GFK-1601

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GE Fanuc Manuals

Supplement for
SmartStackä Modules

SmartStack™ Modules

05 September 2001 **GFK-1601D**

Warnings, Cautions, and Notes as Used in this Publication

Warning

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

Caution

Caution notices are used where equipment might be damaged if care is not taken.

Note

Notes merely call attention to information that is especially significant to understanding and operating the equipment.

This document is based on information available at the time of its publication. While efforts have been made to be accurate, the information contained herein does not purport to cover all details or variations in hardware or software, nor to provide for every possible contingency in connection with installation, operation, or maintenance. Features may be described herein which are not present in all hardware and software systems. GE Fanuc Automation assumes no obligation of notice to holders of this document with respect to changes subsequently made.

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Revisions to This Manual

This version (GFK-1601D) of the SmartStack™ Modules Supplement contains the following revisions and additions:

1. Added a **Safety Warning** in the *Installation/Safety* section of the data sheets to the modules that are listed after the warning.

Warning: Previous versions of this product provided internal fuses on the output circuits (relay contacts). Due to CE Low Voltage Directive (LVD) marking requirements, these fuses have been removed and replaced with solid wire. Therefore, it is now the responsibility of the user of this equipment to ensure that adequate fusing is installed *externally* on each relay output circuit.

Module	Revision (or higher)	Module	Revision (or higher)
IC300DIQ612	C	IC300DIQ712	C
IC300DIQ622	C	IC300DIQ722	C
IC300DIQ624	D	IC300DQM202	D
IC300DIQ627	AY	IC300DQM902	B

2. Added a **Safety Warning** in the *Wiring* section of the data sheets to the modules that are listed after the warning. **Be sure to check each data sheet for the actual fuse size required**.

Warning: To protect the module and associated wiring from load faults, use external fuse ( ) as shown.

Module	Revision (or higher)	Module	Revision (or higher)
IC300DIQ612	C	IC300DIQ712	C
IC300DIQ622	C	IC300DIQ722	C
IC300DIQ624	D	IC300DQM202	D
IC300DIQ627	AY	IC300DQM902	B

3. Added a **Safety Warning** in the *Wiring* section of the data sheets to the modules that are listed after the warning. **Be sure to check each data sheet for the actual fuse size required**.

Warning: Connecting high voltage to any I/O pin may cause high voltage to appear at other I/O pins.

Module	Module
IC300DIM210	IC300DIQ722
IC300DQM202	IC300DIQ624
IC300DIQ612	IC300DIQ627
IC300DIQ712	IC300MIX963
IC300DIQ622	

4. Added a **Safety Warning** in the *Wiring* section of the data sheets to the modules that are listed after the warning. Output pins are specified for each module.

> **Warning:** Wiring the line side of the AC source to loads connected to outputs ( ) through ( ) and the neutral side of the AC source to the output common(s) would create a Negative Logic condition, which may be considered an unsafe practice.

Module	Module
IC300DQM202	IC300DIQ722
IC300DQM902	IC300DIQ624
IC300DIQ612	IC300DIQ627
IC300DIQ712	IC300MIX963
IC300DIQ622	

5. Added a **Safety Warning** in the *Wiring* section of the data sheets to the modules that are listed after the warning. Output pins are specified for each module.

> **Warning:** Wiring the positive side of the DC source to loads connected to outputs ( ) through ( ) and the negative side of the DC source to the output common(s) would create a Negative Logic condition, which may be considered an unsafe practice under CE directives.

Module
IC300DIQ611
IC300DIQ935
IC300HSC600

6. Added a **Safety Warning** in the *Installation/Safety* section of the data sheets to *all* SmartStack modules.

> **Warning:** Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

7. Added electro-mechanical relay compliance information in the *Internal Schematic Circuit* section of the data sheets to the following modules:

Module
IC300DQM202
IC300DQM902
IC300DIQ612
IC300DIQ712
IC300DIQ622
IC300DIQ722
IC300MIX963

8. Added a statement in the *Internal Circuit Schematic* section of data sheets for modules containing transient voltage suppressors (transorbs) used on output circuitry.

Module	Module	Module	Module
IC300DQM202	IC300DIQ722	IC300MIX011/111	IC300DIQ611
IC300DQM306/406	IC300DIQ624	IC300MIX022/122	IC300DIQ711
IC300DQM902	IC300DIQ627	IC300MIX901	
IC300DIQ612	IC300DAC001/101	IC300MIX902	
IC300DIQ712	IC300DAC002/102	IC300MIX904	
IC300DIQ616	IC300DAC202	IC300MIX912	
IC300DIQ622	IC300HSC600	IC300MIX963	

9. Added **Digital Input Chart** to the following SmartStack modules.

Module	Module	
IC300DIM210	IC300DIQ722	IC300DIQ616
IC300DIM310/410	IC300DIQ627	IC300DIQ716
IC300DIQ611	IC300DIQ935	
IC300DIQ612	IC300MIX901	
IC300DIQ622	IC300MIX902	
IC300DIQ624	IC300MIX904	
IC300DIQ711	IC300HSC600	
IC300DIQ712	IC300HSC601	

10. Added A **Derating Output Chart** to the following SmartStack modules.

Module	Module
IC300DQM202	IC300DIQ722
IC300DQM902	IC300DIQ935
IC300DIQ611	IC300MIX901
IC300DIQ612	IC300MIX902
IC300DIQ616	IC300MIX904
IC300DIQ622	IC300MIX912
IC300DIQ624	IC300MIX963
IC300DIQ711	IC300HSC600
IC300DIQ712	IC300HSC601
IC300DIQ716	IC300DIQ627

11. Added an **Output Operating Area Chart** to the following SmartStack modules.

Module	Module
IC300DAC002/102	IC300MIX904
IC300DAC202	IC300MIX912
IC300MIX022/122	IC300MIX963
IC300MIX902	

12. Added a statement in the *Configuration* section of SmartStack module data sheets that the status of the I/O can be monitored in Cscape Software.

13. Added safety symbols in the *Installation/Safety* section to the following SmartStack module data sheets.

Module	Module
IC300DQM202	IC300DIQ722
IC300DQM902	IC300DIQ624
IC300DIQ612	IC300DIQ627
IC300DIQ712	IC300MIX963
IC300DIQ622	

14. Added information pertaining to applications in which two-wire proximity switches are used as sensors for discrete AC inputs.

IC300DIQ622
IC300DIQ624
IC300DIQ627
IC300DIQ722

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION

1.1 Scope

This supplement contains data sheets for the SmartStack I/O Option Modules. Wiring diagrams, specifications, and other pertinent information are provided. Installation and configuration procedures that are common to all SmartStack Modules are covered in the Control Station Hardware Manual (GFK-1631). Table 1.1 contains a list of SmartStack Modules that are currently available.

Table 1.1 - SMARTSTACK™ MODULES		
DIGITAL INPUT MODULES		
12/24VDC Input	Positive or Negative Logic, 8 Channels	IC300DIM210
12/24VDC Input	Positive or Negative Logic, 16 / 32 Channels	IC300DIM310 / 410
DIGITAL OUTPUT MODULES		
Relay Output	4A Maximum, 8 Channels	IC300DQM202
Relay Output	2.5A Maximum, 20 Channels	IC300DQM902
Isolated Digital Output	24VDC, Positive Logic, 16 / 32 Channels	IC300DQM306/406
DIGITAL INPUT AND OUTPUT COMBINATION MODULES		
Mixed DC I/O	8 Channel, 12/24VDC (Isolated) Digital In, Positive/Negative Logic, 8 Channel, 24VDC Out, Negative Logic	IC300DIQ611
Mixed DC I/O	16 Channel, 12/24 VDC In, Positive/Negative Logic 12 Channel, 24 VDC Out, Negative Logic	IC300DIQ711
Mixed DC I/O	8 Channel, 12/24VDC In, (Isolated) Digital In, Positive/Negative Logic 8 Channel, 10-28VDC (Sourcing) Out, Positive Logic	IC300DIQ616
Mixed DC I/O	16 Channel, 12/24VDC In (Isolated) Digital In, Positive/Negative Logic 12 Channel, 10-28VDC (Sourcing) Out, Positive Logic	IC300DIQ716
Mixed I/O	8 Channel, 12/24VDC (Isolated) Digital In, Positive/Negative Logic, 6 Channel, 3A Relay Out	IC300DIQ612
Mixed I/O	14 Channel, 12/24VDC (Isolated) Digital In, Positive/Negative Logic, 10 Channel, 3A Relay Out	IC300DIQ712
Mixed I/O	8 Channel, 120 VAC In Positive Logic 6 Channel, 3A Relay Out	IC300DIQ622
Mixed I/O	14 Channel, 120 VAC In Positive Logic 10 Channel, 3A Relay Out	IC300DIQ722
AC Input / AC Output	8 Channel, 120VAC In, Positive Logic 8 Channel, 0-260VAC Out, Positive Logic	IC300DIQ624
AC Input / AC Output	8 Channel, 120-240VAC In, Positive Logic 8 Channel, 80-250VAC Out, Positive Logic	IC300DIQ627
High Density Mixed DC I/O	32 Channel, 12/24 VDC In, Positive Logic 40 Channel, 24Vdc Out, Negative Logic 50mA Maximum, Non-Inductive	IC300DIQ935

Table 1.1 Continued		
ANALOG INPUT MODULES		
+/-10VDC Analog Input	2 Channels, 12 Bit Resolution, +/-10VDC	IC300ADC010
	4 Channels, 12 Bit Resolution, +/-10VDC	IC300ADC110
4-20mA Analog Input	2 Channels, 12 Bit Resolution, 4-20mA	IC300ADC020
	4 Channels, 12 Bit Resolution, 4-20mA	IC300ADC120
Thermistor / Current/ Voltage Analog Input	12 Channels, 12 Bit Resolution, 4-20mA / 0-5VDC	IC300ADC920
RTD Input	2 Channels	IC300RTD000
	4 Channels	IC300RTD100
Thermocouple Input	2 Channels	IC300THM000
	4 Channels	IC300THM100
ANALOG OUTPUT MODULES		
+/-10VDC Analog Output	2 Channels, 14 Bit Resolution, +/-10VDC	IC300DAC001
	4 Channels, 14 Bit Resolution, +/-10VDC	IC300DAC101
4-20mA Analog Output	2 Channels, 14 Bit Resolution, 4-20mA	IC300DAC002
	4 Channels, 14 Bit Resolution, 4-20mA	IC300DAC102
0-10V or 0-20mA Analog Output	8 Channels, 12-Bit Resolution, 0-10V or 0-20mA	IC300DAC202
ANALOG INPUT AND OUTPUT COMBINATION MODULES		
+/-10VDC Analog I/O	1 Channel, 12 Bit Resolution, +/-10VDC In, 1 Channel, 12 Bit Resolution, +/-10VDC Out	IC300MIX011
	2 Channel, 12 Bit Resolution, +/-10VDC In, 2 Channel, 12 Bit Resolution, +/-10VDC Out	IC300MIX111
20mA Analog I/O	1 Channel, 12 Bit Resolution, 20mA In 1 Channel, 12 Bit Resolution, 20mA Out	IC300MIX022
	2 Channel, 12 Bit Resolution, 20mA In, 2 Channel, 12 Bit Resolution, 20mA Out	IC300MIX122
ANALOG / DIGITAL INPUT AND OUTPUT COMBINATION MODULES		
+/-10VDC Analog / Digital I/O	4 Channel, Analog Input, +/-10VDC In,12 Bit Resolution, 2 Channel Analog Output, +/-10VDC Out,12 Bit Resolution, 8 Channel, 24VDC Bipolar Digital Input 8 Channel, 10-28VDC, 0.5 Amp Sourcing Digital Output	IC300MIX901
4-20mA Analog / Digital I/O	4 Channel, Analog Input, 20mA In, 12 Bit Resolution, 2 Channel Analog Output, 20mA Out, 12 Bit Resolution, 8 Channel, 24VDC Bipolar Digital Input 8 Channel, 10-28VDC, 0.5 Amp Sourcing Digital Output	IC300MIX902
24VDC Bipolar Analog / Digital I/O	2 Channel, Analog Input, 20mA In 2 Channel Analog Output, 20mA Out 8 Channel, 24VDC Bipolar Digital Input 8 Channel, 24VDC Sinking Digital Output	IC300MIX904
24VDC Bipolar Analog / Digital I/O	4 Channel, Isolated Analog Input, 20mA In 2 Channel Isolated Analog Output, 20mA Out 8 Channel, 10-30VDC Bipolar Digital Input 8 Channel, 10-30VDC Sourcing Digital Output	IC300MIX912
Temperature I/O	2 Channel, Relay 2 Channel, Analog Output 2 Channel,SSR Driver 4 Channel Thermocouple/RTD	IC300MIX963
SPECIALTY MODULES		
AC Power Monitor	AC Power Monitor Voltage Inputs Current Inputs	IC300ACM200

ASCII BASIC Product also has a detailed Supplement (GFK-1666) which is ordered separately.	3 High Speed Communication Ports	IC300ASC100
Ethernet Product also has a detailed Supplement (GFK-1784) which is ordered separately.	Ethernet Communications	IC300ETN100
High Speed Counter Product also has a detailed Supplement (GFK-1643) which is ordered separately. Covers HSC600 and HSC601.	High Speed Counter Inputs, Sinking Pulse Outputs	IC300HSC600
	High Speed Counter Inputs, Sourcing Pulse Outputs	IC300HSC601

1.2 Wiring Accessories and Spare Parts

A line of wiring accessories is available for use with various SmartStack Modules. For more information, refer to Horner's *Wiring Accessories and Spare Parts Manual* (MAN0347) at www.heapg.com.

1.3 Technical Support

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

NOTES

12/24VDC Input Module

IC300DIM210
Positive or Negative Logic
8 Channels

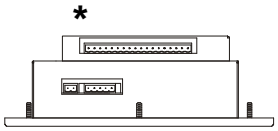
NOTE: There are two models of DIM210. The first model (fully isolated inputs) covers Revision A and Revision B. The second model covers Revision C and higher (bus isolated inputs).

1 DIM210 – Revision A and Revision B Only

1.1 Specifications (Rev. A and Rev. B Only)

Inputs per Module	8 isolated	Input Characteristics	Differential and BiDirectional
Commons per Module	8	Maximum OFF Current	200µA
Input Voltage Range	12-24VDC	Base Power Required	30mA
Peak Voltage	35VDC Max.	OFF to ON Response	1ms.
Isolation Voltage (Channel to Channel and Channel to Common)	500VDC	ON to OFF Response	1ms.
Required Power (Steady State)	0.92W (38.5mA @ 24VDC)	Terminal Type	Spring Clamp, Removable
Required Power (Inrush)	Negligible	Status Indicator	8 LEDs
ON Voltage Level	9VDC Min.	Relative Humidity	5 to 95% Non-condensing
OFF Voltage Level	3VDC Max.	Operating Temperature	0° to 60° Celsius
Input Impedance	. 10K Ohms	CE	GFK-1755
Minimum ON Current	1 mA.	UL	GFK-1754
Weight	9 oz. (256 g)		

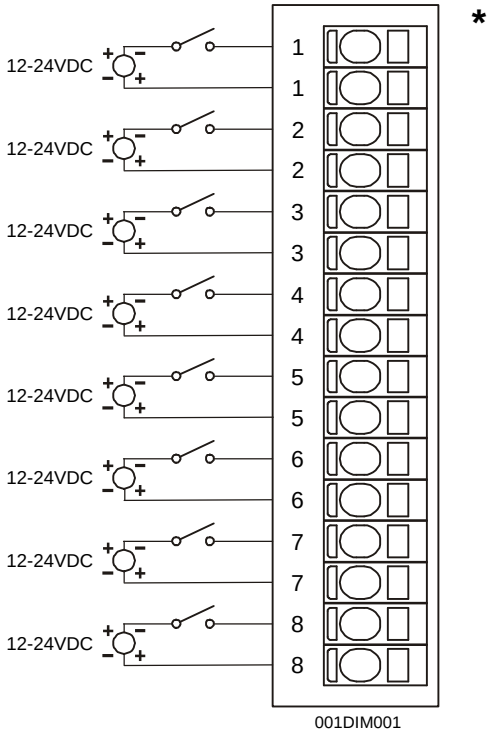
1.2 Wiring – (Rev. A and Rev. B Only)



OCS Bottom View – Shows Corresponding I/O Pin

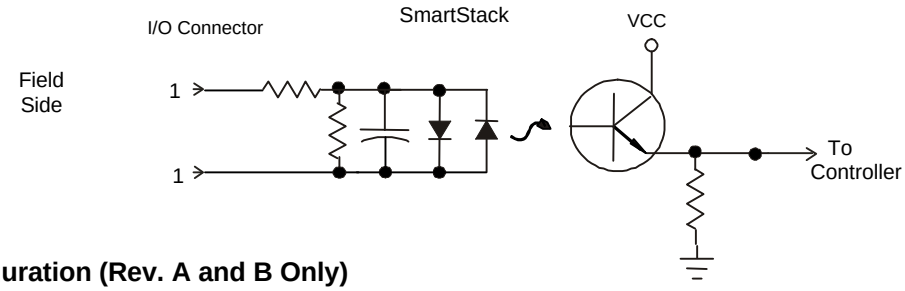
Pin	Signal
1	Input 1 +/-
1	Input 1 -/+
2	Input 2 +/-
2	Input 2 -/+
3	Input 3 +/-
3	Input 3 -/+
4	Input 4 +/-
4	Input 4 -/+
5	Input 5 +/-
5	Input 5 -/+
6	Input 6 +/-
6	Input 6 -/+
7	Input 7 +/-
7	Input 7 -/+
8	Input 8 +/-
8	Input 8 -/+

DIM210 Rev. A and B only



Warning: Connecting high voltage to any I/O pin may cause high voltage to appear at other I/O pins.

1.3 Internal Circuit Schematic (Rev. A and Rev. B Only)



1.4 Configuration (Rev. A and B Only)

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631). Although the module has no user defined parameters, the I/O Map describes which I/O registers are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

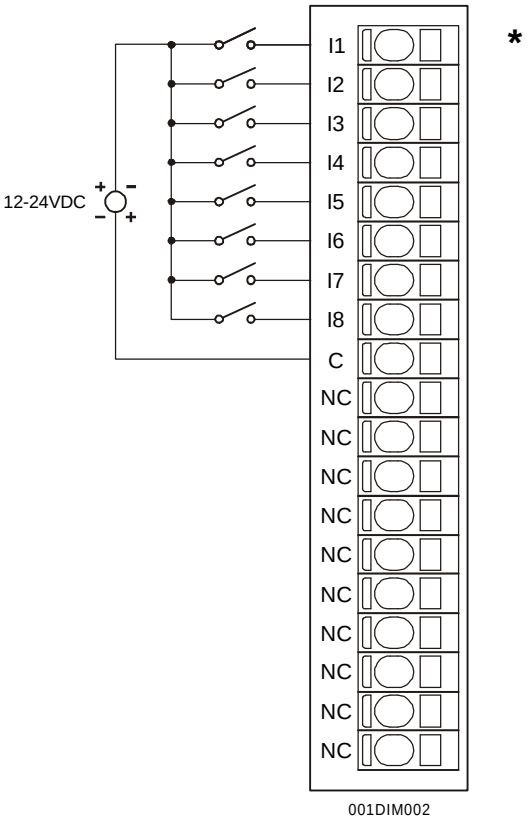
2 DIM210 – (Revision C and Higher)

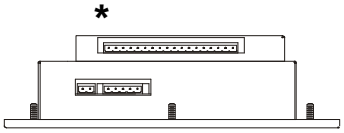
2.1 Specifications (Rev. C and Higher)

INPUT	DIM210			DIM210
Inputs per Module	8 Non-isolated		Input Characteristics	Bidirectional
Commons per Module	1		Maximum OFF Current	200µA
Input Voltage Range	12-24VDC		Minimum ON Current	1mA
Peak Voltage	35VDC Max.		OFF to ON Response	1ms.
Isolation (Channel to Bus)	500VDC		ON to OFF Response	1ms.
ON Voltage Level	9VDC Minimum		Status Indicator	8 LEDs
OFF Voltage Level	3VDC Maximum		Relative Humidity	5 to 95% Non-condensing
Required Power (Steady State)	0.18W (7.7mA @ 24VDC)		Operating Temperature	0° to 60° Celsius
Required Power (Inrush)	Negligible		Terminal Type	Spring Clamp, Removable
Input Impedance	10K Ohms		CE	GFK-1755
Weight	9 oz. (256 g)		UL	GFK-1754

2.2 Wiring (Rev. C and Higher)

DIM210 Rev. C and higher



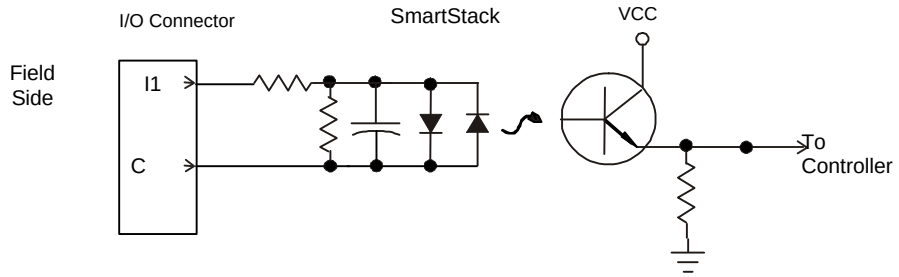


OCS Bottom View – Shows Corresponding I/O Pin

Pin	Signal DIM210 Rev. C or higher
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C	Common
NC	No Connection
NC	No Connection
NC	No Connection
NC	No Connection
NC	No Connection
NC	No Connection
NC	No Connection
NC	No Connection
NC	No Connection

Warning: Connecting high voltage to any I/O pin may cause high voltage to appear at other I/O pins.

