GN3A1-02C-10 Additional Instructions

The GN3A1-02C-10 16 output Genesis unit has five features not shown in the standard GN3A1-01B-10 user manual. These features are,

- A shift register input
- The ability to program Pulsed Outputs
- A Lockout Input
- Remote Program Select
- Two (2) speed-based analog outputs
- The inputs and outputs are located on separate relay boards, not on the back of the Genesis unit.

These features are described below.

Shift Register function

The shift register allows the user to track a package/product as it moves from one station to another. The shift register "shifts" a bit with each rotation of the resolver and can be used to disable/enable outputs based upon the status of this stored shift register bit. This feature is useful on assembly equipment and production lines where the resolver makes more than one rotation for the completion of a process.

The resolver's position data MUST be increasing for the shift register operation to occur correctly.

The shift register input is a dedicated terminal that is located on the back of the GN3A1-02C-10 unit. This is a 10 to 30Vdc bipolar input (that is either terminal can be connected to the positive voltage) and requires 10mA at 24Vdc to be activated.

The shift register monitors an external input called the shift register input and sets the bit in the register according input level of the shift register input. The shift register stores 256 consecutive shifts. The status of the input is monitored for only a portion of the resolver's rotation called the shift window. The register is shifted when the resolver reaches a pre-programmed position called the shift position.

The shift register parameters are programmed on the forth screen of the configuration menu, shown below.

		C	O	N	F	I	G	U	R	E		4		O	F		6				
W	I	N	D	O	W		O	N	*	*	*		O	F	F		*	*	*		
		S	H	I	F	T		P	O	S	I	T	I	O	N		*	*	*		
V	I	E	W	*	*		P	:	*	*	*		R	P	M	*	*	*	*		

WINDOW ON – The position within the resolver's rotation that the Genesis unit begins to monitor the shift register input

WINDOW OFF – The position within the resolver's rotation when the Genesis unit stops monitoring the status of the shift register input.

SHIFT POSITION - The position in the resolver's rotation where the most current state of the shift input is moved into the stack of shift register bits.

The status of the shift register can be monitored in the status menu. The status of the shift bits is displayed in hexadecimal format. A user scrolls through the status of the entire shift register by pressing the NEXT key.

Shift Register Status, bits 0 to 63

							S	T	A	T	U	S										
		0	6	3		S	H	F	T		R	E	G		0	0	0					
		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*					
V	I	E	W	*	*		P	:	*	*	*		R	P	M	*	*	*				

Shift Register Status, bits 64 to 127

							S	T	A	T	U	S										
		1	2	7		S	H	F	T		R	E	G		0	6	4					
		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*					
V	I	E	W	*	*		P	:	*	*	*		R	P	M	*	*	*				

Shift Register Status, bits 128 to 191

							S	T	A	T	U	S										
		1	9	1		S	H	F	T		R	E	G		1	2	8					
		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*					
V	I	E	W	*	*		P	:	*	*	*		R	P	M	*	*	*				

Shift Register Status, bits 192 to 255

							S	T	A	T	U	S										
		2	5	5		S	H	F	T		R	E	G		1	9	2					
		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*					
V	I	E	W	*	*		P	:	*	*	*		R	P	M	*	*	*				

Pulsed Output Programming

The Pulsed Output feature allows an output channel to be programmed to turn on and off a specific number of times for a specific duration in a pre-determined window. This allows multiple on/off setpoints to be easily programmed within an output channel, eliminating the process of entering each on/off setpoint individually.

When programming a limit switch output the user selects the type of output. There are four types to choose from; Normal (N), Timed (T), Pulsed (P), and Disabled (-). To select the output type, place the cursor on the output type selector and press the SELECT key unit the desired type is selected. For a pulsed output, select P. See the Screen below.

C	H			G	R	O	U	P		F	I	R	S	T		L	A	S	T
	1		P				1					*	*	*	-	*	*	*	→
M	O	D	E	:	0		G	R	O	U	P		P	O	S	:		9	0

After the output type is selected, the cursor will move to the GROUP column. Assign the output to the desired group. After the output is assigned to a group, the pulse window is defined. The pulse output window is defined as FIRST and LAST. The FIRST column defines the position where the first pulse will start. The LAST column defines the position of the last pulse of the sequence will turn off. After the LAST position is entered, the display will jump to the ADVANCES screen. To complete the programming of the pulsed output, press the FUNCTION key followed by the TIMED key. The display will appear as below.

C	H			P	U	L	S	E	D		O	U	T	P	U	T			
	1		L	E	N	G	T	H		*	*		Q	N	T	Y		*	*
M	O	D	E	:	0		G	R	O	U	P		P	O	S	:		9	0

Move the cursor to the data entry window for LENGTH. Length defines the number of counts each pulse will be on. After the LENGTH is programmed, the cursor will move to the QNTY data entry window. The QNTY (quantity) defines the number of pulses that will be generated between the FIRST and LAST windows. Enter the number of counts desired within the window. The controller will calculate the correct duty cycle to evenly space the outputs within the pulse window.

