MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

GE PACSYSTEMS RX3I

IC695HSC304-FA

FOUR-CHANNEL HIGH-SPEED COUNTER MODULE

Used with the applicable PACSystems RX3i motion and counting configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: GE official manufacturer documentation

8.2.4.4.1 %AQ Immediate Command Descriptions: APU305

Null	The default %AQ Immediate command. Since the %AQ words are transferred each PLC sweep, you should always enter the Null command to avoid inadvertent execution of another immediate command.
Load Home Position (AQUADB)	The Home reference position value that will be preloaded into the Input counter at the marker location after a Home command.
Load Preload Position (AQUADB)	The position value that will be preloaded into the Input Counter when a Preload Switch Input is recognized or the %Q Preload command is set.
Load Timebase	The timebase to be used for determining the Counts per Timebase value returned in the second %AI word assigned to the module.
Load Encoder Position Offset (ABS Encoder Function only)	The Encoder offset value. The Input Count Value is shifted relative to the Encoder Input by this amount as follows: Input Count Value = Encoder Input - Offset
Load Total Counts	The Total Count value reported in the fifth and sixth %AI words assigned to the module
Load ON/Off Preset Pairs 1-32	The ON and OFF preset value for the specified range comparator output.
Load Output Timer 1.1-8.1	The Output Timer 1 value for the specified range comparator output 1-8.
Load Output Timer 1.2-8.2	The Output Timer 2 value for the specified range comparator output 1-8.

8.3 High-Speed Counter Modules: IC695HSC304, IC695HSC308

For detailed information about both RX3i High-Speed Counter modules, please refer to the *RX3i High-Speed Counters Manual*, GFK-2441.

PACSystems RX3i High-Speed Counter modules provide direct processing of rapid pulse signals up to 1.5 MHz for industrial control applications such as:

- Turbine flowmeter
- Meter proving
- Velocity measurement
- Material handling
- Motion control
- Process control

These modules can sense inputs, process input count information, and control outputs without CPU intervention.

High-Speed Counter module IC695HSC304 provides: 8 high-speed inputs, 7 high-speed outputs, and 1 to 4 counters.

High-Speed Counter module IC695HSC308 provides: 16 high-speed inputs, 14 high-speed outputs, and 1 to 8 counters.

Standard counter types A, B, C, D, E, Z, and a user-defined type can be combined on a module.

Module features include:

- Terminal Block insertion or removal detection
- Meets CE, UL/CUL 508 and 1604, and ATEX requirements
- Flash memory for future upgrades
- Module fault reporting
- Configurable I/O Interrupts
- Select module parameters easily changed without re-configuration.

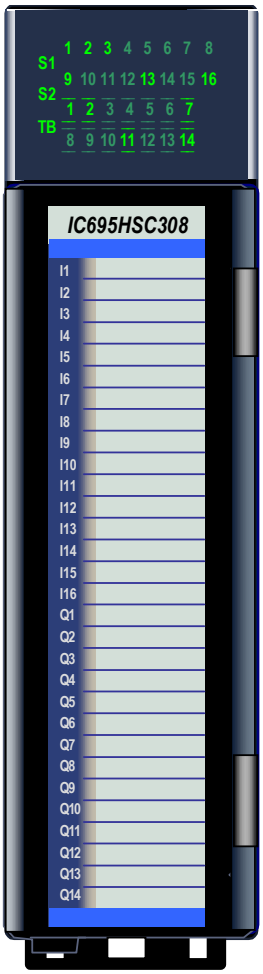


Figure 247: IC695HSC308

These modules must be located in an RX3i Universal Backplane.

Module supports insertion into and removal from an RX3i Universal Backplane which is under power. Refer to *Hot Insertion and Removal*, Section 2.6.4.1. When the module is removed from the backplane or is power-cycled, it stops counting and accumulated counts are lost.

High-Speed Counter modules can be used with a Box-style (IC694TBB032), Extended Box-style (IC694TBB132), Spring-style (IC694TBS032), or Extended Spring-style (IC694TBS132)) Terminal Block (Refer to Chapter 17). Extended terminal blocks provide the extra shroud depth needed for shielded wiring. Terminal Blocks are ordered separately.

8.3.1 LEDs: HSC304 & HSC308

Individual green LEDs indicate the ON/OFF status of the external input and output points of this module. These LEDs are green when the corresponding points are on. They are off when the corresponding points are off. LED positions are illustrated below.

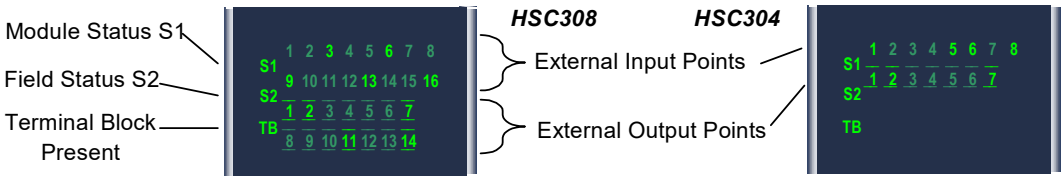


Figure 248: LED Layout HSC304 & HSC308

The Module Status (S1) LED indicates the status of the module. Solid green indicates that the module has been configured. Blinking green indicates no configuration. Blinking amber/yellow indicates a fatal module failure.