2.3 Internal Circuit Schematic (Rev. C and higher)



2.4 Configuration (Rev. C and higher)

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

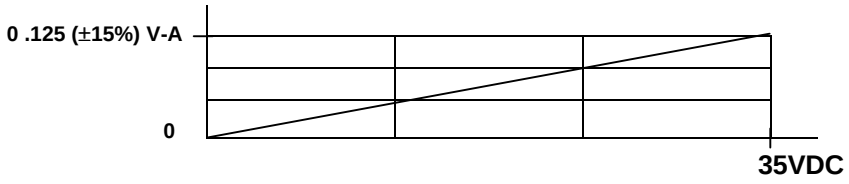
Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default states of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

Warning: The default turns the outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

3 INPUT CHARACTERISTICS

Digital Input Chart



4 INSTALLATION / SAFETY

Warning: **Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.**

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

5 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

NOTES

12 / 24VDC Input Module

IC300DIM310 / IC300DIM410
16 / 32 Channels
Positive or Negative Logic

1 SPECIFICATIONS

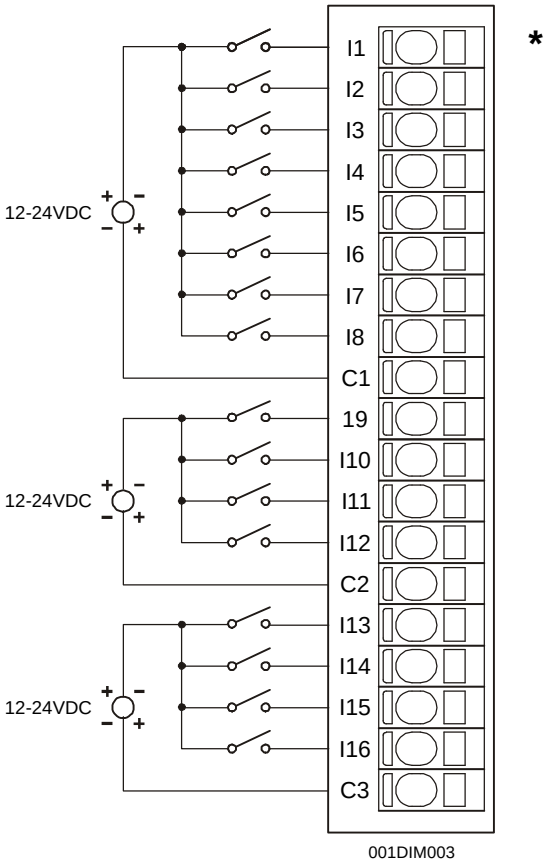
	DIM 310	DIM 410
Inputs per Module	16	32
Commons per Module	3	6
Input Voltage Range	12-24VDC	
Peak Voltage	35VDC Max.	
Isolation Voltage (Common to Common and Common to Channel)	500VDC	
Required Power (Steady State)	.24W (10mA@24VDC)	
Required Power (Inrush)	Same as Steady State	
ON Voltage Level	9VDC Min.	
OFF Voltage Level	3VDC Max.	
Input Impedance	10K Ohms	

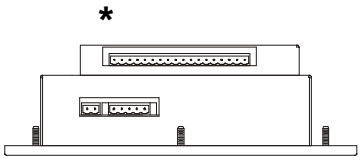
	DIM 310	DIM 410
Minimum ON Current	1 mA.	
Input Characteristics	BiDirectional	
Maximum OFF Current	200µA	
OFF to ON Response	1ms.	
ON to OFF Response	1ms.	
Terminal Type	Spring Clamp, Removable	
Relative Humidity	5 to 95% Non-condensing	
Operating Temperature	0° to 60° Celsius	
CE	GFK-1755	
UL	GFK-1754	

GFK-1836A

2 WIRING

2.1 DIM310 / DIM410 Wiring

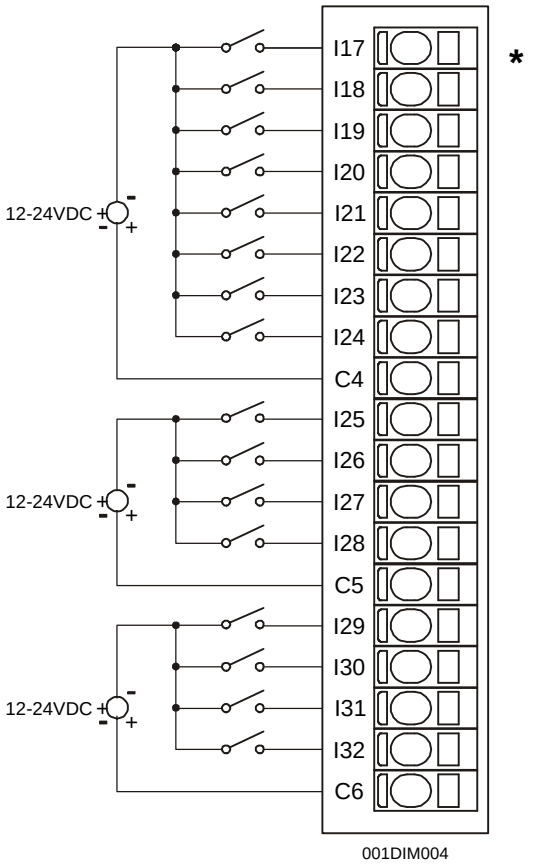


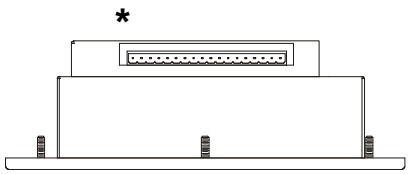


OCS Bottom View – Shows Corresponding I/O Pin

Pin	Signal
	DIM310/410 INPUT
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C1	Common 1 (Isolated)
I9	Input 9
I10	Input 10
I11	Input 11
I12	Input 12
C2	Common 2 (Isolated)
I13	Input 13
I14	Input 14
I15	Input 15
I16	Input 16
C3	Common 3 (Isolated)

2.2 DIM410 Wiring

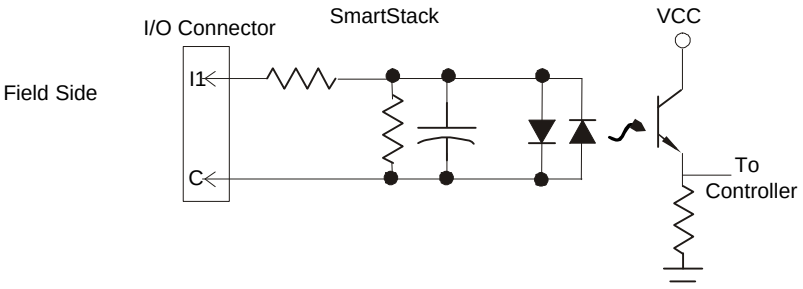




OCS Top View – Shows Corresponding I/O pin

Pin	Signal
	DIM410 INPUT
I17	Input 17
I18	Input 18
I19	Input 19
I20	Input 20
I21	Input 21
I22	Input 22
I23	Input 23
I24	Input 24
C4	Common 4 (Isolated)
I25	Input 25
I26	Input 26
I27	Input 27
I28	Input 28
C5	Common 5 (Isolated)
I29	Input 29
I30	Input 30
I31	Input 31
I32	Input 32
C6	Common 6 (Isolated)

3 INTERNAL WIRING

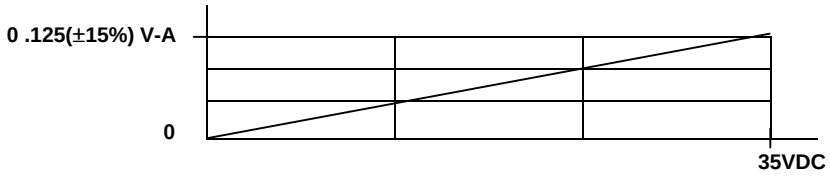


4 CONFIGURATION

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631). Although the module has no user defined parameters, the I/O Map describes which I/O registers are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

5 INPUT CHARACTERISTICS

Digital Input Chart



6 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances

7 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

NOTES

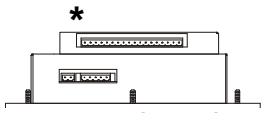
Relay Output Module

IC300DQM202
4 Amp Maximum

1 SPECIFICATIONS

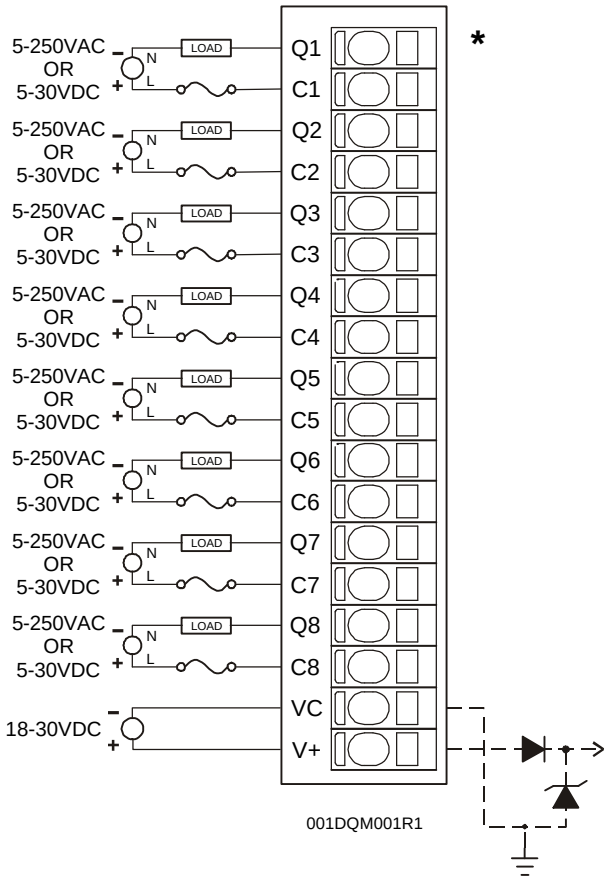
Outputs per Module	1 N.O. Relay	Maximum Inrush Current	10A per channel
Commons per Module	1	OFF to ON Response	10ms Max.
Output Points Consumed	8	ON to OFF Response	5ms. Max.
Isolation (Channel to Channel) (Channel to Common)	500VDC	Terminal Type	Spring Clamp, Removable
Operating Voltage	18-32VDC		
Output Type	NO	Relative Humidity	5 to 95% Non-condensing
Required Power (Steady State)	0.13W (5.5mA @ 24VDC)	Operating Temperature	0° to 60° Celsius
Required Power (Inrush)	Negligible	CE	Refer to GFK-1755
ON Voltage Level	0.15V	UL	Operating Temperature Code T4A; Also refer to GFK-1754
Maximum Load Voltage	250 VAC, 30VDC Max.	Status Indicator	8 LEDs
Maximum Load Current (resistive) per channel	4A Max. (Subject to Derating)	Weight	10.5 oz. (298 g)
Maximum Leakage Current	5μA		

2 WIRING



OCS Bottom View – Shows Corresponding I/O Pin

Pin	Signal	
Q1	Output 1	N.O. Contact
C1	Output 1	Common
Q2	Output 2	N.O. Contact
C2	Output 2	Common
Q3	Output 3	N.O. Contact
C3	Output 3	Common
Q4	Output 4	N.O. Contact
C4	Output 4	Common
Q5	Output 5	N.O. Contact
C5	Output 5	Common
Q6	Output 6	N.O. Contact
C6	Output 6	Common
Q7	Output 7	N.O. Contact
C7	Output 7	Common
Q8	Output 8	N.O. Contact
C8	Output 8	Common
VC	Relay Coil Voltage Common	
V+	Relay Coil Voltage +	

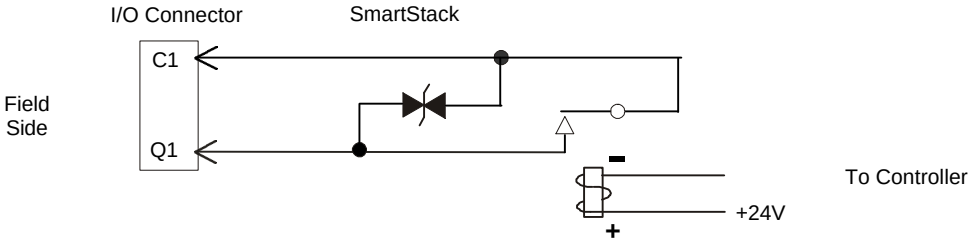


Warning: To protect the module and associated wiring from load faults, use external fuse **(4 A)** as shown. **This warning affects DQM202, Revisions D or higher.**

Warning: Connecting high voltage to any I/O pin may cause high voltage to appear at other I/O pins.

Warning: Wiring the line side of the AC source to loads connected to outputs 1 through 8 and the neutral side of the AC source to the output common(s) would create a Negative Logic condition, which may be considered an unsafe practice.

3 INTERNAL CIRCUIT SCHEMATIC



Specification for transient voltage suppressors (transorbs) used on output circuitry is 400VDC, bi-directional 1500 watts.

Electro-mechanical relays comply with IEC1131-2.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default states of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

Warning: The default turns the outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 INSTALLATION / SAFETY

Warning: Previous versions of this product provided internal fuses on the output circuits (relay contacts). Due to CE Low Voltage Directive (LVD) marking requirements, these fuses have been removed and replaced with solid wire. Therefore, it is now the responsibility of the user of this equipment to ensure that adequate fusing is installed *externally* on each relay output circuit.

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

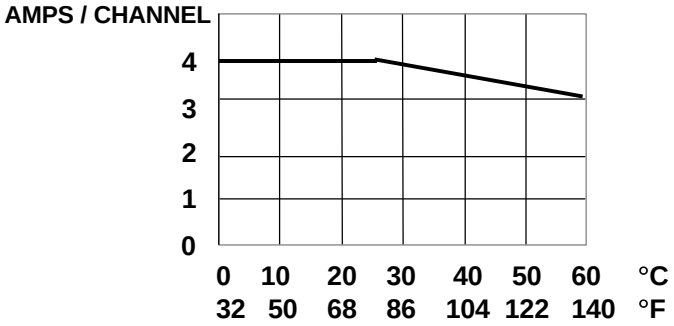
When found on a product, the following symbols specify:

Warning: Consult user documentation.

Warning: Electrical Shock Hazard.

6 OUTPUT CHARACTERISTICS

Derating Output Chart



Typical Relay Life			
Voltage and Load Type	Load Current 1 Amp	2 Amp	4 Amp
30VDC Resistive	800K	500K	200K
30VDC Inductive	500K	250K	100K
250VAC Resistive	800K	500K	200K
250VAC Inductive	500K	250K	100K

7 TECHNICAL ASSISTANCE

Please contact the following locations for technical support.

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

NOTES

Isolated Digital Outputs

24VDC Out, Positive Logic
IC300DQM306 (16 Outputs) /
IC300DQM406 (32 Outputs)

1 SPECIFICATIONS

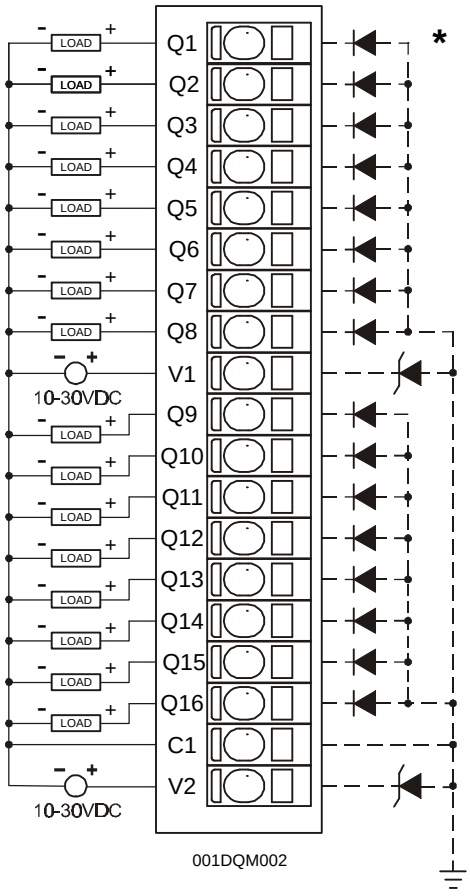
OUTPUT	DIQ306	DIQ406		DIQ306	DIQ406
Outputs per Module	16	32	Maximum Inrush Current per channel	650mA	
Commons per Module	1	2	Minimum Load	None	
Operating Voltage	10 - 30VDC		OFF to ON Response	1ms.	
Output Type	Sourcing / 10K Pull-Down		ON to OFF Response	1ms.	
Peak Voltage	28VDC Max.		Output Characteristics	Current Sourcing	
Maximum Load Current per channel	0.5A Max. per output		Output Protection	Short Circuit	

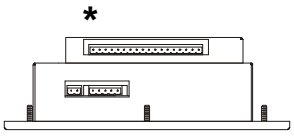
General Specifications			
Required Power (Steady State)	0.12W (5mA @ 24VDC)	CE	GFK-1755
Required Power (Inrush)	Negligible	UL	GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
Operating Temperature	0° to 60° Celsius	Weight	9 oz. (256 g)

GFK-1837A

2 WIRING

2.1 Bottom Connector (Used by DQM306 and DQM406)



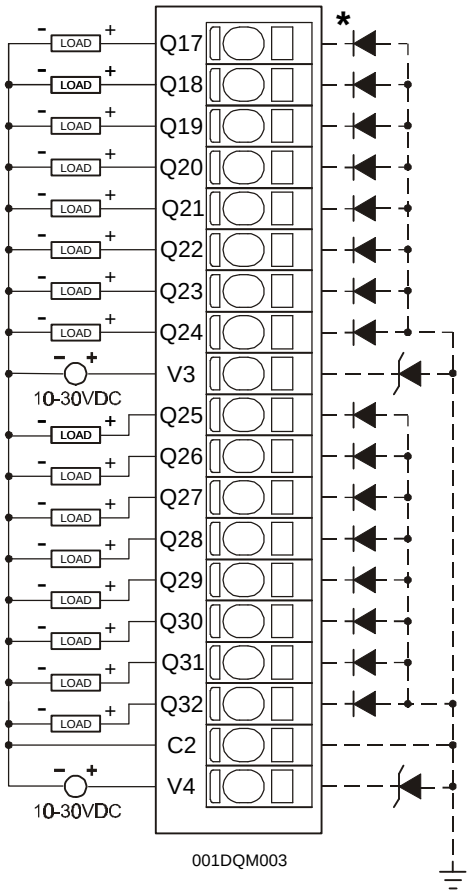


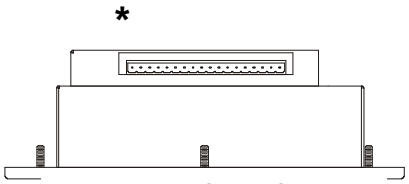
OCS Bottom View – Shows Corresponding I/O Pin

Pin	Signal DQM306/406 OUTPUT
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
V1	Load Power 1
Q9	Output 9
Q10	Output 10
Q11	Output 11
Q12	Output 12
Q13	Output 13
Q14	Output 14
Q15	Output 15
Q16	Output 16
C1	Common 1 (Isolated)
V2	Load Power 2

Load Power	Outputs
1	1-8
2	9-16

2.2 Top Connector (Used by DQM406 only)



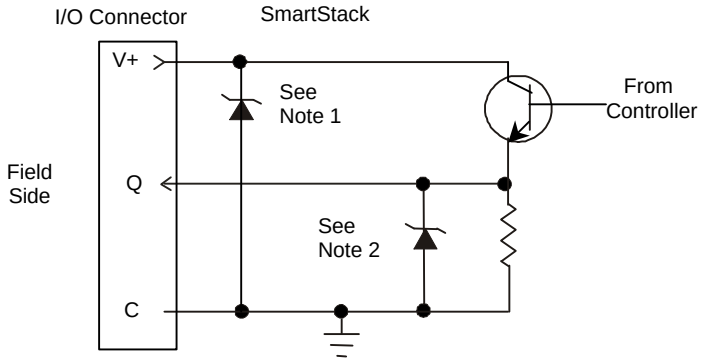


OCS Top View – Shows Corresponding I/O Pin

Pin	Signal DQM406 OUTPUT
Q17	Output 17
Q18	Output 18
Q19	Output 19
Q20	Output 20
Q21	Output 21
Q22	Output 22
Q23	Output 23
Q24	Output 24
V3	Load Power 3
Q25	Output 25
Q26	Output 26
Q27	Output 27
Q28	Output 28
Q29	Output 29
Q30	Output 30
Q31	Output 31
Q32	Output 32
C2	Common 1 (Isolated)
V4	Load Power 4

Load Power	Outputs
3	17-24
4	25-32

3 INTERNAL WIRING



Note 1: Specification for transient voltage suppressors (transorbs) used on output circuitry is 36V, 300W.
Note 2: Specification for transient voltage suppressors (transorbs) used on output circuitry is 33V, 300W.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1601).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default states of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

Warning: The default turns the outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards should be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1601). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

6 TECHNICAL ASSISTANCE

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

NOTES

Relay Output Module

IC300DQM902
20 Relay Outputs
2.5 Amp Maximum

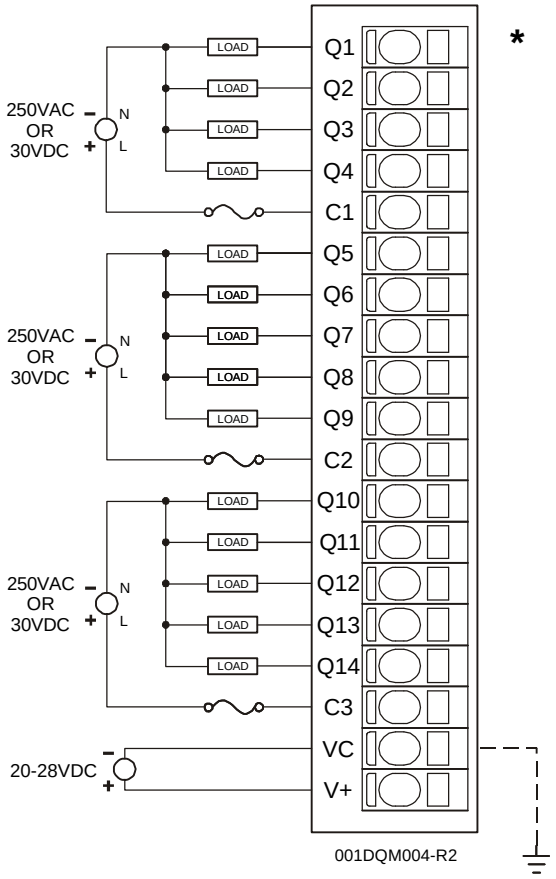
1 SPECIFICATIONS

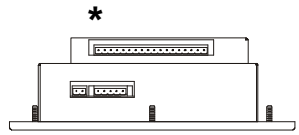
Outputs per Module	20 N.O. Relay	Maximum Load Current (resistive) per channel	2.5A
Commons per Module	5	Maximum Inrush Current	3A
Output Points Consumed	24	OFF to ON Response	10ms. Max.
Isolation (Common to Common (Common to Bus)	500VDC	ON to OFF Response	10ms. Max.
Coil Operating Voltage	20-28VDC	Terminal Type	Spring Clamp, Removable
Output Type	N.O.	Relative Humidity	5 to 95% Non-condensing
Required Power (Steady State)	0.024W (1mA @ 24VDC)	Operating Temperature	0° to 60° Celsius
Required Power (Inrush)	Negligible	CE	GFK-1755
ON Voltage Level	0.15V	UL	GFK-1754
Maximum Load Voltage	250 VAC, 30VDC Max.	Weight	10.5 oz. (298 g)

GFK-1838A

2 SPECIFICATIONS

2.1 Output Wiring (P1) – Outputs 1 – 14





OCS Bottom View – Shows Corresponding I/O Pin

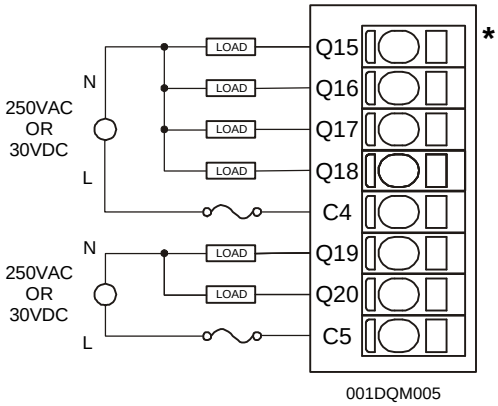
Pin	Signal
	DQM902 OUTPUT
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
C1	Common 1 (Isolated)
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
Q9	Output 9
C2	Common 2 (Isolated)
Q10	Output 10
Q11	Output 11
Q12	Output 12
Q13	Output 13
Q14	Output 14
C3	Common 3 (Isolated)
VC	Coil Power Common
V+	Coil Voltage +

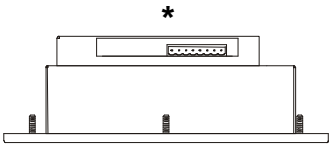
Warning: To protect the module and associated wiring from load faults, use external fuse **(4 A)** as shown. **This warning affects DQM902, Revisions B or higher.**

Warning: Connecting high voltage to any I/O pin may cause high voltage to appear at other I/O pins.

