id
10	Change Baud Rate	New baud rate (0…4)	
51	Force State	Input variable value	
52	Unforce States		
53	Read Attribute Descriptor	Attribute Id	
57	Password	Password	
60	Reset Factory Defaults		

Events

ID	Description	Event Data
0	Diagnostic Event	Number of enabled diagnostic bits in attribute 9
3	End-Of-Timer	Attribute, Input variable
6	Change of Value	Attribute, Input variable
7	NOOP	---