Section 17. Pulse Accumulator Module

17-1. Description

The Pulse Accumulator Module accumulate pulses for two input channels and provides the information to the Controller. There are three possible configurations:

- Counting pulses over a defined period of time allows the module to measure the speed of the input pulses (frequency).
- Counting pulses until instructed to stop counting either by the Ovation Controller or by an external field control input.
- Measuring the time duration of a pulse.

The Pulse Accumulator Module is applicable for CE Mark Certified Systems.

17-2. Module Groups

17-2.1. Electronics Modules

There are two groups of Electronics modules for the Pulse Accumulator Module:

- 1C31147G01 provides for pulse accumulation at one of three possible pulse input levels:
  - 24/48 V (CT+ and CT- inputs). May be referenced to either negative or positive field signal power supply common. Applicable for CE Mark.
  - 12 V medium speed (MC+ and HM- inputs). Not applicable for CE Mark.
  - 5 V medium speed (HC+ and HM-). Not applicable for CE Mark.
- 1C31147G02 provides for pulse accumulation at 5 V high speed (HC+ and HM-). Not applicable for CE Mark certified systems.

17-2.2. Personality Modules

There are three groups of Personality modules for the Pulse Accumulator Module:

- 1C31150G01 accepts 24/48 V count and control inputs from dry contacts or from open-collector transistor drivers. The input signals are low-true and are referenced to the branch internal auxiliary power supply return (common negative).
- 1C31150G02 accepts 24/48 V count and control inputs from dry contacts. The input signals are high-true and are referenced to the branch internal auxiliary power supply positive rail (common positive).
- 1C31150G03 provides dedicated 24/48 V count and control field input power for just this Pulse Accumulator Electronics module. The field input power is obtained from an external DC power supply that is connected to two base unit terminal block terminals (DSA and DSB).

Table 17-1. Pulse Accumulator Subsystem[1]

COUNT Input Level	Control (ENABLE and SNAPSHOT) Input Level	Channels	Electronic Module	Personality Module
24/48 V Medium Speed	24/48 V Medium Speed			
	Local field pwr. common neg.	2	1C31147G01	1C31150G01
	Local field pwr. common pos.	2	1C31147G01	1C31150G02
	Ext. field pwr. common pos. or neg.	2	1C31147G01	1C31150G03
5/12 V Medium Speed	24/48 V Medium Speed			
	Local field pwr. common neg.	2	1C31147G01	1C31150G01
	Local field pwr. common pos.	2	1C31147G01	1C31150G02
	Ext. field pwr. common pos. or neg	2	1C31147G01	1C31150G03
5 V High Speed	24/48 V Medium Speed			
	Local field pwr. common neg.	2	1C31147G02	1C31150G01
	Local field pwr. common pos.	2	1C31147G02	1C31150G02
	Ext. field pwr. common pos. or neg	2	1C31147G02	1C31150G03

[1] To use this module, the algorithm RPACNT or RPAWIDTH must reside in the Ovation Controller. Refer to "Ovation Algorithm Reference Manual" (R3-1100) for detailed information about the RPACNT and RPAWIDTH algorithms.

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17-3. Specifications

Electronics Module (1C31147)
Personality Module (1C31150)

Table 17-2. Pulse Accumulator Specifications

Description	Value
Number of channels	2
Field input voltage range [1]	Field count: +5V (high speed) +5/12V (medium speed) + 24/48V Field controls: +24/48V
24/48 V field input power [2]	Common positive (1C31150G02) Common negative (1C31150G01) Dedicated (user-defined) contact power (1C31150G03)
Configurable functions	Count pulses Measure pulse width Measure period Measure speed
Counter output	15 bit count (bits 14 - 0) Bit 15 (MSB) is an update bit indicating new data available Counter overflow status
Field inputs	External count input (leading or trailing edge) OR Selectable internal timebase: 100 Khz, 10 Khz, 1 Khz See Table 17-3 for more information.
Input filter	+5V High Speed Count: 1 µSec. to 5 µSec. +5/12V Medium Speed Count: 16 µSec. to 38 µSec. +24/48V Count:150 µSec to 450 µSec +24/48V Controls: 150 µSec to 450 µSec
Contact debounce (24/48 V field inputs)	Configurable: Minimum: 1.4 mSec Maximum: 2.0 mSec
Dielectric isolation: Channel to channel Channel to logic	 1000V AC/DC 1000V AC/DC
Operating temperature range	0 to 60°C (32°F to 140°F)
Storage temperature range	-40°C to 85°C (-40°F to 185°F)
Humidity (non-condensing)	0 to 95%

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Table 17-2. Pulse Accumulator Specifications

Description	Value
Module power from logic supply	Main: 1.6 W typical: 2.0 W maximum Aux: When used, both count inputs = 50% duty cycle 0.17 W (24V) typical 0.35 W (48V) typical
[1] All field inputs must be in a shielded cable. [2] Open loop/blown fuse detection for 24/48V power.	