Warning: Wiring the line side of the AC source to loads connected to outputs 1 through 14 and the neutral side of the AC source to the output common(s) would create a Negative Logic condition, which may be considered an unsafe practice.

2.2 Output Wiring (P2) – Outputs 15-20

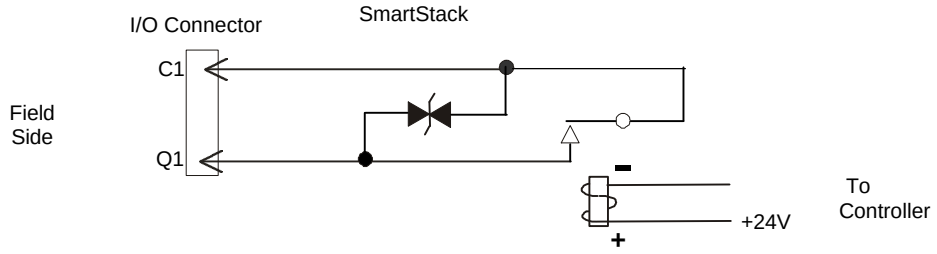




OCS Top View – Shows Corresponding I/O Pin

Pin	Signal
	DQM902 OUTPUT
Q15	Output 15
Q16	Output 16
Q17	Output 17
Q18	Output 18
C4	Common 4 (Isolated)
Q19	Output 19
Q20	Output 20
C5	Common 5 (Isolated)

3 INTERNAL WIRING



Specification for transient voltage suppressors (transorbs) used on output circuitry is 400VDC, bi-directional 400 watts.

Electro-mechanical relays comply with IEC1131-2.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1601).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default states of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

Warning: The default turns the outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 INSTALLATION / SAFETY

Warning: Previous versions of this product provided internal fuses on the output circuits (relay contacts). Due to CE Low Voltage Directive (LVD) marking requirements, these fuses have been removed and replaced with solid wire. Therefore, it is now the responsibility of the user of this equipment to ensure that adequate fusing is installed *externally* on each relay output circuit.

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1601). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

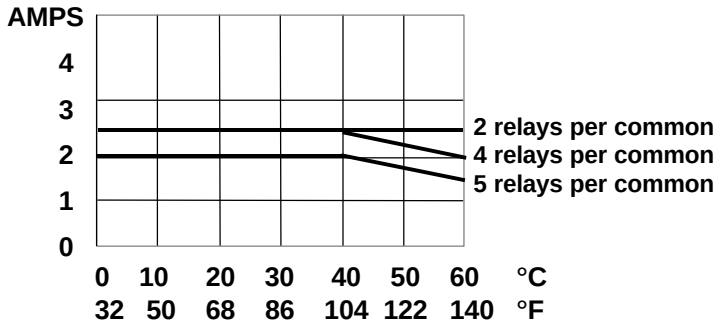
When found on the product, the following symbols specify:

Warning: Consult user documentation.

Warning: Electrical Shock Hazard.

6 OUTPUT CHARACTERISTICS

Derating Chart



Note: Do not exceed 10A on any one common.

Typical Relay Life		
Voltage and Load Type	Load Current	
	1 Amp	2 Amp
30VDC Resistive	35K	12K
250VAC Resistive	30K	10K

7 TECHNICAL ASSISTANCE

Please contact the following locations for technical support.

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

NOTES

Mixed DC I/O Module

IC300DIQ611
12/24 Vdc In, Positive/Negative Logic
24Vdc Out, Negative Logic

1 SPECIFICATIONS

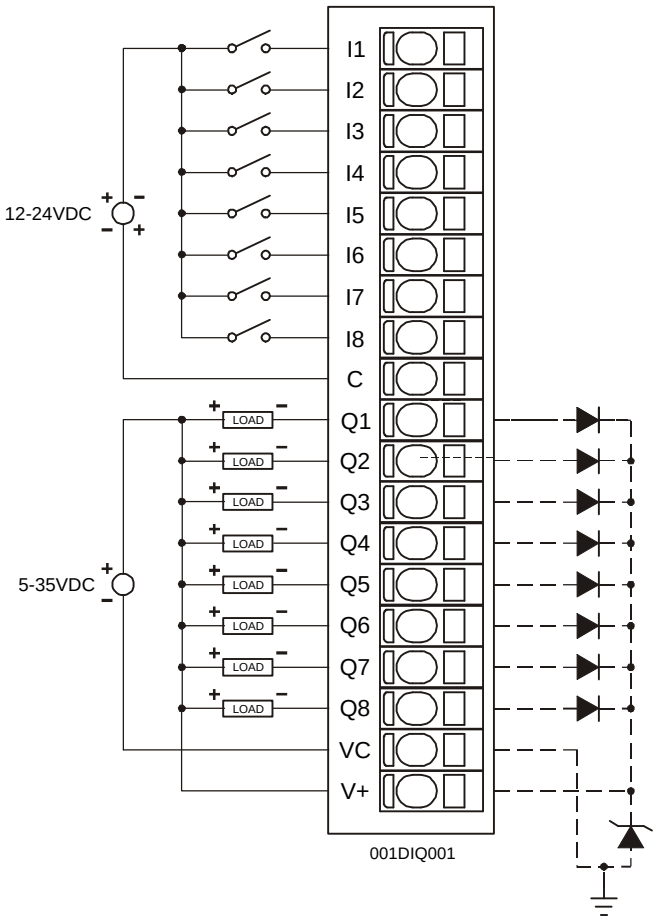
INPUT	DIQ611		DIQ611
Inputs per Module	8	Input Characteristics	Bidirectional
Commons per Module	1	Input Impedance	10K Ohms
Input Voltage Range	12-24VDC	Minimum ON Current	1mA
Peak Voltage	35VDC Max.	Maximum OFF Current	200µA
Isolation (Channel to Common)	500VDC	OFF to ON Response	1ms.
ON Voltage Level	9VDC	ON to OFF Response	1ms.
OFF Voltage Level	3VDC	Status Indicator	8 LEDs

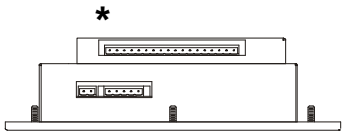
OUTPUT	DIQ611		DIQ611
Outputs per Module	8	Output Protection	Short Circuit
Commons per Module	1	Maximum Leakage Current	100µA
Operating Voltage	5 - 35VDC	Maximum Inrush Current	600mA. per channel
Output Type	Sinking / 10K Pull-Up	Minimum Load	None
Peak Voltage	35VDC Max.	OFF to ON Response	1ms.
Output Characteristics	Current Sinking	ON to OFF Response	1ms.
ON Voltage Level	1.5VDC Max.	Status Indicator	8 LEDs
Maximum Load Current per channel	0.5A Max.		

General Specifications			
Required Power (Steady State)	0.18W (7.7mA @ 24VDC)	Operating Temperature	0° to 60° Celsius
Required Power (Inrush)	Negligible	UL	Refer to GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
		Weight	9 oz. (256 g)

GFK-1606D

2 WIRING



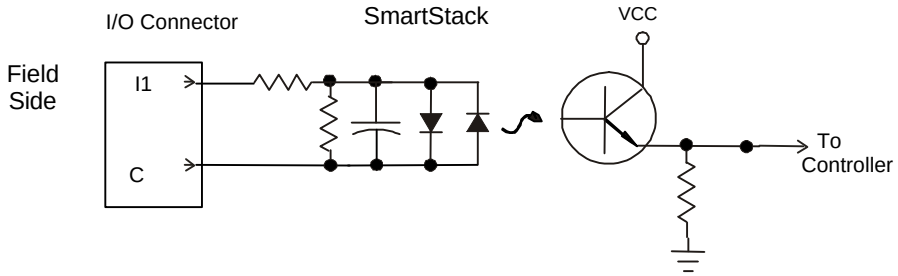


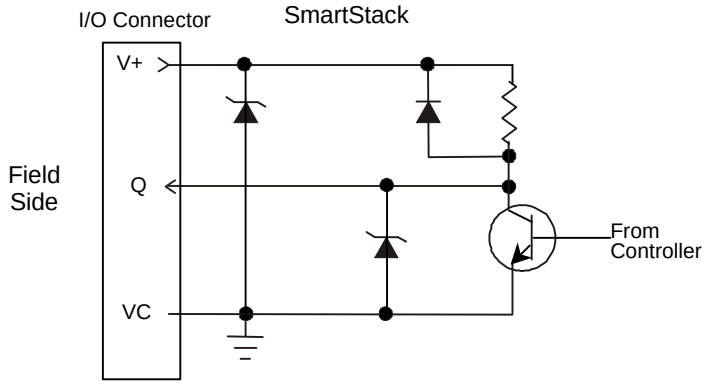
OCS Bottom View – Shows Corresponding I/O Pin

Pin	Signal DIQ611
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C	Common
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
VC	Common
V+	Load Voltage +

Warning: Wiring the positive side of the DC source to loads connected to outputs 1 through 8 and the negative side of the DC source to the output common(s) would create a Negative Logic condition, which may be considered an unsafe practice under CE directives.

3 INTERNAL CIRCUIT SCHEMATIC





Specification for transient voltage suppressors (transorbs) used on output circuitry is 36VDC, 300 watts.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default states of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

Warning: The default turns the outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 INSTALLATION / SAFETY

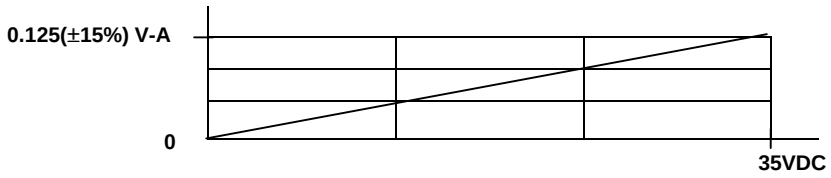
Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

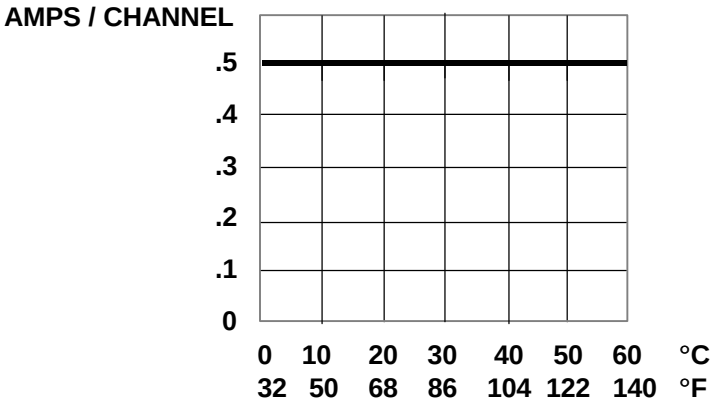
For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

6 INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart



Derating Output Chart



7 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

Mixed DC I/O Module

IC300DIQ711
(16 Input Channels)
12/24 Vdc In, Positive/Negative Logic
(12 Output Channels)
24Vdc Out, Negative Logic

1 SPECIFICATIONS

INPUT	DIQ711		DIQ711
Inputs per Module	16	Input Characteristics	Bidirectional
Commons per Module	3	Input Impedance	10K Ohms
Input Voltage Range	12-24VDC	Minimum ON Current	1mA
Peak Voltage	35VDC Max.	Maximum OFF Current	200µA
Isolation (Channel to Bus)	500VDC	OFF to ON Response	1ms.
ON Voltage Level	9VDC	ON to OFF Response	1ms.
OFF Voltage Level	3VDC		

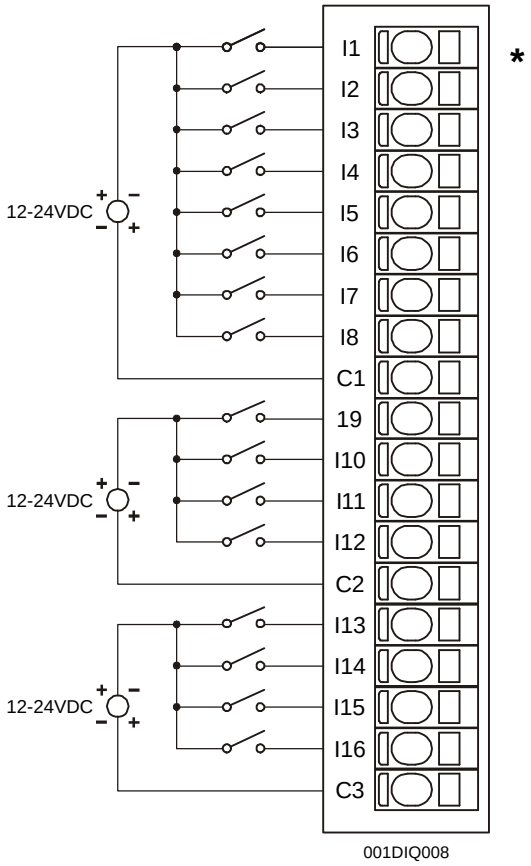
OUTPUT	DIQ711		DIQ711
Outputs per Module	12	Output Protection	Short Circuit
Commons per Module	1	Maximum Leakage Current	100µA
Operating Voltage	5 - 35VDC	Maximum Inrush Current	600mA. per channel
Output Type	Sinking / 10K Pull-Up	Minimum Load	None
Peak Voltage	35VDC Max.	OFF to ON Response	1ms.
Output Characteristics	Current Sinking	ON to OFF Response	1ms.
ON Voltage Level	1.5VDC Max.		
Maximum Load Current per channel	0.5A Max.		

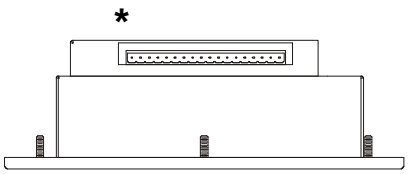
General Specifications			
Required Power (Steady State)	1.18W (49.5mA @ 24VDC)	Operating Temperature	0° to 60° Celsius
Required Power (Inrush)	Negligible	UL	Operating Temperature Code T4A; Also refer to GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
		Weight	9 oz. (256 g)

GFK-1607D

2 WIRING

2.1 Input Wiring

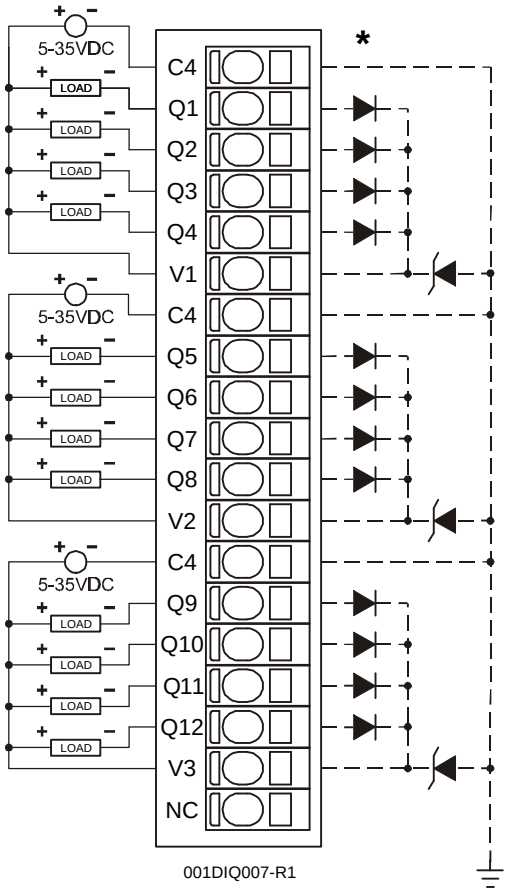


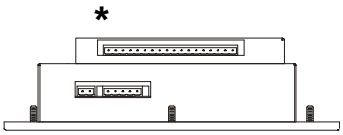


OCS Top View – Shows Corresponding I/O Pin

Pin	Signal
	DIQ711 Input
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C1	Common 1
I9	Input 9
I10	Input 10
I11	Input 11
I12	Input 12
C2	Common 2
I13	Input 13
I14	Input 14
I15	Input 15
I16	Input 16
C3	Common 3

2.2 Output Wiring



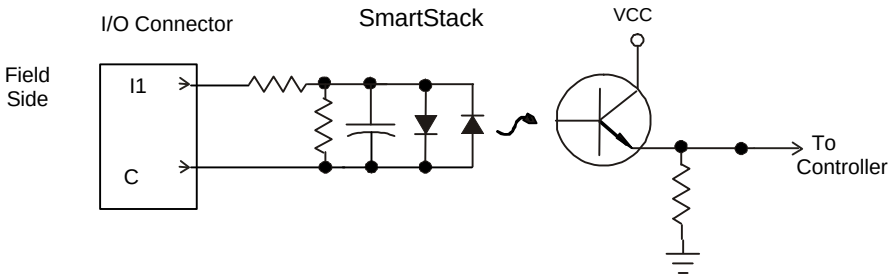


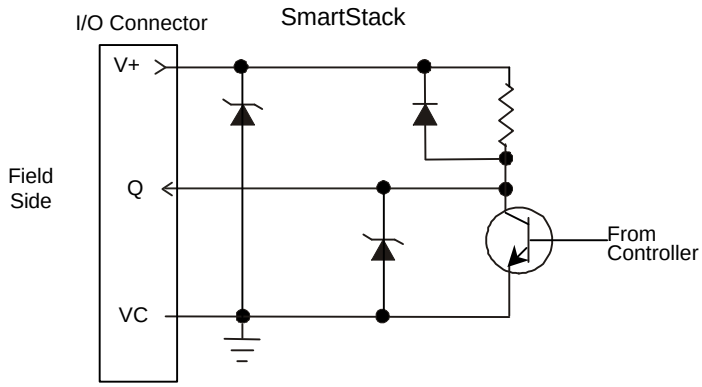
OCS Bottom View – Shows Corresponding I/O Pin

Pin	Signal DIQ711 Output
C4	Common 4
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
V1	Load Power 1
C4	Common 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
V2	Load Power 2
C4	Common 4
Q9	Output 9
Q10	Output 10
Q11	Output 11
Q12	Output 12
V3	Load Power 3
NC	No Connection

Warning: This is a negative logic device. Use of it may be considered an unsafe practice under CE directives.

3 INTERNAL CIRCUIT SCHEMATIC





Specification for transient voltage suppressors (transorbs) used on output circuitry is 36VDC, 300 watts.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default states of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

Warning: The default turns the outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 INSTALLATION / SAFETY

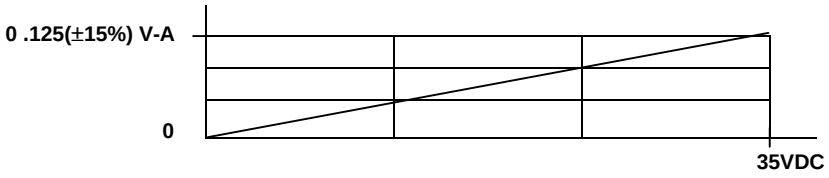
Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

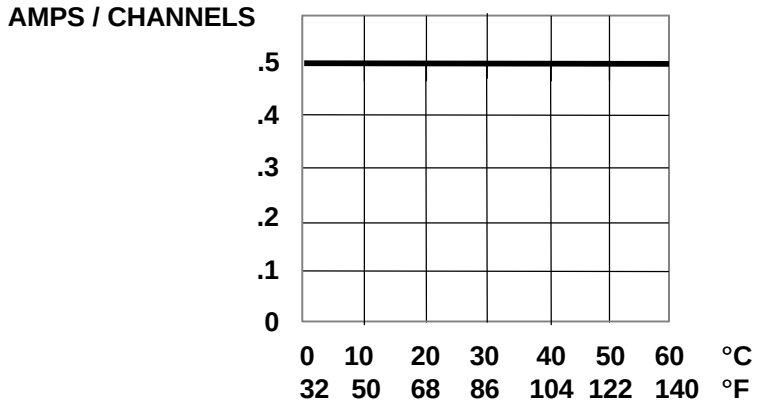
For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

6 INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart



Derating Output Chart



7 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

Mixed I/O Module

IC300DIQ612
12/24 Vdc In, Positive/Negative Logic
3A Relay Out

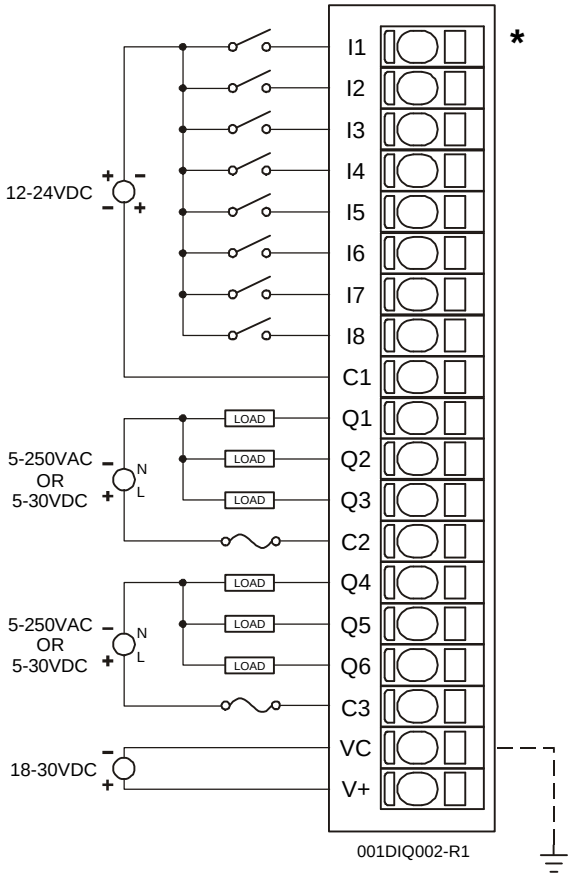
1 SPECIFICATIONS

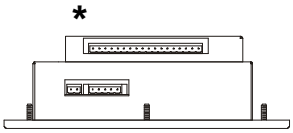
INPUT	DIQ612		DIQ612
Inputs per Module	8 isolated	Input Impedance	> 10K Ohms
Commons per Module	1	Minimum ON Current	1mA
Input Voltage Range	12/24VDC	Maximum OFF Current	200µA
Peak Voltage	35VDC Max.	OFF to ON Response	1ms.
ON Voltage level	Min. 9VDC	ON to OFF Response	1ms.
OFF Voltage level	Max. 3VDC	Status Indicator	8
Isolation (Common to Common and Channel to Common)	500VDC		