The Field Status (S2) LED is off if field power is not present. For module IC695HSC308, this LED is off unless power is present on BOTH V_A and V_B. Solid green indicates that field power is present and that no output circuit faults have been detected on circuits for which fault detection has been enabled in the configuration. If S2 is amber/yellow, field power is present but circuit faults exist for one or more outputs.

The red/green Terminal Block LED is green when the removable terminal block of this module is locked in place. It is red when the terminal block is not locked. The module also sends an *Addition of Terminal Block* or *Loss of Terminal Block* message to the RX3i CPU to report the Terminal Block status.

During a firmware update, the S1, S2, and TB LEDs blink in a green/off pattern.

8.3.2 Specifications: HSC304 & HSC308

Number of Counter Channels	IC695HSC304: 4 counters (8 inputs and 7 outputs) IC695HSC308: 8 counters (16 inputs and 14 outputs)	
High-Speed Counter Types	Configurable as Types A, B, C, D, E, Z, and User-Defined.	
Maximum Count Rates	1.5MHz with configurable input filtering, all counter types except 750kHz for Type C or User-Defined when using four counter outputs. (40 MHz internal oversampling). For A-Quad B count mode, 1.5MHz is the maximum overall count rate.	
Counting Range	-2147483648 to 2147483647	
Oscillator Accuracy Over Operating Temperature Range	±100ppm	
Oscillator Drift Over Time	±5ppm maximum per year	
Backplane Power Requirements	IC695HSC304:	64 mA maximum at 5Vdc 457 mA maximum at 3.3Vdc

8.3.2.1 Thermal Derating: HSC304 & HSC308 Outputs

The charts below show thermal deratings for modules IC695HSC304 and IC695HSC308 with maximum loads of 0.75A on each output.

For example, if five outputs are used on module IC695HSC304, at 60°C the total current of all outputs would be 3.75 Amps. If smaller loads are used on the outputs, then more output channels can be used at a given temperature.

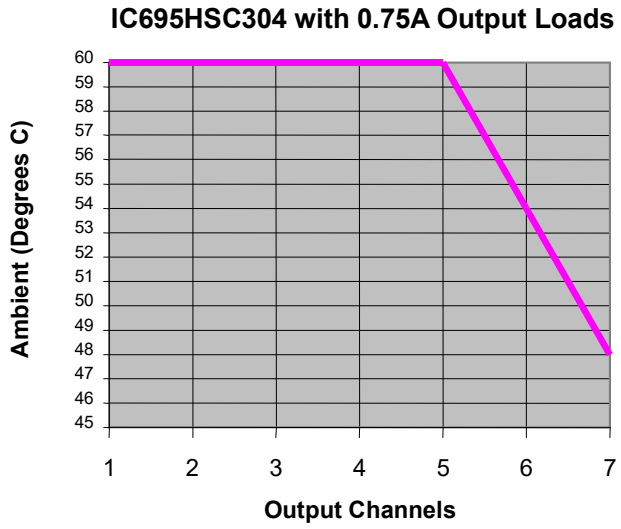


Figure 249: Thermal Derating HSC304 Outputs

For module IC695HSC308, more output channels can be used at the same time at a given ambient temperature when outputs are evenly distributed into two groups. If outputs are either set up as one output group or unevenly distributed between two output groups, fewer output channels can be used for a given ambient temperature.

For example, if eight outputs are used on module IC695HSC308, and they are equally distributed between two output groups, the total current of all outputs at 60°C can be up to 6 Amps. At a given ambient temperature, if smaller loads are used on the outputs, more output channels can be used.

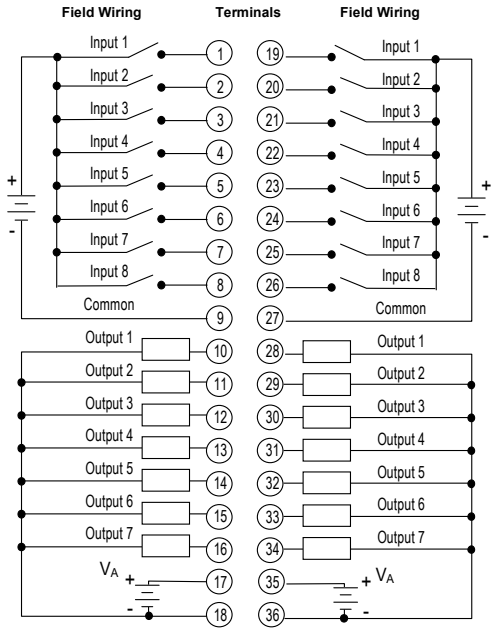
Output 1	10		28	Output 1
Output 2	11		29	Output 2
Output 3	12		30	Output 3
Output 4	13		31	Output 4
Output 5	14		32	Output 5
Output 6	15		33	Output 6
Output 7	16		34	Output 7
DC+ for Voltage Source A	17		35	DC+ for Voltage Source A
DC- for Voltage Source A	18		36	DC- for Voltage Source A

Figure 251: Field Wiring HSC304

All outputs on module IC695HSC304 form a single output group. Each row of terminals (i.e.: 1-18, 19-36) is internally connected. The dual connection points are for wiring convenience; the module cannot be wired for differential inputs. For load distributions, Refer to *Thermal Derating: HSC304 & HSC308 Outputs* above.