Table 17-3. Field Input Pulse Accumulator Specifications

Count Inputs	On Time msec. min.	Off Time msec. min.	Count Rate max.	Description
Count Outputs				
(MC+/HM-) 12V (HC+/HM-) 5V	0.03	0.03	20 kHz	medium speed without de-bounce circuit enabled (1C31147G01)
(MC+/HM-) 12V (HC+/HM-) 5V	2.5	2.5	200 Hz	medium speed with de-bounce circuit enabled (1C31147G01)
(HC+/HM-) 5V	0.007	0.007	70 kHz	high speed without de-bounce circuit enabled (1C31147G02)
(HC+/HM-) 5V	2.5	2.5	200 Hz	high speed with de-bounce circuit enabled (1C31147G02)
(CT+/CT-) 24V/ 48V	1	1	500 Hz	without de-bounce circuit enabled (1C31147G01)
(CT+/CT-) 24V/ 48V	2.5	2.5	200 Hz	with de-bounce circuit enabled (1C31147G01)
Control Inputs				
24V/48V	1	1	500 Hz	without de-bounce circuit enabled
24V/48V	2.5	2.5	200 Hz	with de-bounce circuit enabled

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17-3.1. Input Signal Levels

Table 17-4. 5/12 Volt Medium Speed COUNT Input Signals

Voltage	Vin OFF	Vin ON			Iin Off	Iin ON		
	V max.	V min.	V nom.	V max.	ma max.	ma min.	ma nom.	ma Max
5V Input	0.8	3.9	--	5.0	1.5	12.0	--	21.0
12V Input	0.8	9.75	--	12.5	1.5	12.0	--	21.0

The 5V medium speed COUNT input impedance is typically 250 ohms. This is a two leaded input signal.

Table 17-5. 5 Volt High Speed COUNT Input Signals

Vin OFF	Vin ON			Iin Off	Iin ON		
V max.	V min.	V nom.	V max.	ma max.	mA min.	mA nom.	mA Max
0.8	3.9	--	5.0	3.0	25.0	--	42.0

The 5V high speed COUNT input impedance is typically 125 ohms. This is a two-leaded input signal

Table 17-6. 24/48 Volt Medium Speed COUNT Input Signals

Input Level	ON Input Volts		OFF Input Volts	ON Input mA		Off Input mA
	min.	max.	max.	min.	max.	max.
Control Signals						
24 VDC	18	60	9	2.0	5.1	0.6
48 VDC	18	60	9	2.0	5.1	0.6
Count Signals						
24 VDC	18	60	9	3.0	7.7	0.9
48 VDC	18	60	9	3.0	7.7	0.9

This signal level applies to the control inputs and to the 24/48 Volt COUNT input depending upon the group and the wiring.

This input will accept either a 24V or 48V input. The Electronics Module can accept a positive or a negative field signal common. The Personality Module determines if the field signal common is positive or negative.

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17-4. Pulse Accumulator Terminal Block Wiring Information

Each Personality module has a simplified wiring diagram label on its side, which appears above the terminal block. This diagram indicates how the wiring from the field is to be connected to the terminal block in the base unit.

Note

Do **not** use unmarked terminal block locations.

The diagrams for the Pulse Accumulator Personality modules are illustrated in Figure 17-1. The following table lists and defines the diagram abbreviations.