WARNING

Because the pulsed output parameters are programmed one at a time, there is no error checking to verify that the parameters are valid. If there is a problem with the parameters, the output may be on in the entire pulse window.

Lockout Input

Input 8 functions as a Lockout Input. Whenever power is applied to the input, the GN3A1-02C-10 is forced into VIEW mode. It will not be possible to program the unit from its keypad or to remotely select which program is running.

Remote Program Select

The GN3A1-02C-10 can be programmed with 15 different programs. These programs can be numbered 1 to 99. Programs numbered 1 to 33 can also be remotely selected with inputs 9 to 13.

Program	Input 13	Input 12	Input 11	Input 10	Input 9
1	OFF	OFF	OFF	OFF	OFF
2	OFF	OFF	OFF	OFF	ON
3	OFF	OFF	OFF	ON	OFF
4	OFF	OFF	OFF	ON	ON
↓	↓ ↓ ↓ ↓				
30	ON	ON	ON	OFF	OFF
31	ON	ON	ON	OFF	ON
32	ON	ON	ON	ON	OFF
33	ON	ON	ON	ON	ON

Programs that have been assigned numbers 34 to 99 can still be selected from the Genesis units keypad, but they cannot be remotely selected.

Input 14 controls the Remote Program Select operation. That is, the program can only be Remotely changed by inputs 9 to 13 when input 14 is ON. Any changes on inputs 9 to 13 will be ignored if input 14 is OFF.

Note: Two RB-8 relay boards, one daisy chained to the first, are required to use the Remote Program select feature. Inputs 9 to 14 will always be located on the second relay board.

Analog Outputs

The GN3A1-02C-10 has the ability to control up to two analog outputs built into the RB-8-1A (one analog output) or the RB-8-2A (two analog outputs) relay boards. Based on the resolver's speed and a programmed formula, these outputs can either be 0 to 10Vdc analog voltage, or 4 to 20mA analog current.

The analog output is programmed with two parameters, a zero speed value and the speed at which the maximum analog output is reached. These two values are used to calculate a linear slope of the analog output.

Note: Analog Output 1 must be programmed before Analog Output 2.

		C	O	N	F	I	G	U	R	E		5		O	F		6		
A	N	A	L	O	G		O	U	T	*		D	I	S	A	B	L	E	D
0	R	P	M	+	*	*	*	*		M	A	X	R	P	M	*	*	*	*
V	I	E	W	*	*		P	:	*	*	*		R	P	M	*	*	*	*

ANALOG OUT – There are two analog outputs available. Select 1 or 2 to program the respective analog output.

DISABLED/ENABLED – Select between DISABLED, VOLTAGE, or CURRENT.

0(zero) RPM – The zero RPM value is the value of the analog output when the resolver is at zero speed. The zero speed value is based on the slope of the analog output. The value is programmed in 0.01V increments for voltage output or 0.01mA increments for a current output.

The zero speed value can be programmed to be less than zero. This is done to accommodate different slopes of the analog output. Although the value is programmed to be less than zero, the value will never be less than 0Vdc for voltage outputs or 4.00mA for current outputs.

MAX RPM – This is the speed at which the maximum output will occur. It has a range of 0 to 9999rpm. If the resolver's velocity exceeds what has been programmed in this field, the analog output will remain at its maximum value. The following steps can be used to calculate the MAX RPM value.

1. The formula is Analog Output = m * (RPM) + b
2. Determine the output value at zero speed (RPM)
3. Determine a 2nd output value at a 2nd speed
4. b = output value at zero speed
5. m = (2nd output - b)/ (2nd RPM)
6. If the 2nd output value is not the maximum, calculate the maximum RPM. RPM max = (max output - b)/m

Relay Board Information

There are five possible relay boards that can be used with the GN3A1-02C-10. The possible combinations are one RB-7, one RB-8, a RB-8 and a RB-7, two RB-8s, or one RB-9. Relay boards with Analog Outputs, RB-8-1A (one analog output) or the RB-8-2A (two analog outputs), are also available.