OUTPUT	DIQ612		DIQ612
Outputs per Module	6 relay	Maximum Leakage Current	5µA
Commons per Module	2	Maximum Inrush Current	3A per channel
Output Type	Relay	Minimum Load	None
Coil Voltage	18-30VDC	OFF to ON Response	6ms. Typical
Contact Voltage	250VAC / 30VDC Max.	ON to OFF Response	0.3ms. Typical
ON Voltage drop	0.2V Max.	Status Indicator	6
Fuses	10A common	Isolation (Common to Common and Channel to Common)	500VDC
Maximum Load current (resistive) per channel	3A		

General Specifications			
Required Power (Steady State)	0.23W (9.6mA @ 24VDC)	CE	Refer to GFK-1755
Required Power (Inrush)	Negligible	UL	Refer to GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
Operating Temperature	0° to 60° Celsius	Weight	9 oz. (256 g)

2 WIRING





OCS Bottom View – Shows Corresponding I/O Pin

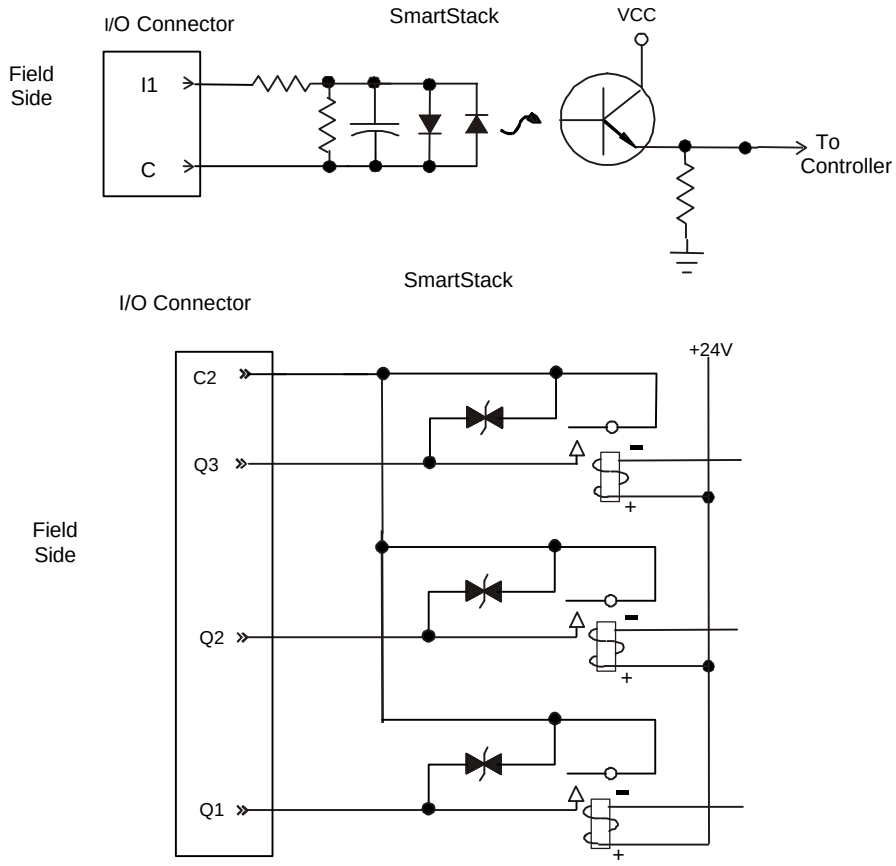
Pin	Signal DIQ612
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C1	Common 1
Q1	Output 1
Q2	Output 2
Q3	Output 3
C2	Common 2
Q4	Output 4
Q5	Output 5
Q6	Output 6
C3	Common 3
VC	Relay Coil Voltage Common
V+	Relay Coil Voltage +

Warning: To protect the module and associated wiring from load faults, use external fuses **(10 A)** as shown. **This warning affects DIQ612, Revisions C or higher.**

Warning: Connecting high voltage to any I/O pin may cause high voltage to appear at other I/O pins.

Warning: Wiring the line side of the AC source to loads connected to outputs 1 through 6 and the neutral side of the AC source to the output common(s) would create a Negative Logic condition, which may be considered an unsafe practice.

3 INTERNAL CIRCUIT SCHEMATIC



Specification for transient voltage suppressors (transorbs) used on output circuitry is 400VDC, bi-directional 400 watts.

Electro-mechanical relays comply with IEC1131-2.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default states of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

Warning: The default turns the outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 INSTALLATION / SAFETY

Warning: Previous versions of this product provided internal fuses on the output circuits (relay contacts). Due to CE Low Voltage Directive (LVD) marking requirements, these fuses have been removed and replaced with solid wire. Therefore, it is now the responsibility of the user of this equipment to ensure that adequate fusing is installed *externally* on each relay output circuit.

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

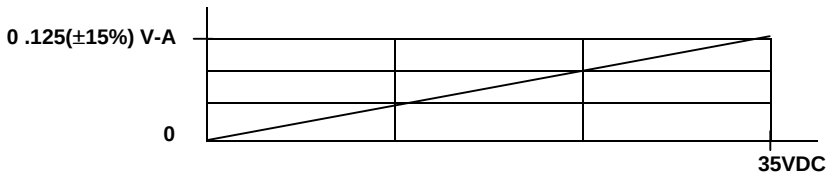
When found on the product, the following symbols specify:

Warning: Consult user documentation.

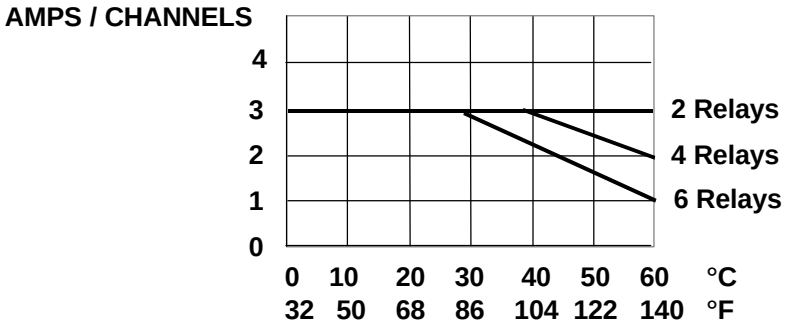
Warning: Electrical Shock Hazard.

6 INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart



Derating Output Chart



Typical Relay Life (DIQ612)			
Voltage (Resistive)	**Load Current**		
	1 Amp	**2 Amp**	**3 Amp**
30VDC	600K	250K	125K
125VAC	750K	300K	150K
250VAC	500K	200K	100K

7 TECHNICAL SUPPORT

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:

(+) 353-21-4321-266

NOTES

Mixed I/O Module

IC300DIQ712
12/24 Vdc In, Positive/Negative Logic
3A Relay Out

1 SPECIFICATIONS

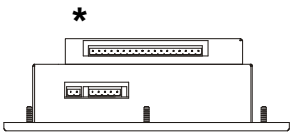
INPUT	DIQ712		DIQ712
Inputs per Module	14 isolated	Minimum ON Current	1mA
Commons per Module	3	Maximum OFF Current	200µA
Input Voltage Range	12/24VDC	OFF to ON Response	1ms.
Peak Voltage	35VDC Max.	ON to OFF Response	1ms.
ON Voltage level	Min. 9VDC	Isolation (Channel to Common)	500VDC
OFF Voltage level	Max. 3VDC		
Input Impedance	> 10K Ohms		

OUTPUT	DIQ712		DIQ712
Outputs per Module	10 relay	Maximum Inrush Current	3A
Commons per Module	2	Minimum Load	None
Output Type	Relay	OFF to ON Response	6ms. Typical
Coil Voltage	18-30VDC	ON to OFF Response	.3ms. Typical
Contact Voltage	250VAC / 30VDC Max.	Isolation (Channel to Channel and Channel to Common)	2500VDC
ON Voltage drop	0.2V Max.	Maximum Leakage Current	5µA
Maximum Load current (resistive) per output	3A		

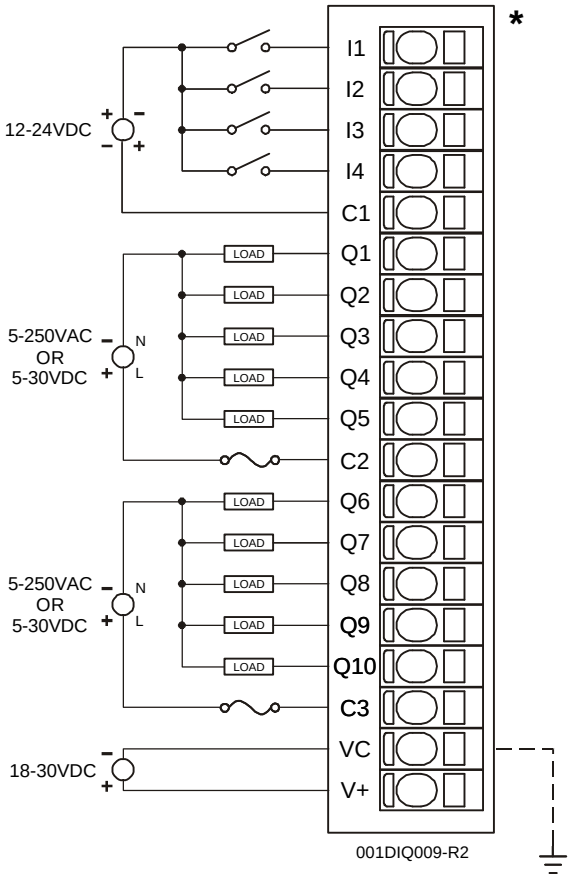
General Specifications			
Required Power (Steady State)	0.19W(8mA @ 24VDC)	CE	Refer to GFK-1755
Required Power (Inrush)	Negligible	UL	Refer to GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
Operating Temperature	0° to 60° Celsius	Weight	9.5 oz. (256 g)

2 WIRING

2.1 Input / Output Connector Wiring



OCS Bottom View – Shows Corresponding I/O Pin



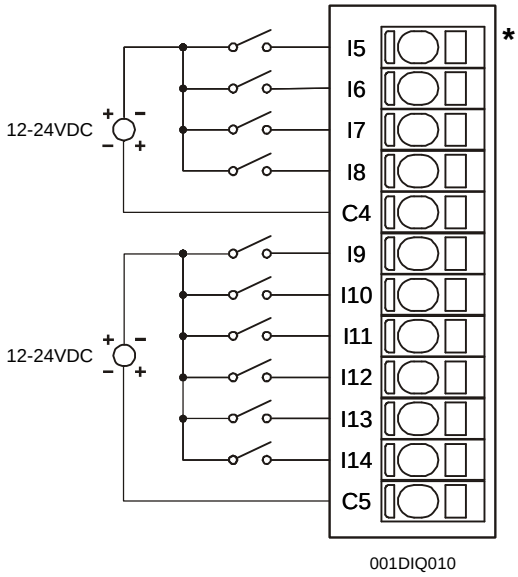
Pin	Signal
	DIQ712
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
C1	Common for Inputs1,2,3,4
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
C2	Common for Outputs 1,2,3,4,5
Q6	Output 6
Q7	Output 7
Q8	Output 8
Q9	Output 9
Q10	Output 10
C3	Common for Outputs 6,7,8,9,10
VC	Relay Coil power common, connected to bus common internally.
V+	Relay Coil Power, +18 to +30VDC, 90mA max.

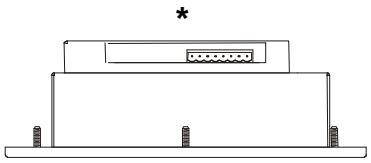
Warning: To protect the module and associated wiring from load faults, use external fuse (**10 A**) as shown. **This warning affects DIQ712, Revisions C or higher.**

Warning: Connecting high voltage to any I/O pin may cause high voltage to appear at other I/O pins.

Warning: Wiring the line side of the AC source to loads connected to outputs 1 through 10 and the neutral side of the AC source to the output common(s) would create a Negative Logic condition, which may be considered an unsafe practice.

2.2 Input Connector Wiring

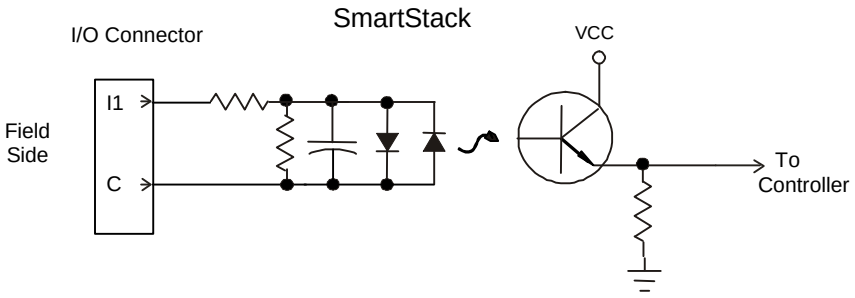


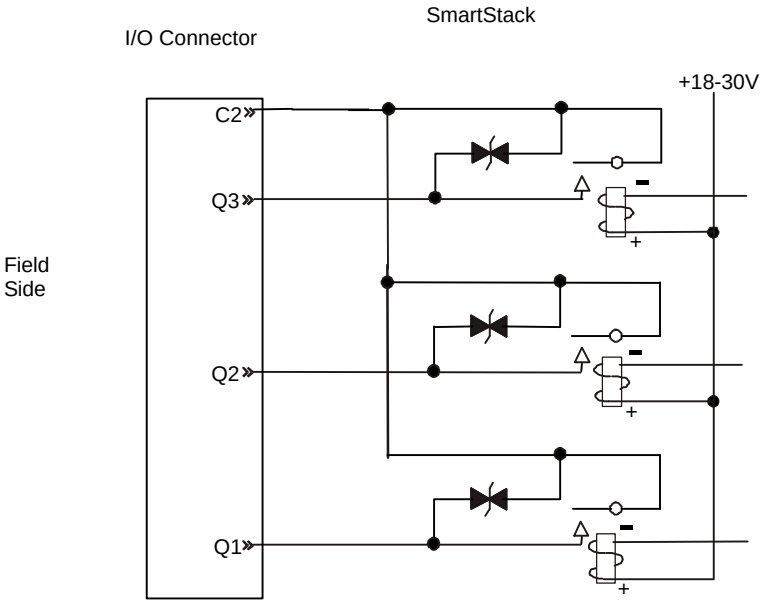


OCS Top View – Shows Corresponding I/O Pin

Pin	Signal DIQ712
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C4	Common for Inputs 5,6,7,8
I9	Input 9
I10	Input 10
I11	Input 11
I12	Input 12
I13	Input 13
I14	Input 14
C5	Common for Inputs 9,10,11,12,13,14

3 INTERNAL CIRCUIT SCHEMATIC





Specification for transient voltage suppressors (transorbs) used on output circuitry is 400VDC bi-directional 400 watts.

Note: Electro-mechanical relays comply with IEC1131-2.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default states of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

Warning: The default turns the outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 INSTALLATION / SAFETY

Warning: Previous versions of this product provided internal fuses on the output circuits (relay contacts). Due to CE Low Voltage Directive (LVD) marking requirements, these fuses have been removed and replaced with solid wire. Therefore, it is now the responsibility of the user of this equipment to ensure that adequate fusing is installed *externally* on each relay output circuit.

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

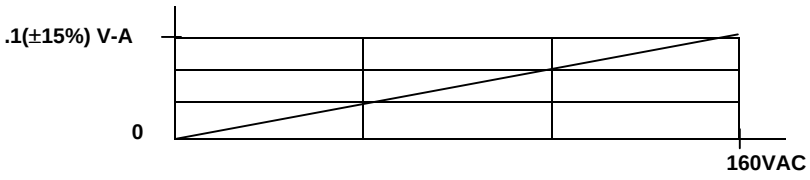
For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

Warning: Consult user documentation.

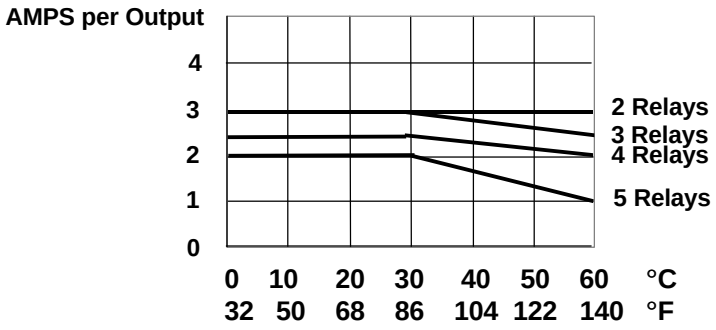
Warning: Electrical Shock Hazard.

6 INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart



Derating Output Chart
(Each group of 5)



Typical Relay Life (DIQ712)				
Voltage (Resistive)	**No Load**	**Load Current**		
		1 Amp	**2 Amp**	**3 Amp**
30VDC	20 Million	600K	250K	125K
125VAC		750K	300K	150K
250VAC		500K	200K	100K

7 TECHNICAL SUPPORT

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

Mixed DC I/O Module

IC300DIQ616
12/24 Vdc In, Positive/Negative Logic
24Vdc Out, Positive Logic

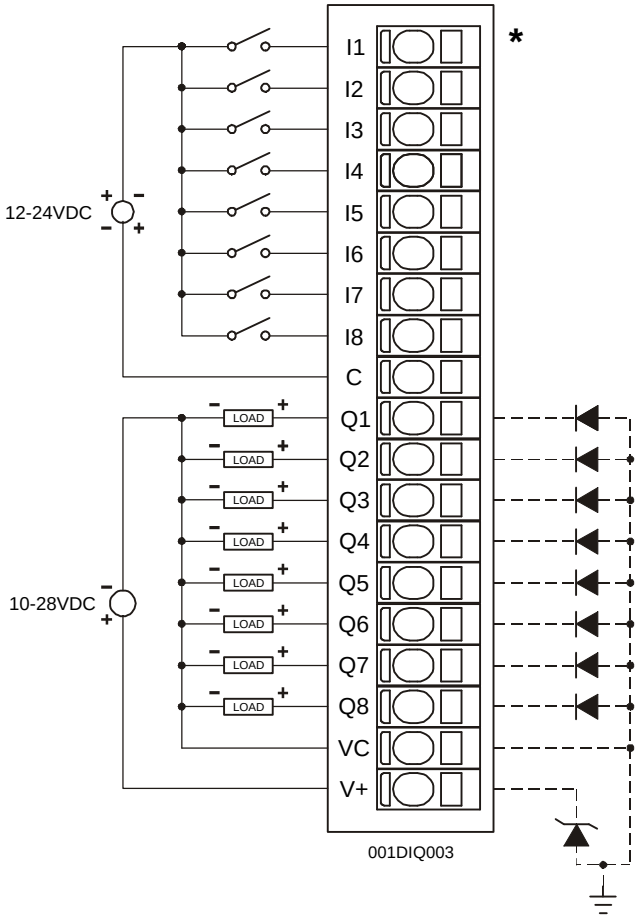
1 SPECIFICATIONS

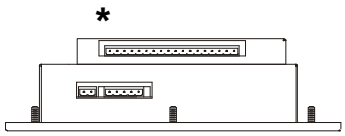
INPUT	DIQ616		DIQ616
Inputs per Module	8	Input Characteristics	Bidirectional
Commons per Module	1	Input Impedance	10K Ohms
Input Voltage Range	12-24VDC	Minimum ON Current	1mA
Peak Voltage	35VDC Max.	Maximum OFF Current	200µA
Isolation (Channel to Bus)	500VDC	OFF to ON Response	1ms.
ON Voltage Level	9VDC	ON to OFF Response	1ms.
OFF Voltage Level	3VDC	Status Indicator	8 LEDs

OUTPUT	DIQ616		DIQ616
Outputs per Module	8	Maximum Inrush Current	650mA per channel
Commons per Module	1	Minimum Load	None
Operating Voltage	10 - 28VDC	OFF to ON Response	1ms.
Output Type	Sourcing / 10K Pull-Down	ON to OFF Response	1ms.
Peak Voltage	28VDC Max.	Output Characteristics	Current Sourcing
Maximum Load Current per channel	0.5A Max.	Status Indicator	8 LEDs
Output Protection	Short Circuit		

General Specifications			
Required Power (Steady State)	0.14W (6.05mA @ 24VDC)	CE	Refer to GFK-1755
Required Power (Inrush)	Negligible	UL	Refer to GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
Operating Temperature	0° to 60° Celsius	Weight	9 oz. (256 g)

2 WIRING

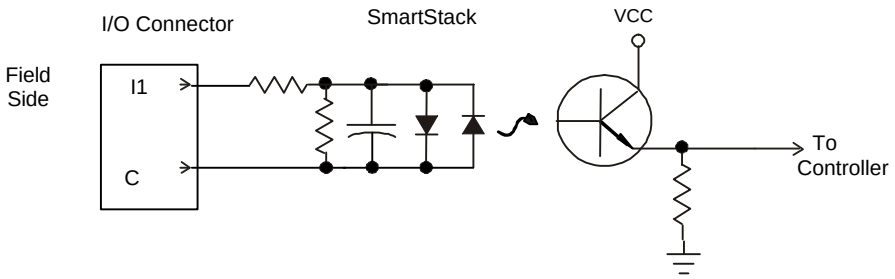


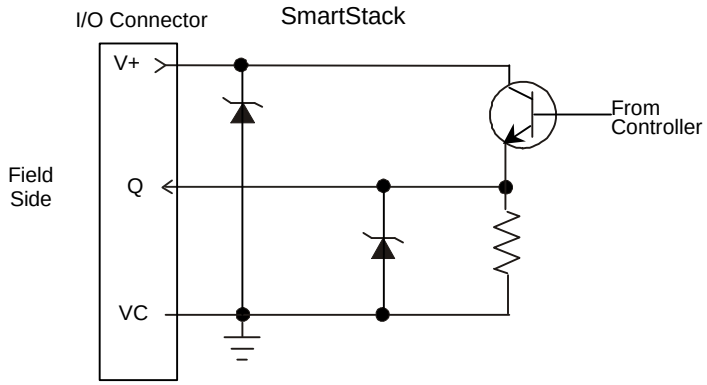


OCS Bottom View – Shows Corresponding I/O Pin

Pin	DIQ616
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C	Common
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
VC	Common
V+	Load Voltage +

3 INTERNAL CIRCUIT SCHEMATIC





Specification for transient voltage suppressors (transorbs) used on output circuitry is 33VDC, 600 watts.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default states of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

Warning: The default turns the outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 INSTALLATION / SAFETY

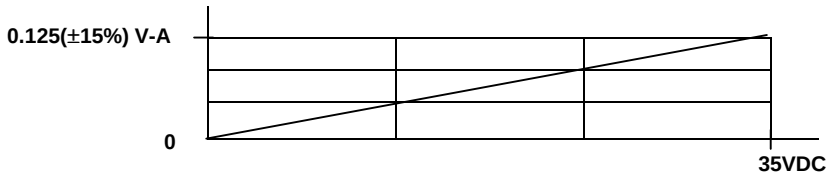
Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