Abbreviation	Definition
CTX	24/48V count terminal connection using external power
CTY	24/48V count terminal connection using external power
CT+	24/48V positive count terminal connection
CT-	24/48V negative count terminal connection
DSA	Dedicated external supply
DSB	Dedicated external supply
	Earth ground terminal
ENX	24/48V external enable connection using external power
ENY	24/48V external enable connection using external power
EN+	24/48V positive external enable connection
EN-	24/48V negative external enable connection
HC+	+5V high/medium speed count connection
HM-	5/12V high/medium speed count reference
MC+	+12V medium speed count connection
PS+, PS-	Auxiliary power supply terminals
RSV	Reserved terminal. No connections allowed on these terminals, except when specified for terminals C4 or C12.
SSX	24/48V snapshot connection using external power
SSY	24/48V snapshot connection using external power
SS+	24/48V positive snapshot connection
SS-	24/48V negative snapshot connection

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Note

Do **not** use unmarked terminal block locations.

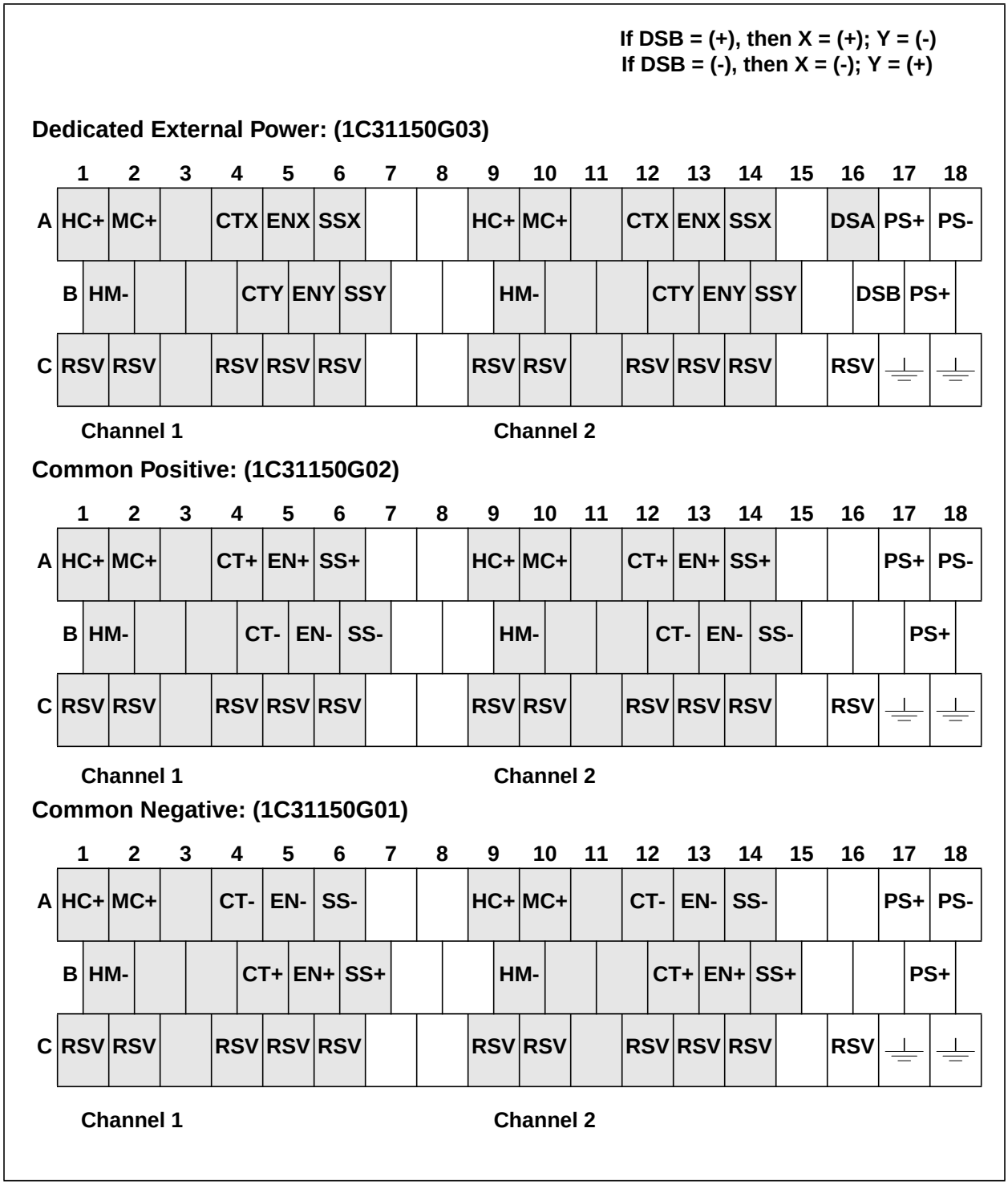


Figure 17-1. Terminal Block Connections for the Pulse Accumulator Personality Module