Part Number	Number of Inputs and Outputs	Current Draw (@24Vdc)
RB-7	8 outputs	100mA
RB-8	8 outputs and 8 inputs	125mA
RB-9	16 outputs	200mA
RB-8-1A	8 outputs, 8 inputs, and 1 analog output	220mA
RB-8-2A	8 outputs, 8 inputs, and 2 analog outputs	240mA

Interconnections between the GN3A1-02C-10 and relay boards are made with *CRP-(x)* cables, where (x) is the length in feet. Presently, two, six, and twelve foot cables are available from AMCI. CRP cables are shielded, fine pitch ribbon cables with drain lugs at both ends. Due to their complexity, AMCI strongly recommends that you purchase pre-assembled and tested CRP cables instead of making them yourself. Connections are made by inserting the blue IDC connector into the proper socket and connecting the drain wire to the screw terminal. Note that the IDC connector is keyed and can only be inserted in one way. The retaining clips on the IDC socket snap over the top of the connector to secure it in place. The drain wire on the CRP cable must be connected to the screw terminals next to the IDC sockets. The screw terminal on the GN3A1-02C-10 module is connected to Earth Ground. The screw terminals on the relay boards are not connected to Earth Ground and function as a strain relief.

RB-8's have two IDC sockets that allow you to daisy chain a second relay board to it. The CRP cable from the GN3A1-02C-10 is connected to the socket labeled "CN1" on the first RB-8. A second CRP cable is connected from the "CN2" socket of the first RB-8 to the "CN1" socket of either a RB-7 or RB-8. The first RB-8, the one connected to the GN3A1-02C-10, has the Inputs and Outputs 1 to 8. If the second relay board is an RB-7, it has the Outputs 9 to 16. If the second relay board is an RB-8, it has the Inputs and Outputs 9 to 16.

An external, isolated +24Vdc supply is needed to drive the inputs and relays. Connect +24Vdc to the +24V terminal, the power supply common to the GND terminal. The required current is shown in the above table. Note that these measurements are for the relay boards only. If you are using an RB-8 and powering the input sensors with the same supply, then you must add in the current requirements of each sensor to determine the power supply size.

Compatible Relays

Every output requires a solid state relay. These relays are fused protected and have a retaining screw and indicator LED. These relays are available from AMCI under the following part numbers.

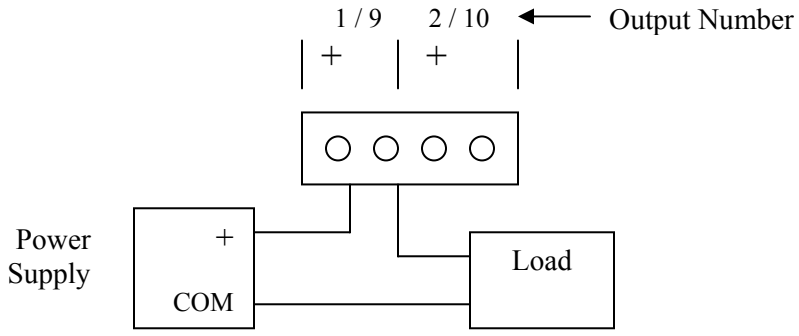
	Output Voltage	Rated Current
KD-6	3 to 60Vdc	3Adc
KA-3	120Vac	3Aac

Chassis Ground

When a relay board is DIN rail mounted the case is isolated from the panel by the plastic DIN rail adapters. You *MUST* run a heavy gauge wire from the Chassis GND terminal of the power supply terminal block to your ground bus to ground the metal relay board case. When a relay board is panel mounted the case is usually connected to chassis ground through the mounting hardware. If you believe that the ground is insufficient then run a heavy gauge wire from the Chassis GND terminal to your ground bus.

Relay Board Output Wiring

Each Relay Board output has two terminals. One is labeled + and the other that is unlabeled. Connect your power supply to the + terminal and your load to the unlabeled terminal.



RB-8 Sink / Source Inputs

The RB-8 inputs are connected to the TB1 terminal block. There are nine pins, one for each input and an Input Common. All inputs are opto-isolated and floating. That is, they are configured as sinking or sourcing inputs by connecting Input Common to a power supply. Typically, the +24Vdc supply that powers the output relays is also used to power the inputs. When Input Common is attached to +Vdc the inputs will source current into the sensors attached to them. When Input Common is attached to the sensor's power supply common the inputs will sink current from the sensors attached to them.

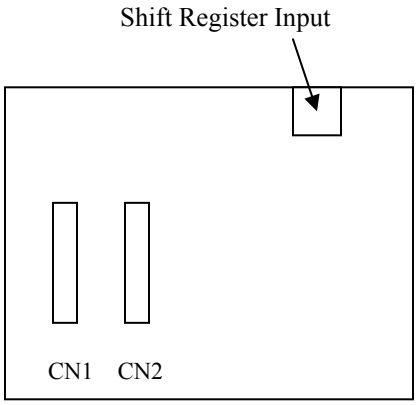
Sixteen inputs are split between two RB-8 relay boards. The two banks of inputs can be configured differently. For example, Inputs 1 to 8 can be configured as sinking inputs and Inputs 9 to 16 can be configured as sourcing inputs.