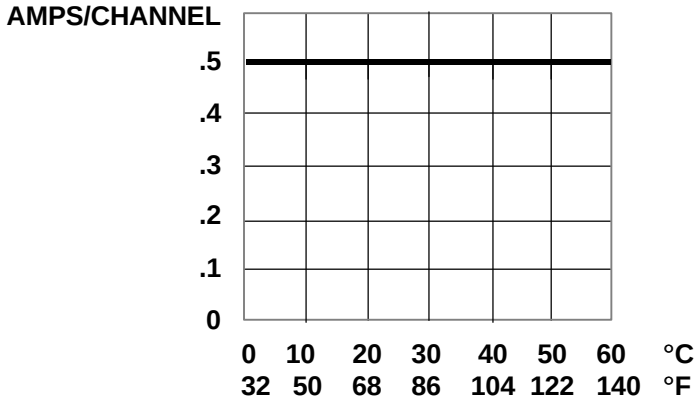
For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

6 INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart



Derating Chart for DIQ616



7 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

Mixed DC I/O Module

IC300DIQ716
12/24 Vdc In, Positive/Negative Logic
(16 Input Channels)
10-28Vdc Out, Positive Logic
(12 Output Channels)

1 SPECIFICATIONS

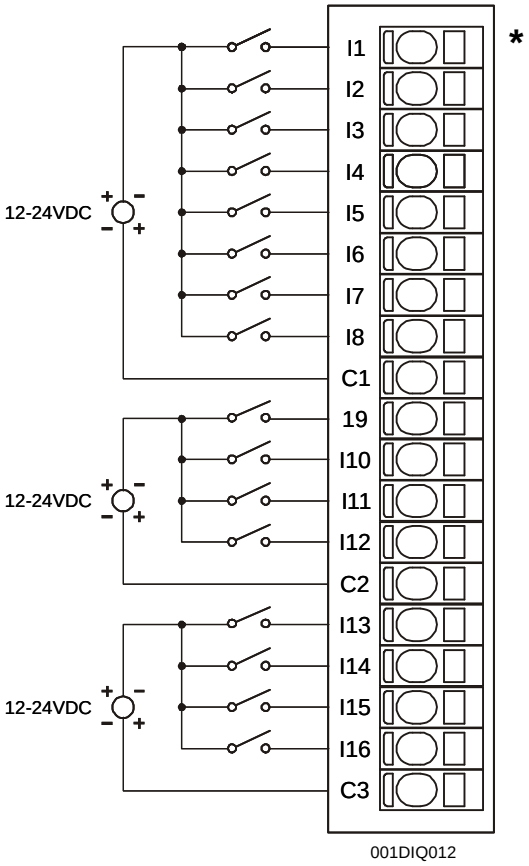
INPUT	DIQ716		DIQ716
Inputs per Module	16	Input Characteristics	Bidirectional
Commons per Module	3	Input Impedance	10K Ohms
Input Voltage Range	12-24VDC	Minimum ON Current	1mA
Peak Voltage	35VDC Max.	Maximum OFF Current	200µA
Isolation (Channel to Channel)	500VDC	OFF to ON Response	1ms.
ON Voltage Level	9VDC /1mA minimum	ON to OFF Response	1ms.
OFF Voltage Level	3VDC		

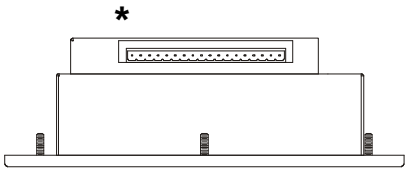
OUTPUT	DIQ716		DIQ716
Outputs per Module	12	Maximum Inrush Current	650mA
Commons per Module	1	Minimum Load	None
Operating Voltage	10 - 28VDC	OFF to ON Response	1ms.
Output Type	Sourcing / 10K Pull-Down	ON to OFF Response	1ms.
Peak Voltage	28VDC Max.	Output Characteristics	Current Sourcing
Maximum Load Current per channel	0.5A Max.	Output Protection	Short Circuit

General Specifications			
Required Power (Steady State)	0.13W (5.5mA @ 24VDC)	CE	Refer to GFK-1755
Required Power (Inrush)	Negligible	UL	Operating Temperature Code T4; Also refer to GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
Operating Temperature	0° to 60° Celsius	Weight	9 oz. (256 g)

2 WIRING

2.1 Input Wiring

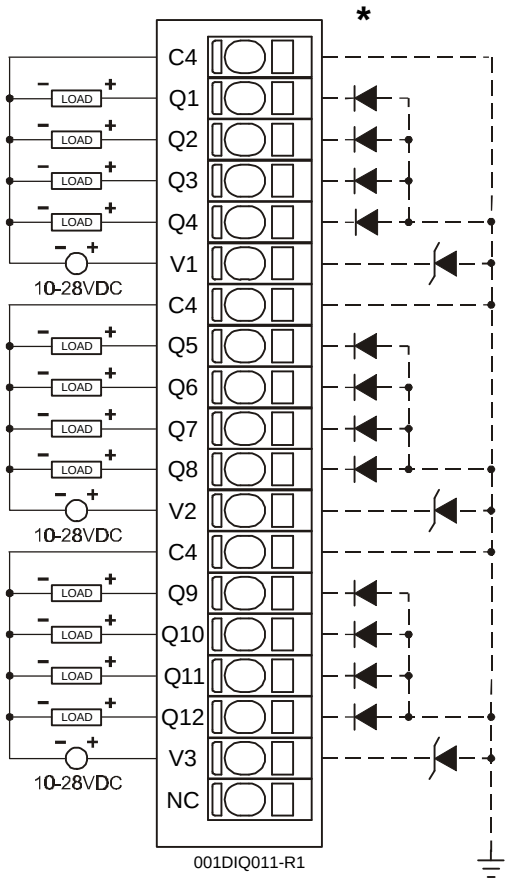


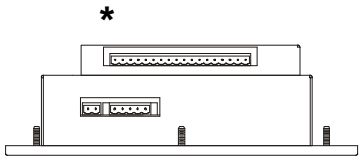


OCS Top View – Shows Corresponding I/O Pin

Pin	Signal
	DIQ716 INPUT
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C1	Common 1 (Isolated)
I9	Input 9
I10	Input 10
I11	Input 11
I12	Input 12
C2	Common 2 (Isolated)
I13	Input 13
I14	Input 14
I15	Input 15
I16	Input 16
C3	Common 3 (Isolated)

2.2 Output Wiring

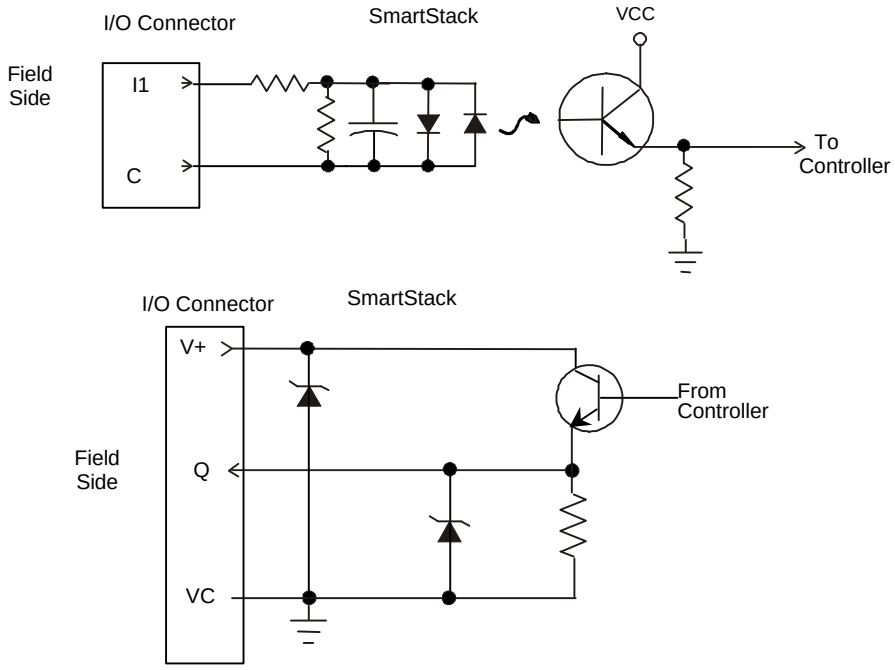




OCS Bottom View – Shows Corresponding I/O Pin

Pin	Signal
	DIQ716 OUTPUT
C4	Common
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
V1	Load Power 1
C4	Common
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
V2	Load Power 2
C4	Common
Q9	Output 9
Q10	Output 10
Q11	Output 11
Q12	Output 12
V3	Load Power
NC	No Connection

3 INTERNAL SCHEMATIC DRAWING



Specification for transient voltage suppressors (transorbs) used on output circuitry is 33VDC, 600 watts.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default states of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

Warning: The default turns the outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 INSTALLATION / SAFETY

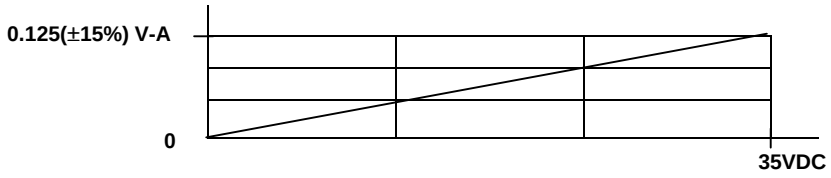
Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

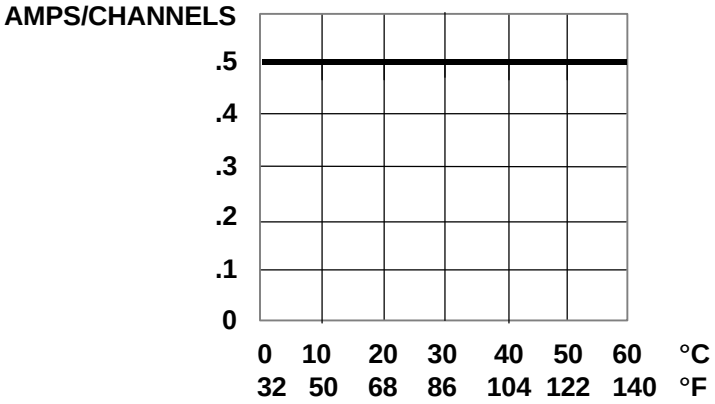
For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

6 INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart



Derating Chart for DIQ716



7 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

AC Input /AC Output Module

IC300DIQ622
120 VAC In, Positive Logic
3A Relay Out

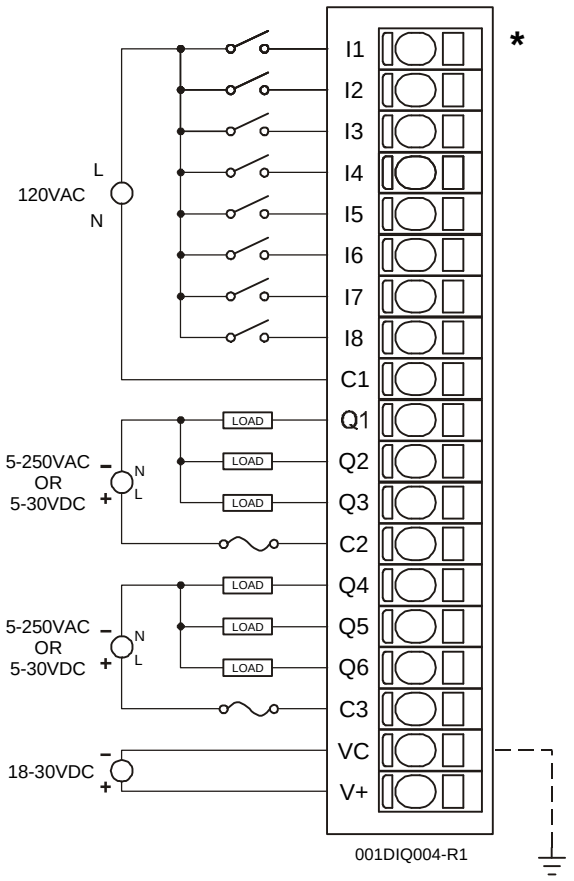
1 SPECIFICATIONS

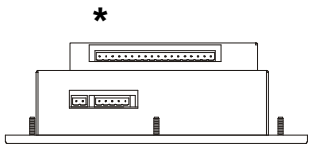
INPUT	DIQ622		DIQ622
Inputs per Module	8	Input Impedance	0.01µF +10K
Commons per Module	1	Isolation (Channel to Bus)	500VDC
Input Voltage Range	120 – 160 VAC	Minimum ON Current	1mA.
Peak Voltage	160VAC	Maximum OFF Current	200µA.
AC Frequency	50 / 60Hz	OFF to ON Response	50ms.
ON Voltage Level	70VAC Min.	ON to OFF Response	50ms.
OFF Voltage level	30VAC Max.	Status Indicator	8

OUTPUT	DIQ622		DIQ622
Outputs per Module	6 relay	Maximum Leakage Current	5µA
Commons per Module	2	Maximum Inrush Current	3A per channel
Output Type	Relay	Minimum Load	None
Coil Voltage	18-30VDC	OFF to ON Response	6ms. Typical
Contact Voltage	250VAC / 30VDC Max.	ON to OFF Response	0.3ms. Typical
ON Voltage drop	0.1V Max.	Status Indicator	6
Fuses	10A common	Isolation (Channel to Channel and Channel to Common)	500VDC
Maximum Load current (resistive) per channel	3A		

General Specifications			
Required Power (Steady State)	0.06 (2.75 @ 24VDC)	CE	GFK-1755
Required Power (Inrush)	Negligible	UL	Operating Temperature Code T4A; Also refer to GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
Operating Temperature	0° to 60° Celsius	Weight	9oz. (256 g)

2 WIRING





OCS Bottom View – Shows Corresponding I/O Pin

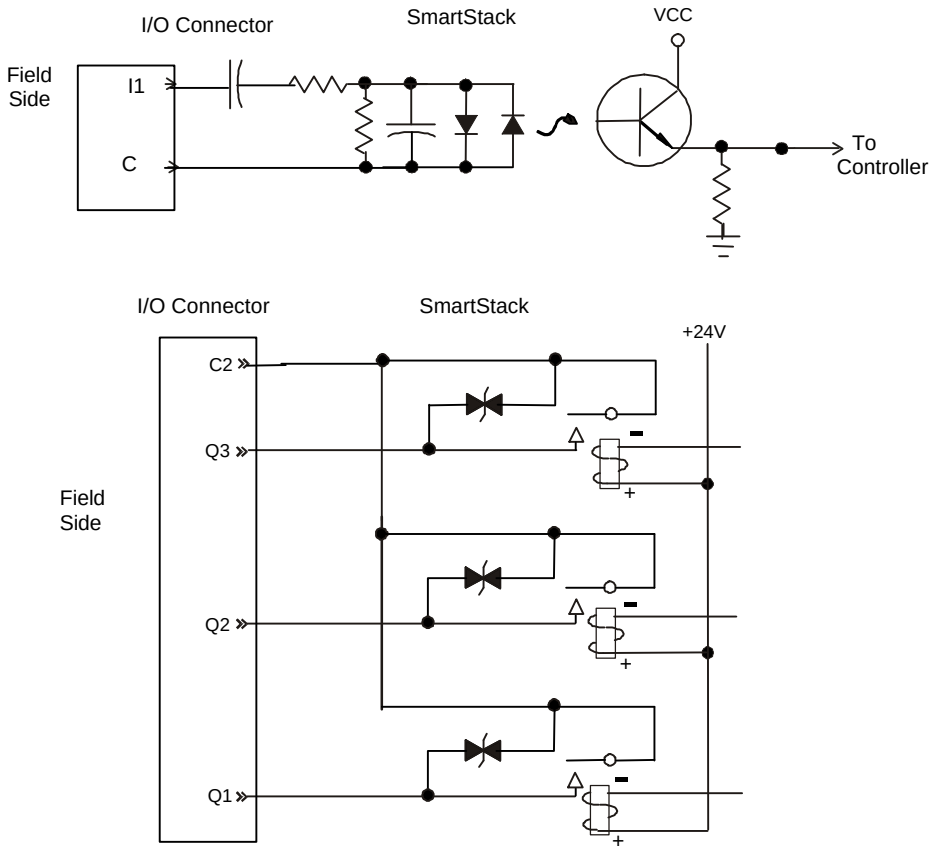
Pin	Signal	
	DIQ622	DIQ522
I1	Input 1	Input 1
I2	Input 2	Input 2
I3	Input 3	Input 3
I4	Input 4	Input 4
I5	Input 5	No Connection
I6	Input 6	No Connection
I7	Input 7	No Connection
I8	Input 8	No Connection
C1	Common 1	
Q1	Output 1	Output 1
Q2	Output 2	Output 2
Q3	Output 3	Output 3
C2	Common 2	
Q4	Output 4	No Connection
Q5	Output 5	No Connection
Q6	Output 6	No Connection
C3	Common 3	No Connections
VC	Relay Coil Voltage Common	
V+	Relay Coil Voltage +	

Warning: To protect the module and associated wiring from load faults, use external fuse **(10 A)** as shown. **This warning affects DIQ622, Revisions C or higher.**

Warning: Connecting high voltage to any I/O pin may cause high voltage to appear at other I/O pins.

Warning: Wiring the line side of the AC source to loads connected to outputs 1 through 6 and the neutral side of the AC source to the output common(s) would create a Negative Logic condition, which may be considered an unsafe practice.

3 INTERNAL CIRCUIT SCHEMATICS



Specification for transient voltage suppressors (transorbs) used on output circuitry is 400VDC, bi-directional 400 watts.

Electro-mechanical relays comply with IEC1131-2.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default states of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

Warning: The default turns the outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 INSTALLATION / SAFETY

Warning: Previous versions of this product provided internal fuses on the output circuits (relay contacts). Due to CE Low Voltage Directive (LVD) marking requirements, these fuses have been removed and replaced with solid wire. Therefore, it is now the responsibility of the user of this equipment to ensure that adequate fusing is installed *externally* on each relay output circuit.

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

When found on the product, the following symbols specify:

Warning: Consult user documentation.

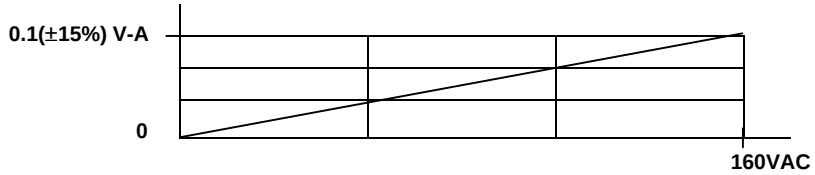
Warning: Electrical Shock Hazard.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

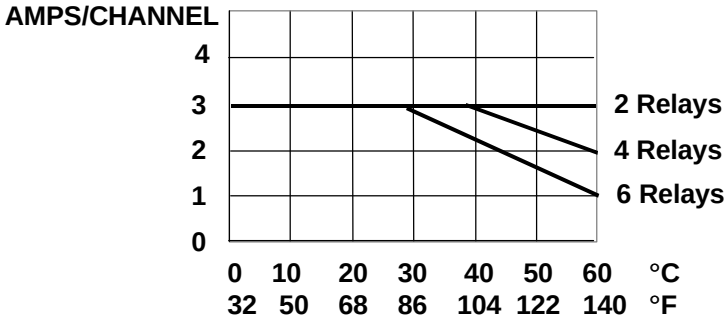
For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

6 INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart



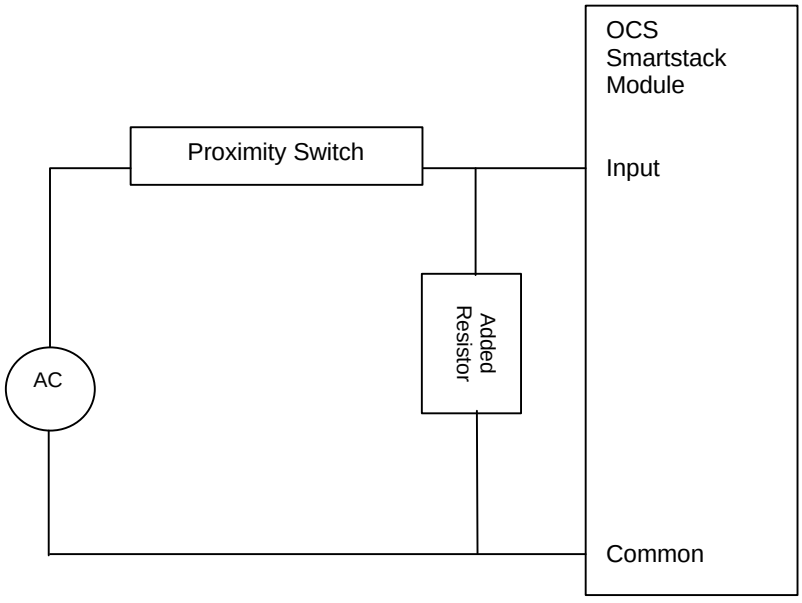
Derating Output Chart



Typical Relay Life (DIQ622)			
Voltage (Resistive)	**Load Current**		
	1 Amp	**2 Amp**	**3 Amp**
30VDC	600K	250K	125K
125VAC	750K	300K	150K
250VAC	500K	200K	100K

The following applies to applications in which two-wire proximity switches are used as sensors for discrete AC inputs. For these applications, an external resistor *or* resistor/capacitor combination must be added to each input as shown below. The resistor provides a small current to power the proximity switch. The resistor is not required for other types of proximity switches.

120VAC: 15K ohm, 2W resistor *or* 0.22µF metallized film capacitor rated for 120VAC service in series with 470 ohm, 0.5W resistor



7 TECHNICAL SUPPORT

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

AC Input /AC Output Module

IC300DIQ722
120 VAC In, Positive Logic
3A Relay Out

1 SPECIFICATIONS

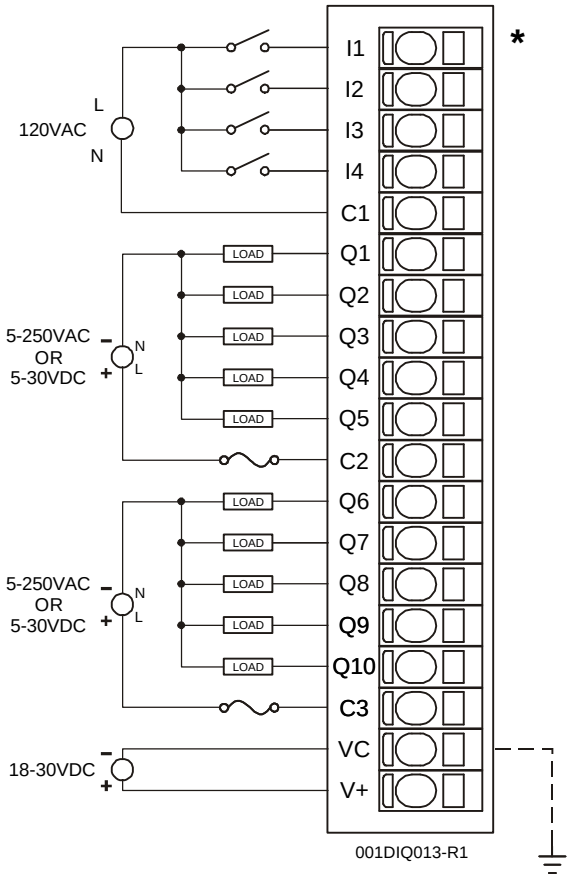
INPUT	DIQ722		DIQ722
Inputs per Module	14	Input Impedance	0.01µF +10K
Commons per Module	3	Isolation (Channel to Common)	1500VDC
Input Voltage Range	120 – 160 VAC	Minimum ON Current	1mA.
Peak Voltage	160VAC	Maximum OFF Current	200µA.
AC Frequency	50 / 60Hz	OFF to ON Response	50ms.
ON Voltage Level	70VAC Min.	ON to OFF Response	50ms.
OFF Voltage level	30VAC Max.		