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17-5. Pulse Accumulator Field Connection Wiring Diagrams

Non-CE Mark Certified Systems

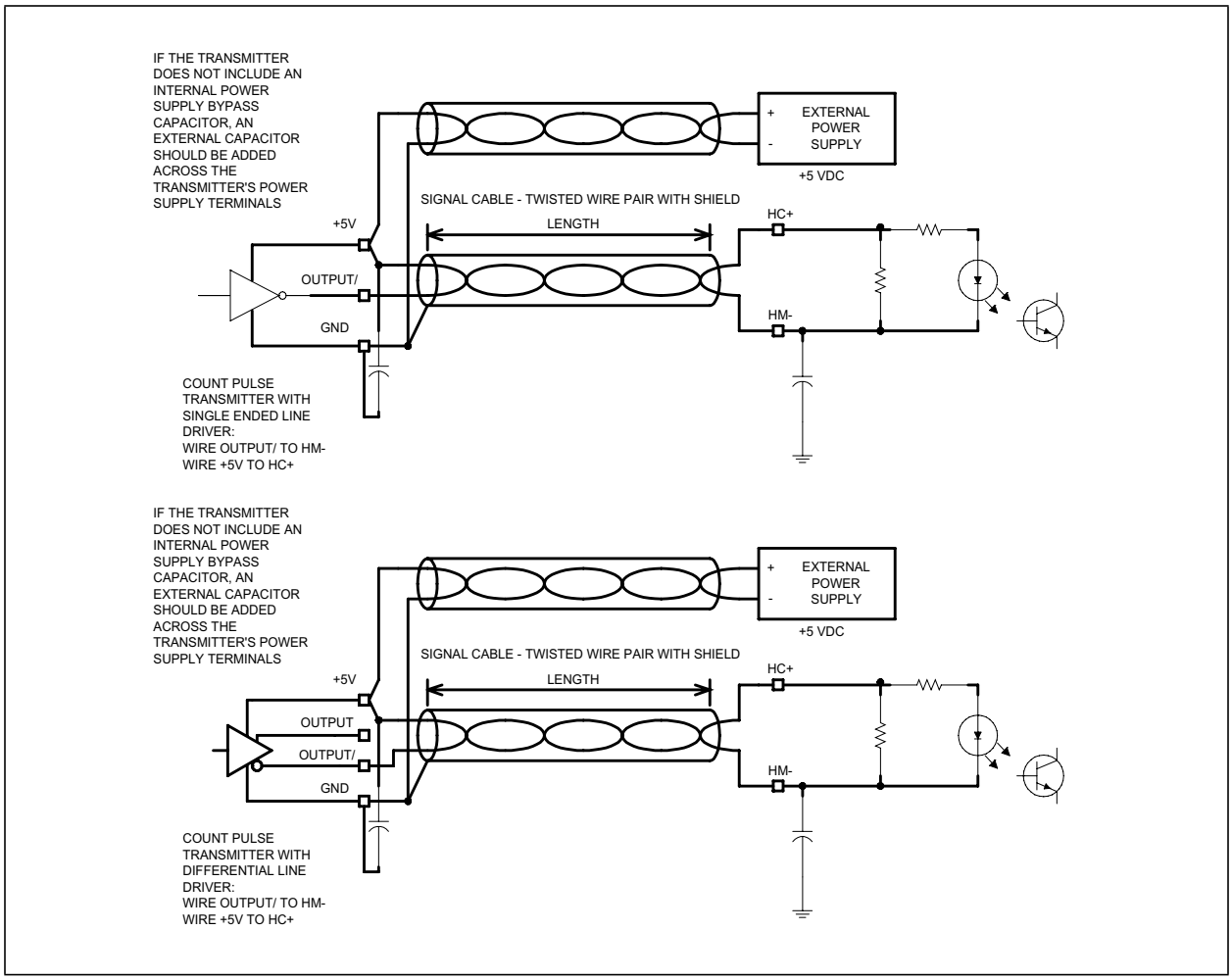


Figure 17-2. 5 V Count Field Connections - (Non-CE Mark)

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