Connecting GN3A1-02C to Relay Boards

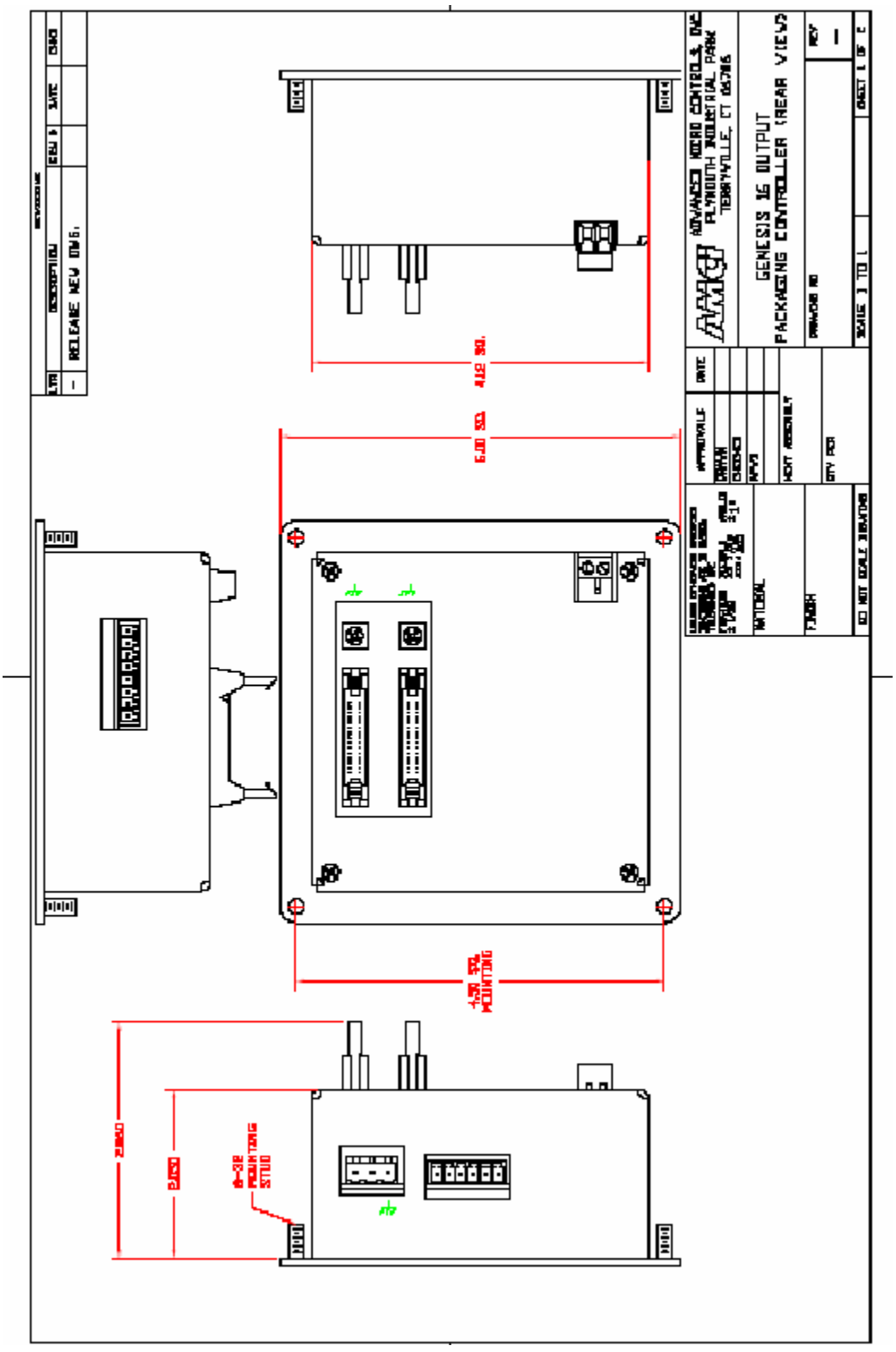
Two ribbon cable connectors are located on the back of the GN3A1-02C-10, labeled CN1 and CN2.

Plug the CRP ribbon cable into connector CN1 if you are using discrete inputs and outputs. Plug the other end of the ribbon cable into the relay board's CN1 connector. This first relay board will have inputs and outputs 1 to 8. If a RB-8 is being used, it is possible to daisy chain the first relay board to a second RB-8 for inputs and outputs 9 to 16.

Plug the CRP ribbon cable into connector CN2 if both discrete and analog outputs are being used. In addition to the two analog outputs, discrete outputs 1 to 8 will also be available on the RB-8-2A relay board.



Rear view of GN3A1-02C-10



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