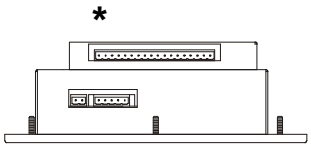
OUTPUT	DIQ722		DIQ722
Outputs per Module	10 relay	Maximum Leakage Current	5µA
Commons per Module	2	Maximum Inrush Current	3A
Output Type	Relay	Minimum Load	None
Coil Voltage	18-30VDC	OFF to ON Response	6ms. Typical
Contact Voltage	250VAC / 30VDC Max.	ON to OFF Response	0.3ms. Typical
ON Voltage drop	0.2VDC max.	Isolation (Channel to Channel and Channel to Common)	2500VDC
Maximum Load current (resistive) per channel	3A		

General Specifications			
Required Power (Steady State)	0.17W (7mA @ 24VDC)	CE	GFK-1755
Required Power (Inrush)	Negligible	UL	GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
Operating Temperature	0° to 60° Celsius	Weight	9.5 oz.

2 WIRING

2.1 Input / Output Connector Wiring





OCS Bottom View – Shows Corresponding I/O Pin

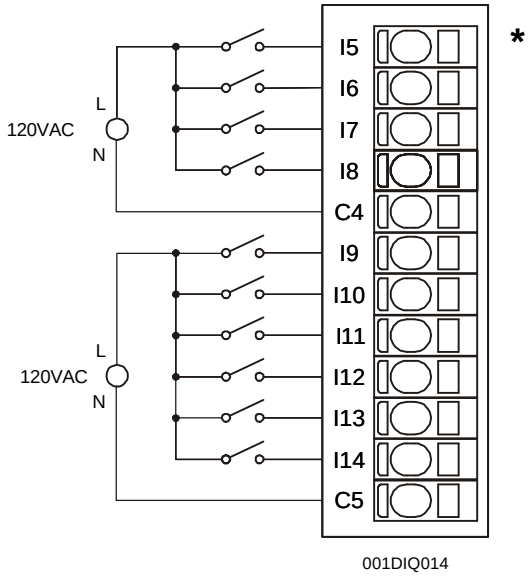
Pin	Signal
	DIQ722
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
C1	Common for Inputs 1,2,3,4
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
C2	Common for Outputs 1,2,3,4,5
Q6	Output 6
Q7	Output 7
Q8	Output 8
Q9	Output 9
Q10	Output 10
C3	Common for Outputs 6,7,8,9,10
VC	Relay Coil power common, connected to bus common internally.
V+	Relay Coil power + 18 to +30VDC, 90mA max.

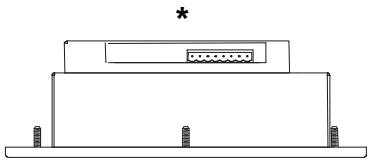
Warning: To protect the module and associated wiring from load faults, use external **(10 A)** fuse(s) as shown. **This warning affects DIQ722, Revisions C or higher.**

Warning: Connecting high voltage to any I/O pin may cause high voltage to appear at other I/O pins.

Warning: Wiring the line side of the AC source to loads connected to outputs 1 through 10 and the neutral side of the AC source to the output common(s) would create a Negative Logic condition, which may be considered an unsafe practice.

2.2 Input Connector Wiring

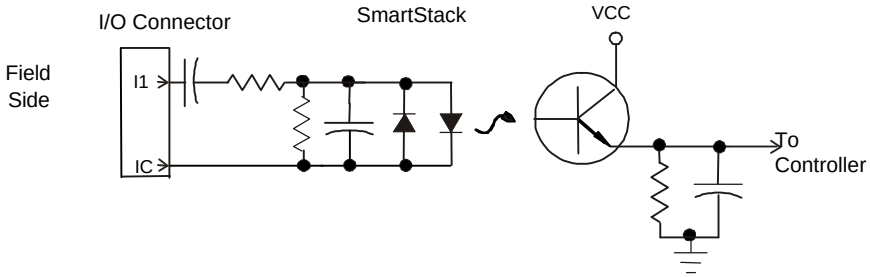


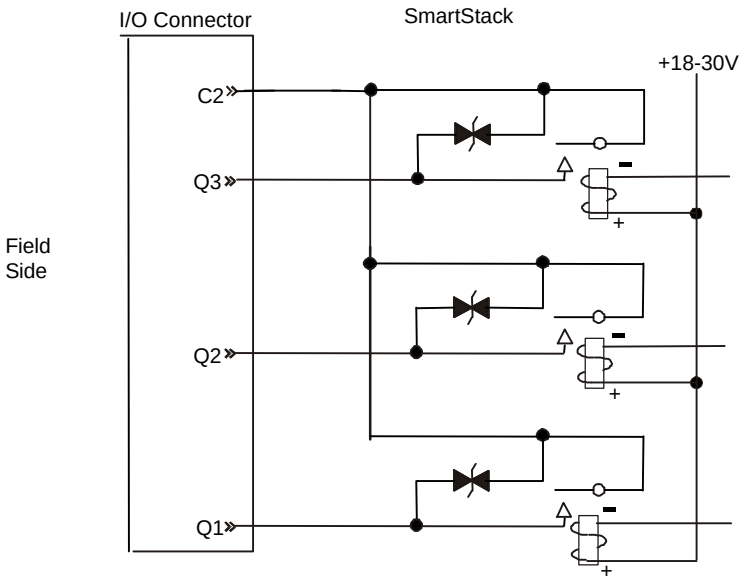


OCS Top View – Shows Corresponding I/O Pin

Pin	Signal
	DIQ722
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C4	Common for Inputs 5,6,7,8
I9	Input 9
I10	Input 10
I11	Input 11
I12	Input 12
I13	Input 13
I14	Input 14
C5	Common for Inputs 9,10,11,12,13,14

3 INTERNAL SCHEMATIC DRAWINGS





Specification for transient voltage suppressors (transorbs) used on output circuitry is 400V bi-directional 400W.

Note: Electro-mechanical relays comply with IEC1131-2.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default states of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

Warning: The default turns the outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 INSTALLATION / SAFETY

Warning: Previous versions of this product provided internal fuses on the output circuits (relay contacts). Due to CE Low Voltage Directive (LVD) marking requirements, these fuses have been removed and replaced with solid wire. Therefore, it is now the responsibility of the user of this equipment to ensure that adequate fusing is installed *externally* on each relay output circuit.

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

When found on the product, the following symbols specify:

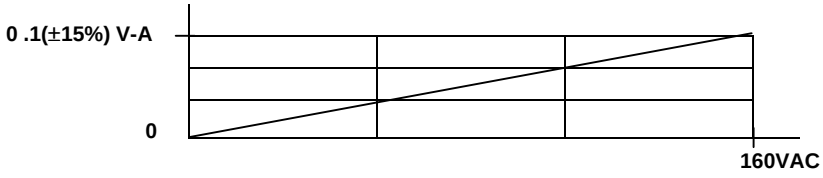
Warning: Consult user documentation.

Warning: Electrical Shock Hazard.

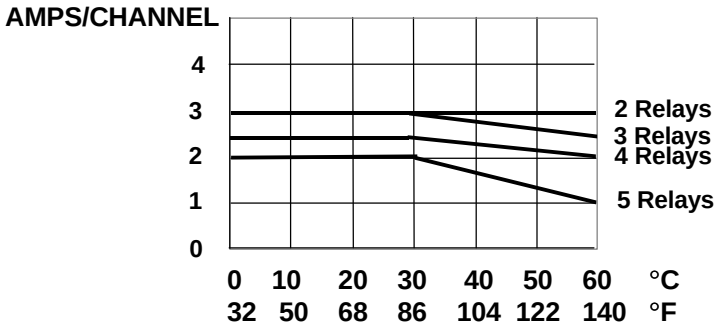
For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

6 INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart



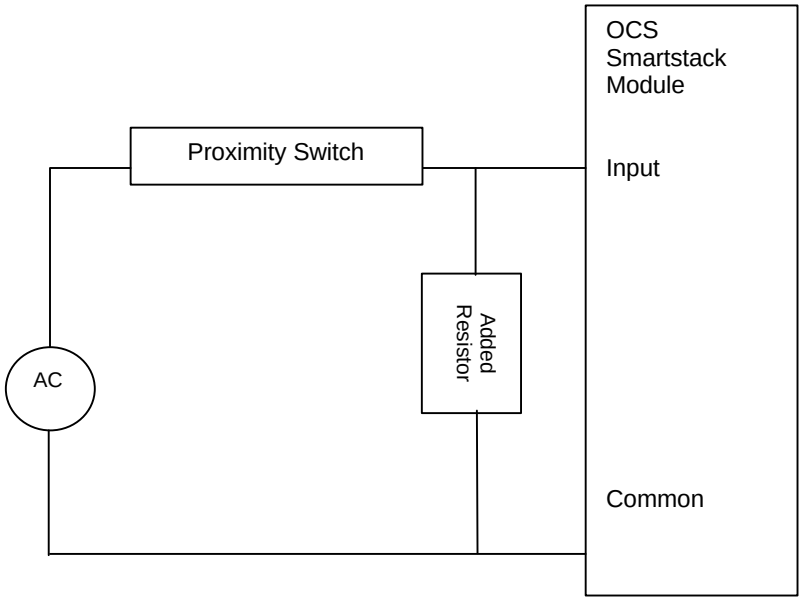
Derating Chart for DIQ722
(Each group of 5)



Typical Relay Life				
Voltage (Resistive)	No Load	Load Current 1 Amp	2 Amp	3 Amp
30VDC	20 Million	600K	250K	125K
125VAC		750K	300K	150K
250VAC		500K	200K	100K

The following applies to applications in which two-wire proximity switches are used as sensors for discrete AC inputs. For these applications, an external resistor *or* resistor/capacitor combination must be added to each input as shown below. The resistor provides a small current to power the proximity switch. The resistor is not required for other types of proximity switches.

120VAC: 15K ohm, 2W resistor *or* 0.22µF metallized film capacitor rated for 120VAC service in series with 470 ohm, 0.5W resistor



7 TECHNICAL SUPPORT

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

NOTES

AC Input /AC Output Module

IC300DIQ624
120 VAC In, Positive Logic
0-260 VAC Out, Positive Logic

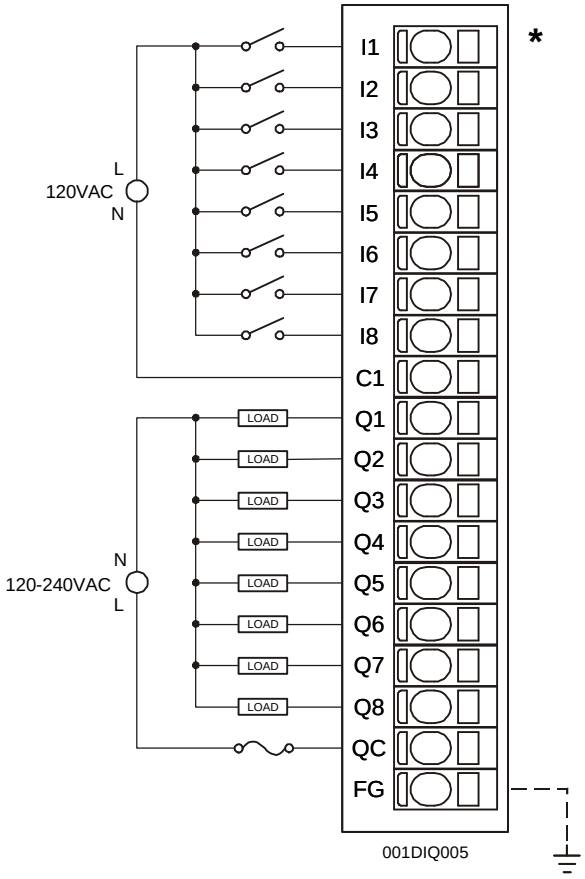
1 SPECIFICATIONS

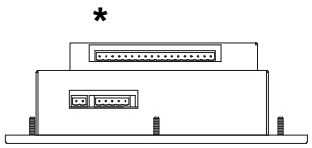
INPUT	DIQ624		DIQ624
Inputs per Module	8	Input Impedance	0.01µF +10K
Commons per Module	1	Isolation (Channel to Common)	500VDC
Input Voltage Range	120 – 160 VAC	Minimum ON Current	1mA.
Peak Voltage	160VAC	Maximum OFF Current	200µA.
AC Frequency	60Hz	OFF to ON Response	50ms.
ON Voltage Level	70VAC Min.	ON to OFF Response	50ms.
OFF Voltage level	30VAC Max.	Status Indicator	8

OUTPUT	DIQ624		DIQ624
Outputs per Module	8	Maximum Load Current per output	0.3A Max.
Commons per Module	1	Maximum Leakage Current	15µA Max.
Operating voltage	260VAC Max.	Maximum Inrush Current	500mA
Output Type	MOSFET	OFF to ON Response	10ms. Max.
Contact Voltage	260VAC Max.	ON to OFF Response	3ms. Max.
ON Voltage level	1V Max.	Status Indicator	8
Isolation (Channel to Channel and Channel to Common)	500VDC		

General Specifications			
Required Power (Steady State)	0.18W (7.7mA @ 24VDC)	CE	Refer to GFK-1755
Required Power (Inrush)	Negligible	UL	Refer to GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
Operating Temperature	0° to 60° Celsius	Weight	9.5 oz. (256 g)

2 WIRING





OCS Bottom View – Shows Corresponding I/O Pin

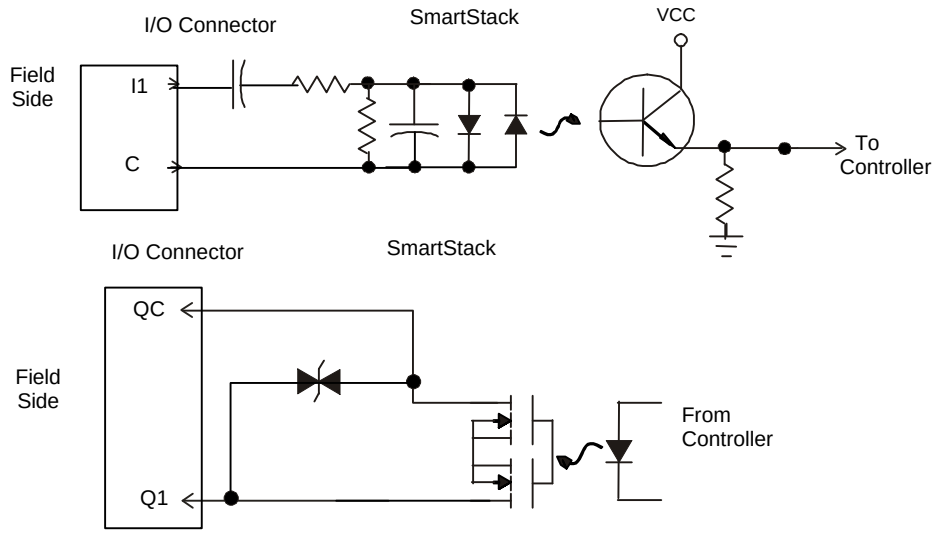
Pins	DIQ624
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
IC	Input Common
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
QC	Output Common
FG	Frame Ground

Warning: To protect the module and associated wiring from load faults, use external fuse **(2.5A)** as shown. **This warning affects DIQ624, Revisions D or higher.**

Warning: Connecting high voltage to any I/O pin may cause high voltage to appear at other I/O pins.

Warning: Wiring the line side of the AC source to loads connected to outputs 1 through 8 and the neutral side of the AC source to the output common(s) would create a Negative Logic condition, which may be considered an unsafe practice.

3 INTERNAL CIRCUIT SCHEMATICS



Specification for transient voltage suppressors (transorbs) used on output circuitry is 400VDC, bi-directional 400 watts.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default states of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

Warning: The default turns the outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 INSTALLATION / SAFETY

Warning: Previous versions of this product provided internal fuses on the output circuits (relay contacts). Due to CE Low Voltage Directive (LVD) marking requirements, these fuses have been removed and replaced with solid wire. Therefore, it is now the responsibility of the user of this equipment to ensure that adequate fusing is installed *externally* on each relay output circuit.

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

When found on the product, the following symbols specify:

Warning: Consult user documentation.

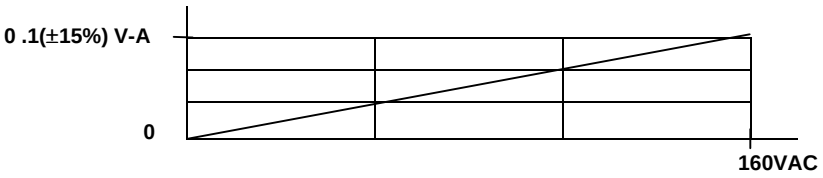
Warning: Electrical Shock Hazard.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

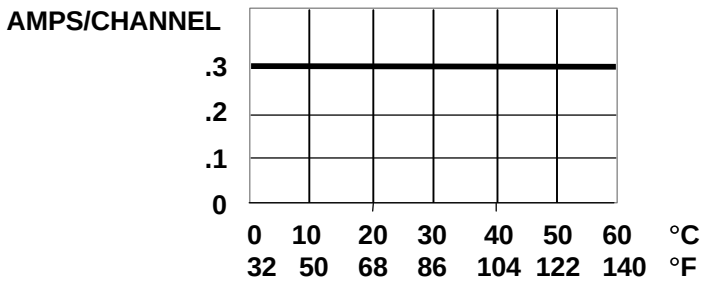
For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

6 INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart

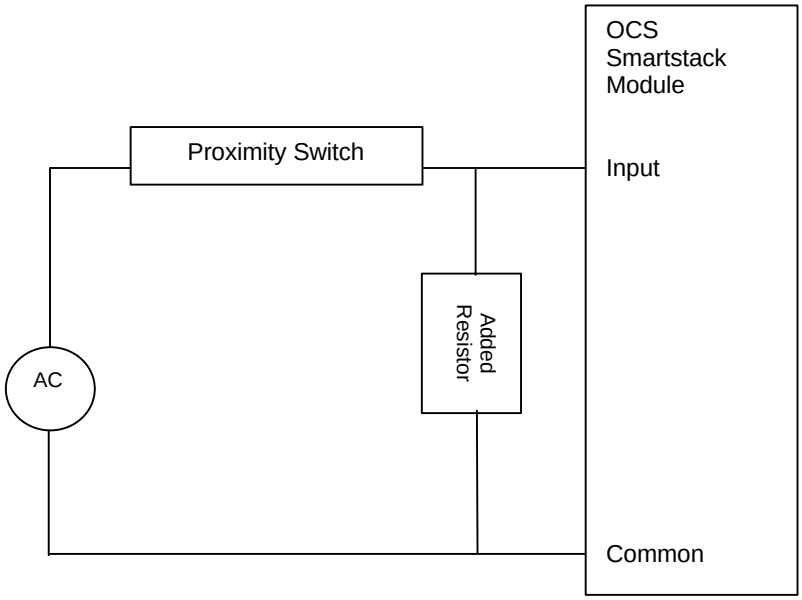


Derating Output Chart



The following applies to applications in which two-wire proximity switches are used as sensors for discrete AC inputs. For these applications, an external resistor *or* resistor/capacitor combination must be added to each input as shown below. The resistor provides a small current to power the proximity switch. The resistor is not required for other types of proximity switches.

120VAC: 15K ohm, 2W resistor *or* 0.22µF metallized film capacitor rated for 120VAC service in series with 470 ohm, 0.5W resistor



7 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

AC Input /AC Output Module

IC300DIQ627
120 / 240 VAC In, Positive Logic
80-250 VAC Out, Positive Logic

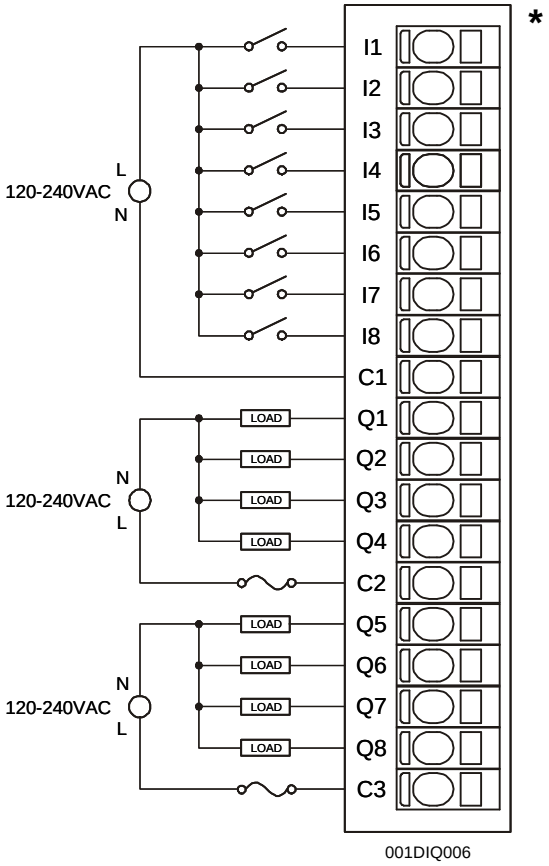
1 SPECIFICATIONS

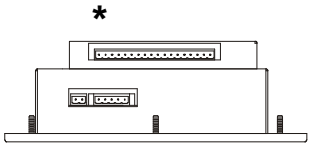
INPUT	DIQ627			DIQ627
Inputs per Module	8		Input Impedance	0.01µF +10K
Commons per Module	1		Isolation (Channel to Common)	1500VDC
Input Voltage Range	120 – 240 VAC		Minimum ON Current	1ms.
Peak Voltage	275 VAC		Maximum OFF Current	1ms.
AC Frequency	60Hz		OFF to ON Response	50ms.
ON Voltage Level	70VAC Min.		ON to OFF Response	50ms.
OFF Voltage level	30VAC Max.		Status Indicator	8 LEDs
OUTPUT	**DIQ627**			**DIQ627**
Outputs per Module	8		Maximum Load Current per output	2A Max.
Commons per Module	2		Maximum Leakage Current	600µA Max.
Operating voltage	250VAC Max.		Maximum Inrush Current	4A
Output Type	Triac		OFF to ON Response	10ms. Max.
ON Voltage level	1.6V Max.		ON to OFF Response	10ms. Max.
Isolation (Channel to Common)	1500VDC		Status Indicator	8

General Specifications			
Required Power (Steady State)	0.48W (20mA @ 24VDC)	CE	GFK-1755
Required Power (Inrush)	Negligible	UL	GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
Operating Temperature	0° to 60° Celsius	Weight	9.5 oz. (256 g)

GFK-1889A

2 WIRING





OCS Bottom View – Shows Corresponding I/O Pin

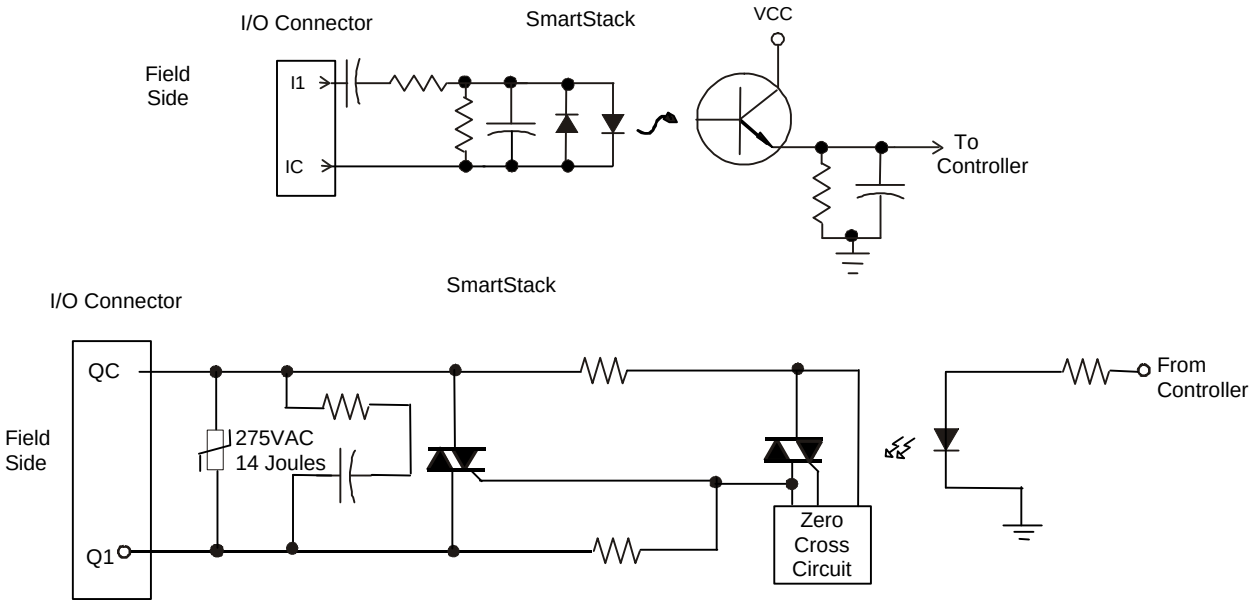
Pins	DIQ627
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
IC	Input Common Isolated
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
C2	Output Common 2 Isolated
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
C3	Output Common 3 Isolated

Warning: To protect the module and associated wiring from load faults, use external fuse **(5 A)** as shown. **This warning affects DIQ627, Revisions AY or higher.**

Warning: Connecting high voltage to any I/O pin may cause high voltage to appear at other I/O pins.

Warning: Wiring the line side of the AC source to loads connected to outputs 1 through 8 and the neutral side of the AC source to the output common(s) would create a Negative Logic condition, which may be considered an unsafe practice.

3 INTERNAL CIRCUIT SCHEMATICS



Specification for transient voltage suppressors (MOVs) used on output circuitry is 275VAC, 14 Joules.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default states of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

Warning: The default turns the outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 INSTALLATION / SAFETY

Warning: Previous versions of this product provided internal fuses on the output circuits (relay contacts). Due to CE Low Voltage Directive (LVD) marking requirements, these fuses have been removed and replaced with solid wire. Therefore, it is now the responsibility of the user of this equipment to ensure that adequate fusing is installed *externally* on each relay output circuit.

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

When found on the product, the following symbols specify:

Warning: Consult user documentation.

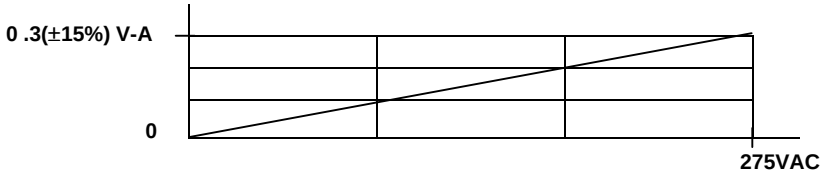
Warning: Electrical Shock Hazard.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

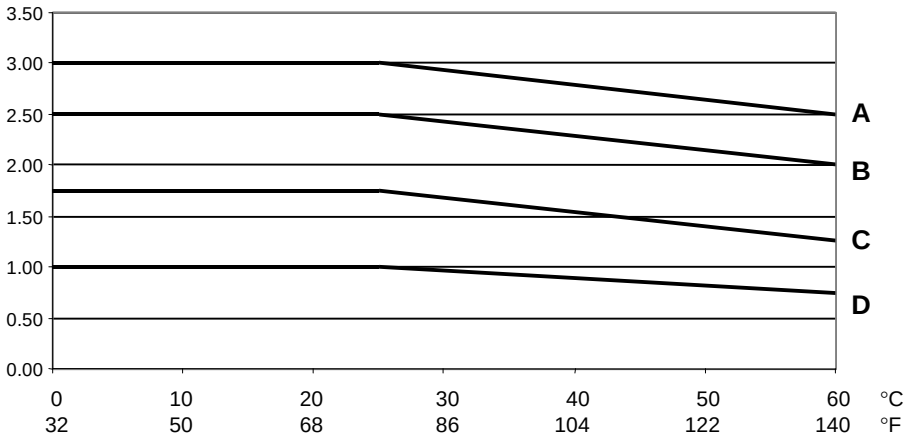
For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

6 INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart



Derating Chart



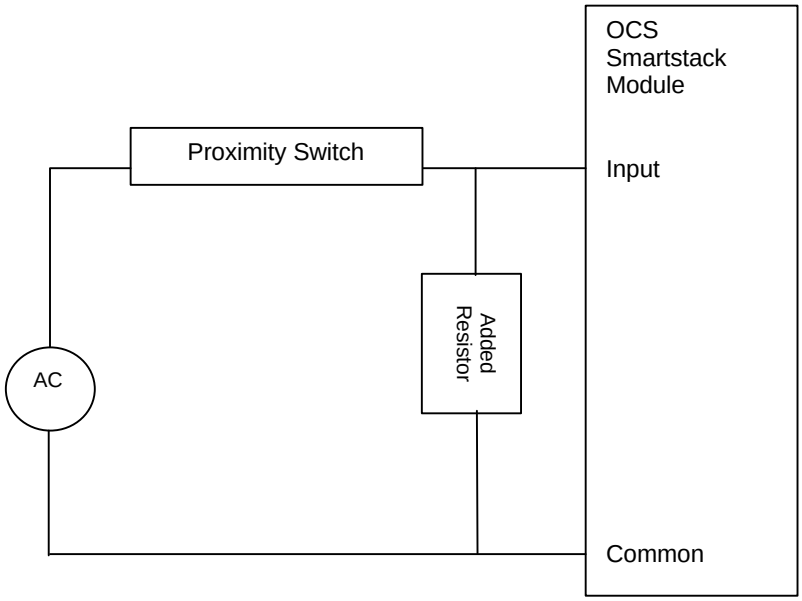
Derating Legend	
A	1 Channel ON
B	2 Channels ON ▪ One even channel and one odd channel or ▪ One low channel (1-4) and one high channel (5-8).
C	4 Channels ON ▪ One channel (1 or 3) ▪ One channel (2 or 4) ▪ One channel (5 or 7) ▪ One channel (6 or 8)
D	8 Channels ON

For maximum output power, loads are to be distributed between even and odd channels, and also, between low (1-4) and high (5-8) channels. Allow for ample air circulation around the DIQ627 module. Current levels typically need to be reduced by 0.5 amp for restricted air flow.

The following applies to applications in which two-wire proximity switches are used as sensors for discrete AC inputs. For these applications, an external resistor *or* resistor/capacitor combination must be added to each input as shown below. The resistor provides a small current to power the proximity switch. The resistor is not required for other types of proximity switches.

120VAC: 15K ohm, 2W resistor *or* 0.22µF metallized film capacitor rated for 120VAC service in series with 470 ohm, 0.5W resistor

240VAC: 15K ohm, 10W resistor *or* 0.22µF metallized film capacitor rated for 240VAC service in series with 470 ohm, 0.5W resistor



7 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

High Density Mixed DC I/O Module

IC300DIQ935
24 Vdc In, Positive Logic
24Vdc Out, Negative Logic
50mA Maximum, Non-Inductive

The High Density Mixed DC I/O Module (DIQ935) is used for applications requiring a high number of digital connections and relatively low current such as LED panels and Annunciator panels. Because of the high density of the module, the I/O connectors required are high density D-subs. A list of required parts and supplier information is provided under *Installation/Safety.*

1 SPECIFICATIONS

INPUT	DIQ935		DIQ935
Inputs per Module	32	Input Impedance	6K Ohms
Input Voltage	24 VDC	Minimum ON Current	3mA
Peak Voltage	35 VDC Max.	Maximum OFF Current	1mA
ON Voltage Level	18 VDC	OFF to ON Response	1ms.
OFF Voltage Level	6 VDC	ON to OFF Response	1ms.

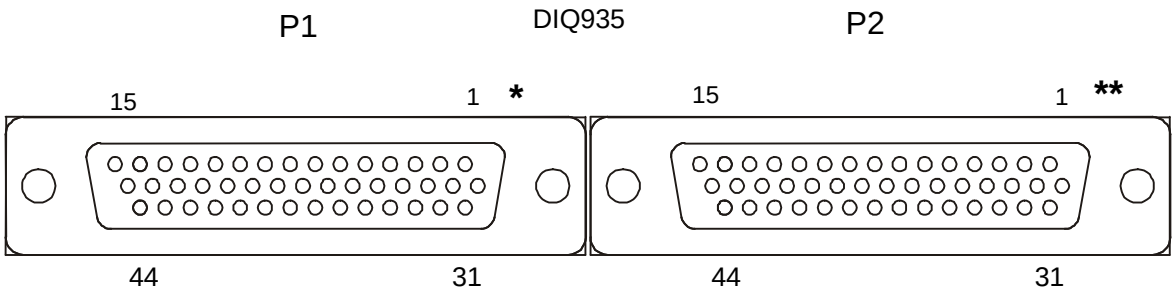
OUTPUT	DIQ935		DIQ935
Outputs per Module	40	Maximum Leakage Current	100μA
Operating Voltage	5 - 35VDC	Maximum Load Current per output	50mA Max., Non-Inductive
Output Type	Sinking	Maximum Inrush Current	500mA. per channel
Peak Voltage	35VDC Max.	Minimum Load	None
ON Voltage Level	1.5VDC Max.	OFF to ON Response	1ms.
Output Characteristics	Current Sinking	ON to OFF Response	1ms.

General Specifications			
Required Power (Steady State)	0.12W (5mA @ 24VDC)	Operating Temperature	0° to 60° Celsius
Required Power (Inrush)	Negligible	UL	Refer to GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	High Density D-Sub
		Weight	9.5oz.

2 WIRING

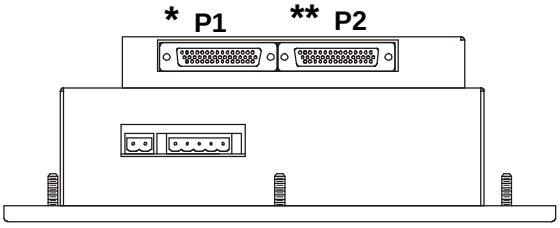
Note: See the following page to read the Wiring Note that follows the P1 and P2 pin-outs *prior* to wiring the system. Also see the pin positions on connectors as marked by * and **.

	DIQ935 INPUT Connector (P1)					
	Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
*	**1**	Input Common	**16**	Input Common	**31**	Input Common
	2	Input 1	**17**	Input Common	**32**	Input 2
	3	Input 4	**18**	Input 3	**33**	Input 5
	4	Input 7	**19**	Input 6	**34**	Input 8
	5	Input 10	**20**	Input 9	**35**	Input 11
	6	Input 13	**21**	Input 12	**36**	Input 14
	7	Input 16	**22**	Input 15	**37**	Input 17
	8	Input 19	**23**	Input 18	**38**	Input 20
	9	Input 22	**24**	Input 21	**39**	Input 23
	10	Input 25	**25**	Input 24	**40**	Input 26
	11	Input 28	**26**	Input 27	**41**	Input 29
	12	Input 31	**27**	Input 30	**42**	Input 32
	13	No Connection	**28**	No Connection	**43**	No Connection
	14	No Connection	**29**	No Connection	**44**	No Connection
	15	No Connection	**30**	No Connection		



OCS Bottom View – Shows corresponding I/O pin location
(Asterisks denote location of pin 1. Refer to Connector Tables.)

	DIQ935 OUTPUT Connector (P2)					
	Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
**	**1**	Output Common	**16**	Output Common	**31**	Output Common
	2	Output 1	**17**	Output Common	**32**	Output 2
	3	Output 4	**18**	Output 3	**33**	Output 5
	4	Output 7	**19**	Output 6	**34**	Output 8
	5	Output 10	**20**	Output 9	**35**	Output 11
	6	Output 13	**21**	Output 12	**36**	Output 14
	7	Output 16	**22**	Output 15	**37**	Output 17
	8	Output 19	**23**	Output 18	**38**	Output 20
	9	Output 22	**24**	Output 21	**39**	Output 23
	10	Output 25	**25**	Output 24	**40**	Output 26
	11	Output 28	**26**	Output 27	**41**	Output 29
	12	Output 31	**27**	Output 30	**42**	Output 32
	13	Output 34	**28**	Output 33	**43**	Output 35
	14	Output 37	**29**	Output 36	**44**	Output 38
	15	Output 40	**30**	Output 39		

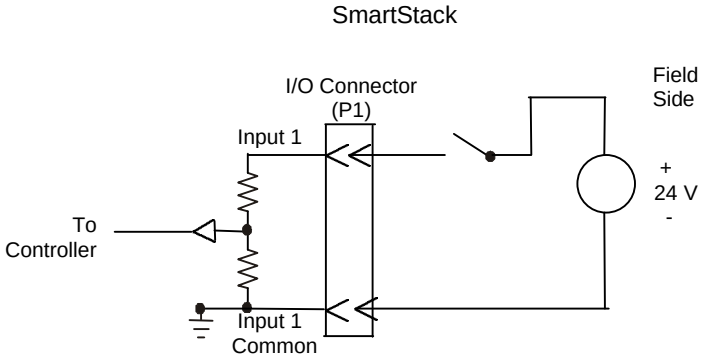


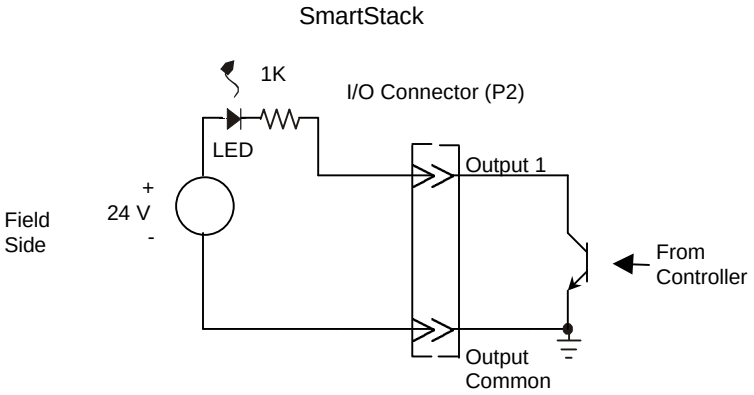
OCS Bottom View – Shows Corresponding I/O Pin Location

Wiring Note

The DIQ935 has two 44-pin connectors. There is an input connector (P1) and an output connector (P2). **All four ground pins on each of the connectors need to be returned directly to the I/O power supply ground connection.**

3 INTERNAL CIRCUIT SCHEMATIC





Warning: Wiring the positive side of the DC source to loads connected to outputs 1 through 40 and the negative side of the DC source to the output common(s) would create a Negative Logic condition, which may be considered an unsafe practice under CE directives.

4 CONFIGURATION

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

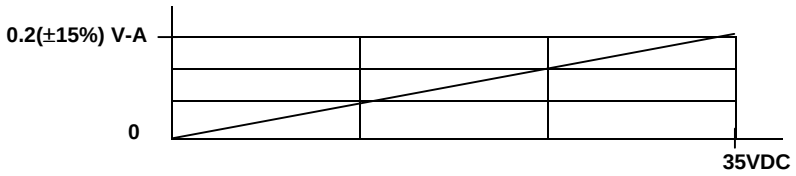
Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default states of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

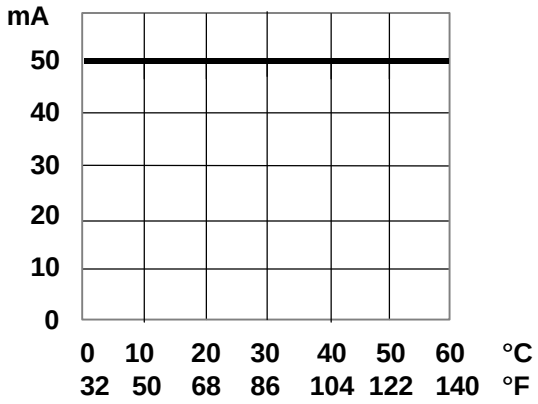
Warning: The default turns the outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart



Derating Chart



6 TECHNICAL ASSISTANCE

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

7 INSTALLATION / SAFETY

7.1 General

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

All applicable codes and standards should be followed in the installation of this product.
For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

7.2 Connectors

Because of the high density of the module, the I/O connectors required are high density D-subs. The D-sub connectors and pins can be obtained from a variety of sources including Digi-Key Corporation (1-800-344-4539). The part numbers are:

Description	Manufacturer	Manufacturer Part #	Digi-Key Part #
D-Sub Connector 44 (Male)	AMP	748366-1	A2078-ND
D-Sub Pin for D-Sub Connector (22-28 AWG), 30µ Gold	AMP	748333-4	A2088-ND

7.3 Termination Options

The following parts allow the DIQ935 to be used with commercially available DIN-rail mount terminal strips. An overview is provided to show the relationship of the various parts.

Note: When using the accessories in *DIQ935 Termination OptionsTable* (see below), only 32 of the 40 outputs are available for use. Due to the light duty rating of the DIQ935, shielded I/O wiring needs to be used when wiring to passive terminal blocks like the TRM500 and TRM526.

To drive higher current outputs, the HE690RLY160 can be used in place of the TRM500/526. This allows the DIQ935 to drive up to 5A of current and eliminates the requirement for shielded output wiring.

DIQ935 Termination Options		
Description	**Part Number**	Quantity of Parts Required *(for a complete system using 32 inputs and 32 outputs)*
Distribution circuit board converts DIQ935 high density D-subs (2) to 26-pin ribbon headers (4).	HE800DST935	1
Shielded Cable with 26-pin connector (1 meter). Connects the DIQ935 to a DIN-rail mount terminal strip.	HE800CBL126	4
DIN-Rail Mount Terminal Strip	HE693TRM500 ***** **(*** The HE693TRM526 can also be used as an alternative to the HE693TRM500.)	4
Protected Input Conditioner for DIQ935	HE800INP935	See Examples

Example 1:

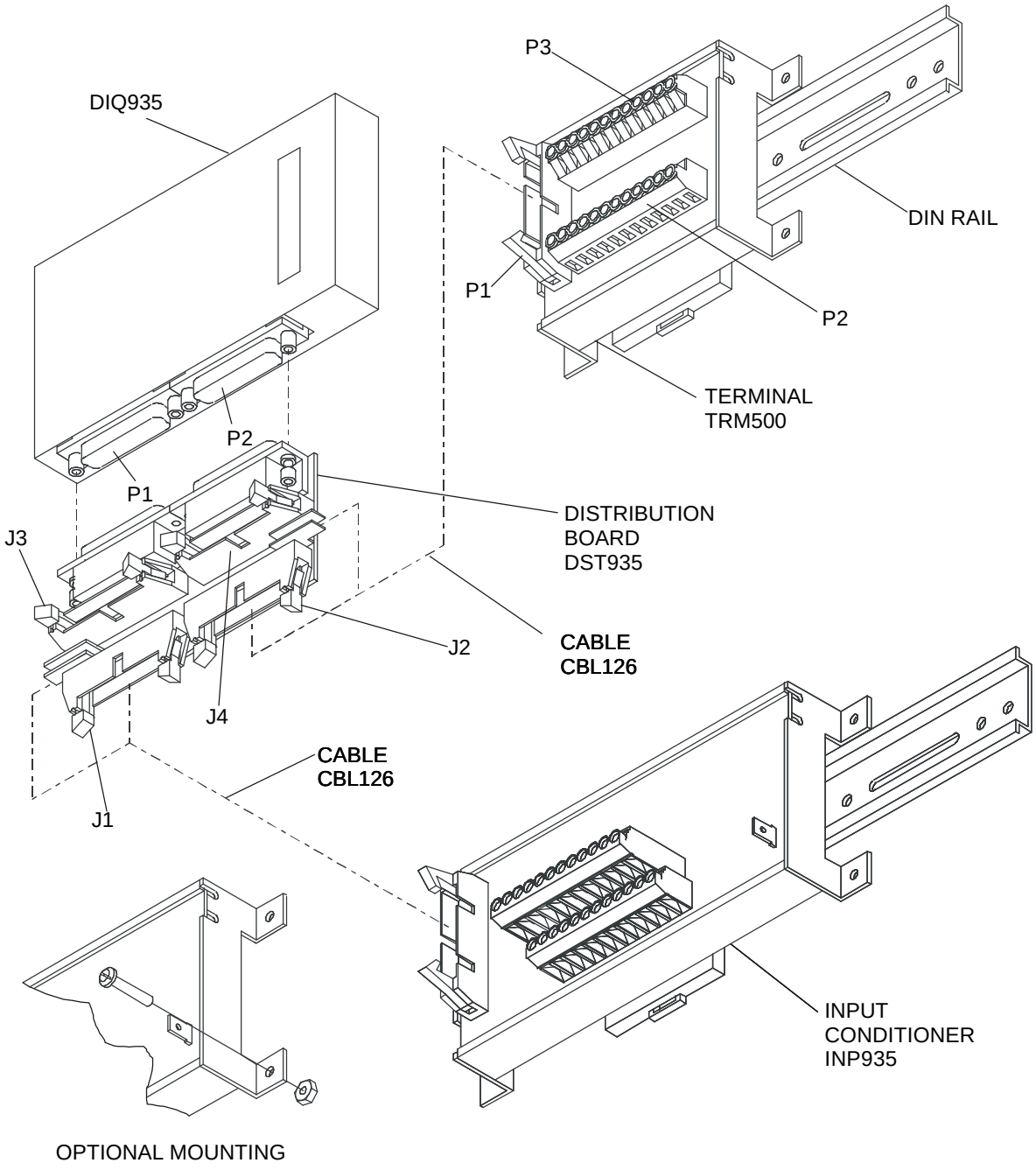
Parts Required for
32 Protected Inputs and 32 Outputs:

1 DIQ935
1 DST935
4 CBL126
2 TRM500 (Outputs)
2 INP935 (Protected Inputs)

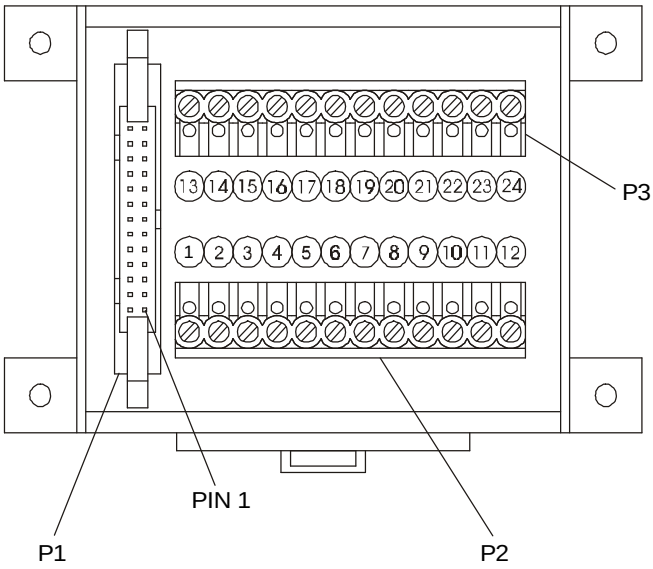
Example 2:

Parts Required for
32 Inputs and 32 Outputs:

1 DIQ935
1 DST935
4 CBL126
4 TRM500 (Inputs and Outputs)



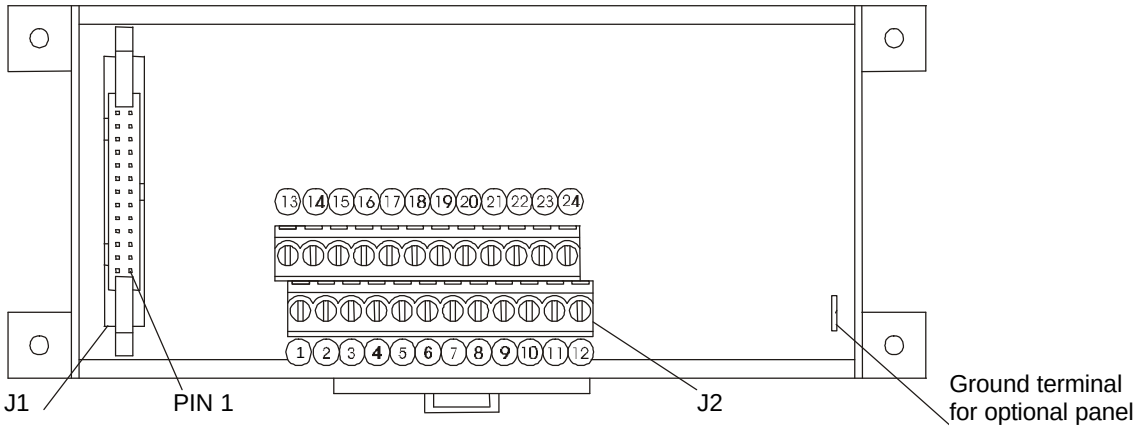
Overview of DIQ935 using DIN-Rail Mount Terminal Strip



HE693TRM500

TRM500 PIN-OUT			
Ribbon (P1)	**Screw Terminal (P2)**	**Ribbon (P1)**	**Screw Terminal (P3)**
1	1	**13**	13
2	2	**14**	14
3	3	**15**	15
4	4	**16**	16
5	5	**17**	17
6	6	**18**	18
7	7	**19**	19
8	8	**20**	20
9	9	**21**	21
10	10	**22**	22
11	11	**23**	23
12	12	**24**	24
		25	
		26	

DST935 CONNECTOR PIN-OUT				
Pin	**J1**	**J2**	**J3**	**J4**
1	Input 1	Input 17	Output 1	Output 17
2	Input 2	Input 18	Output 2	Output 18
3	Input 3	Input 19	Output 3	Output 19
4	Input 4	Input 20	Output 4	Output 20
5	Input 5	Input 21	Output 5	Output 21
6	Input 6	Input 22	Output 6	Output 22
7	Input 7	Input 23	Output 7	Output 23
8	Input 8	Input 24	Output 8	Output 24
9 & 10	Common (GND)	Common (GND)	Common (GND)	Common (GND)
11, 12, 13 & 14	NC	NC	NC	NC
15 & 16	Common (GND)	Common (GND)	Common (GND)	Common (GND)
17	Input 16	Input 32	Output 16	Output 32
18	Input 15	Input 31	Output 15	Output 31
19	Input 14	Input 30	Output 14	Output 30
20	Input 13	Input 29	Output 13	Output 29
21	Input 12	Input 28	Output 12	Output 28
22	Input 11	Input 27	Output 11	Output 27
23	Input 10	Input 26	Output 10	Output 26
24	Input 9	Input 25	Output 9	Output 25
25 & 26	NC	NC	NC	NC
Note: **J1** and **J2** connect inputs using either INP935 or TRM500. **J3** and **J4** connnect outputs using the TRM500.				



INP935 Connector

Pin-Out for INP935 (J2)				
Pin	**Description**		**Pin**	**Description**
1	Input 1		**13**	Input 9
2	Input 2		**14**	Input 10
3	Common (GND)		**15**	Common (GND)
4	Input 3		**16**	Input 11
5	Input 4		**17**	Input 12
6	Common (GND)		**18**	Common (GND)
7	Input 5		**19**	Input 13
8	Input 6		**20**	Input 14
9	Common (GND)		**21**	Common (GND)
10	Input 7		**22**	Input 15
11	Input 8		**23**	Input 16
12	Common (GND)		**24**	Common (GND)

NOTES

+/- 10V Analog Input Module

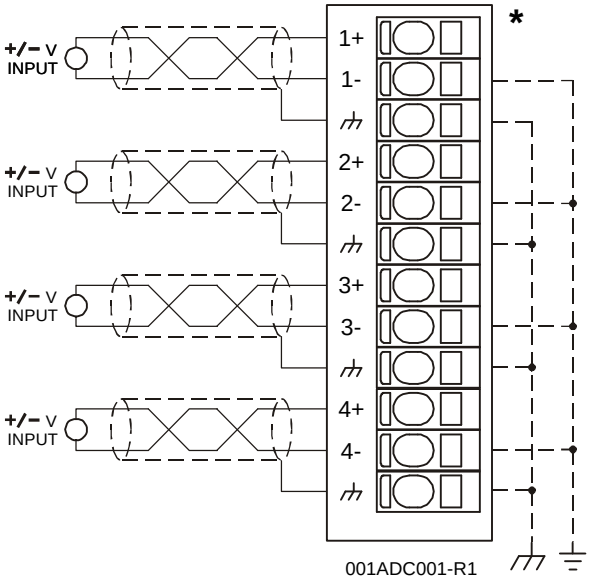
IC300ADC010 / IC300ADC110
12-Bit Resolution

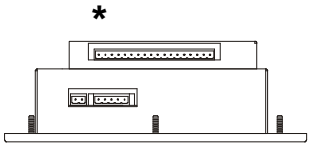
1 SPECIFICATIONS

	ADC010	ADC110
Number of Channels	2	4
Input Ranges (Including over-range)	±10.23VDC; ±5.11, 0 - +10.23, 0 - +5.11	
Resolution	12-Bit	
Input Impedance	10Meg Ohm <12VDC or 6Meg Ohm >12VDC Nom.	
Usable Resolution	12-Bits	
Maximum Error at 25°C	0.05% Full Scale	
Required Power (Steady State)	.09W (4.1mA @ 24VDC)	
Required Power (Inrush)	Negligible	
Maximum Over-Voltage	350VDC Max.	
Digital Filtering	Yes	
Conversion Time (PLC Update Rate)	Set by PLC Scan Time	

	ADC010	ADC110
Analog Inputs Input Points Required	2	4
External Power Supply	None	
Converter Type	Successive Approximation	
Operating Temperature	0° to 60° Celsius	
Additional error for temperatures other than 25°C	0.005% / °C	
Relative Humidity	5 to 95% Non-condensing	
CE	Refer to GFK-1755	
UL	Refer to GFK-1754	
Terminal Type	Spring Clamp, Removable	
Weight	9 oz. (256 g)	

2 WIRING

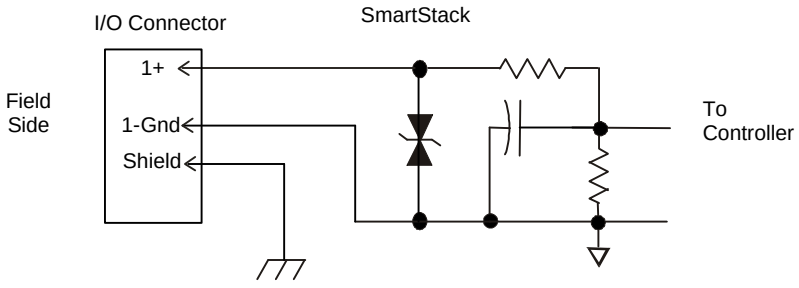




OCS Bottom View – Shows Corresponding I/O Pin Location

	Signal	
	ADC110	**ADC010**
1+	Channel 1+	Channel 1+
1-	Common	Common
⏚	Shield	Shield
2+	Channel 2+	Channel 2+
2-	Common	Common
⏚	Shield	Shield
3+	Channel 3+	
3-	Common	
⏚	Shield	
4+	Channel 4+	
4-	Common	
⏚	Shield	

3 INTERNAL CIRCUIT SCHEMATIC



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4 CONFIGURATION

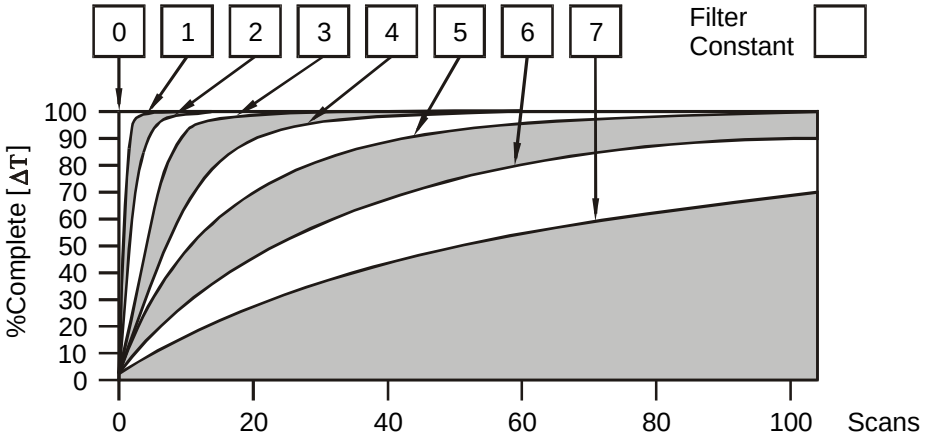
Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (MAN0227).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

Module Setup Tab

a. Input range for each channel may be selected independently.
b. Filter Constant sets the level of digital filtering according to the following chart.



Digital Filtering. The illustration above demonstrates the effect of digital filtering (set with Filter Constant) on module response to a temperature change.

5 INPUT CONVERSION FACTOR

The following table describes how real-world inputs are scaled into the controller. Given a known input voltage, the data value is configured by using the conversion factor from the table. The following formula is used: **Data = Voltage In (Vin) / Conversion Factor**

Example: The user selects a voltage range of 0 to +5 VDC:

1. The known input voltage is 3 VDC.
2. Using the table, the conversion factor for the voltage range of 0 to +5 VDC is .00015625.
3. To determine the data value, the formula is used: Data = Vin / Conversion Factor
   19200 = 3 VDC / 0.00015625

Conversion of Real-World Inputs into Controller			
Selected Voltage Range	**Voltage In (Vin) VDC**	**Data Out**	**Conversion Factor**
0 to +5.00 VDC	+5.11	32704	0.00015625
	+5.00	32000	
	0.00	0	
	NA	NA	
	NA	NA	
0 to +10.00 VDC	+10.23	32736	0.0003125
	+10.00	32000	
	0.00	0	
	NA	NA	
	NA	NA	
+/-5.00 VDC	+5.11	32704	0.00015625
	+5.00	32000	
	0	0	
	-5.00	-32000	
	-5.11	-32704	
+/-10.00 VDC	+10.23	32736	0.0003125
	+10.00	32000	
	0	0	
	-10.00	-32000	
	-10.23	-32736	

6 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards should be followed in the installation of this product.
b. Shielded, twisted-pair wiring should be used for best performance.
c. Shields may be terminated at the module terminal strip.
d. In severe applications, shields should be tied directly to the ground block within the panel.
e. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

7 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

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4-20mA Analog Input Module

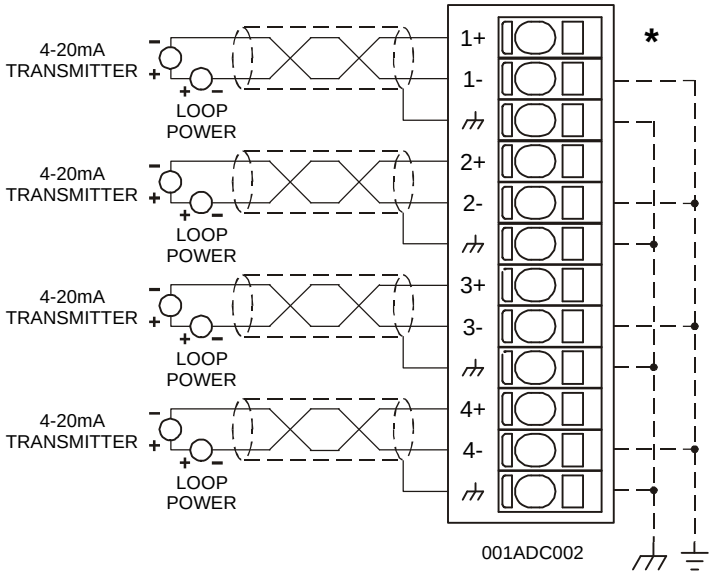
IC300ADC020 / IC300ADC120
12-Bit Resolution

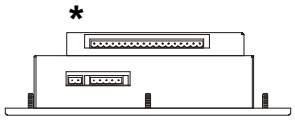
1 SPECIFICATIONS

	ADC020	ADC120
Number of Channels	2	4
Input Ranges (including over-range)	Nominal: 0-20.47mA, ±20.47mA,	
Resolution	12-Bit	
Maximum Error at 25°C	0.05% Full Scale	
Input Impedance	100 Ohm < 12VDC, Clamped @ 12VDC, 35mA Max. Continuous	
Required Power (Steady State)	0.09W (4.1mA @ 24VDC)	
Required Power (Inrush)	Negligible	
Maximum Over-Current	35mA	
External Power Supply	None	
Weight	9 oz. (256 g)	

	ADC020	ADC120
Converter Type	Successive Approximation	
Conversion Time (PLC Update Rate)	Set by PLC Scan Time	
Terminal Type	Spring Clamp, Removable	
Additional error for temperatures other than 25°C	0.005% / °C	
Analog Inputs Input Points Required	2	4
Operating Temperature	0° to 60° Celsius	
Relative Humidity	5 to 95% Non-condensing	
CE	Refer to GFK-1755	
UL	Refer to GFK-1754	

2 WIRING

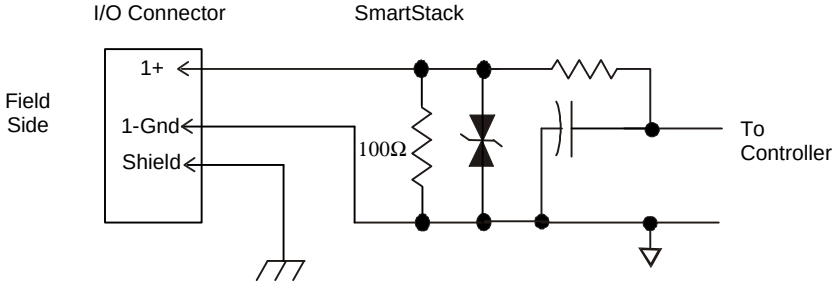




OCS Bottom View – Shows Corresponding I/O Pin

Pin #	ADC120	ADC020
1+	Channel 1+	Channel 1+
1-	Common	Common
⏚	Shield	Shield
2+	Channel 2+	Channel 2+
2-	Common	Common
⏚	Shield	Shield
3+	Channel 3+	
3-	Common	
⏚	Shield	
4+	Channel 4+	
4-	Common	
⏚	Shield	

3 INTERNAL CIRCUIT SCHEMATIC



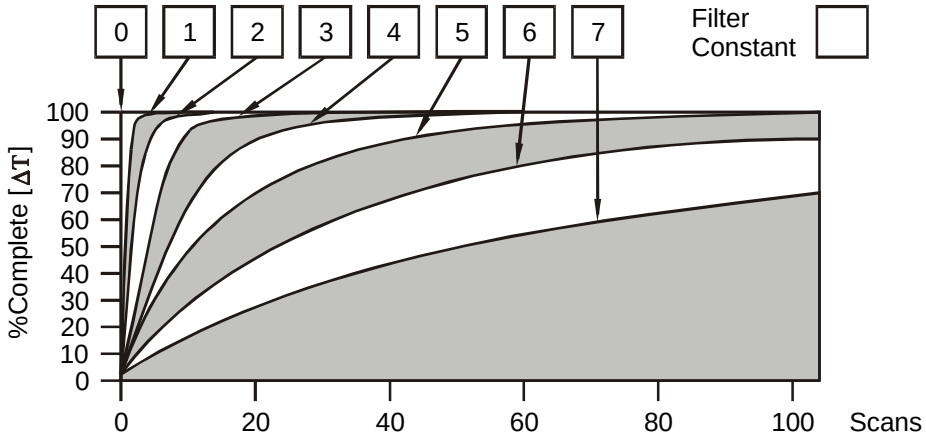
4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

Module Setup Tab

a. Input range for each channel may be selected independently.
b. Filter Constant sets the level of digital filtering according to the following chart.



Digital Filtering. The illustration above demonstrates the effect of digital filtering (set with Filter Constant) on module response to a temperature change.

5 INPUT CONVERSION FACTOR

The following table describes how real-world inputs are scaled into the controller. Given a known input current, the data value is configured by using the conversion factor from the table. The following formula is used: **Data = Input Current (mA) / Conversion Factor**

Example: The user selects a current range of 0 to +20mA:

1. The known input current is 14mA..
2. Using the table, the conversion factor for the current range of 0 to +20 VDC is 0.000625.
3. To determine the data value, the formula is used: Data = Input Current (mA) / Conversion Factor
   22400 = 14mA / 0.000625

Conversion of Real-World Inputs into Controller			
Selected Current Range	**Input Current (mA)**	**Data**	**Conversion Factor**
0 to +20mA	+20.47	32752	0.000625
	+20.00	32000	
	0	0	
-20 to +20mA	-20.00	-32000	0.000625
	-20.47	-32752	

6 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards should be followed in the installation of this product.
b. Shielded, twisted-pair wiring should be used for best performance.
c. Shields may be terminated at the module terminal strip.
d. In severe applications, shields should be tied directly to the ground block within the panel.
e. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

7 TECHNICAL ASSISTANCE

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North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

Thermistor / Current / Voltage Analog Input Module

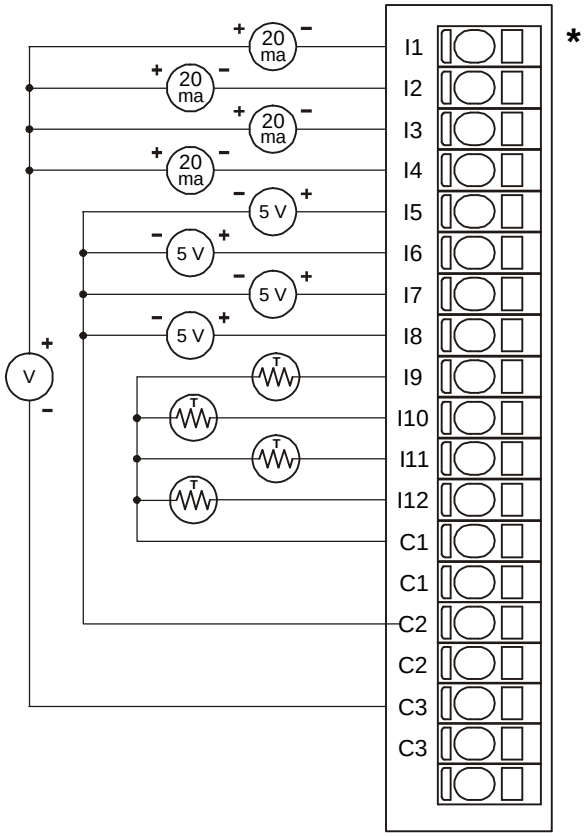
IC300ADC920
12-Bit Resolution

1 SPECIFICATIONS

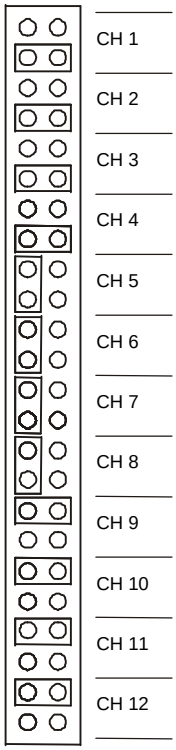
TBD-To Be Determined

	ADC920		ADC920
Number of Channels	12	Converter Type	Successive Approximation
Input Ranges (including over-range) *Thermistor* (1/10° resolution) *Current* *Voltage*	 -37 to 115°C -35 to 240°F 0-20.47mA 0-5.11 VDC	**Input Impedance** *Thermistor* *Current* *Voltage*	< 12VDC, Clamped @ 12VDC, 35mA Max. Continuous 10K ohms 250 ohms 1Megohm
Resolution	12-Bit	Terminal Type	Spring Clamp, Removable
Maximum Error at 25°C	0.1% Full Scale	Operating Temperature	0° to 60° Celsius
Conversion Time (PLC Update Rate)	Set by PLC Scan Time	Analog Inputs Input Points Required	12
Additional error for temperatures other than 25°C	0.01% / C°	Relative Humidity	5 to 95% Non-condensing
Required Power (Steady State)	0.19W (8mA @ 24VDC)	CE	GFK-1755
Required Power (Inrush)	Negligible	UL	GFK-1754
Maximum Over-Current	35mA	Weight	9 oz. (256 g)
External Power Supply	None		

2 WIRING

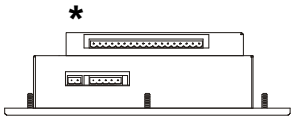


001ADC003



The jumper block indicates the correct jumper positions for the wiring shown above.

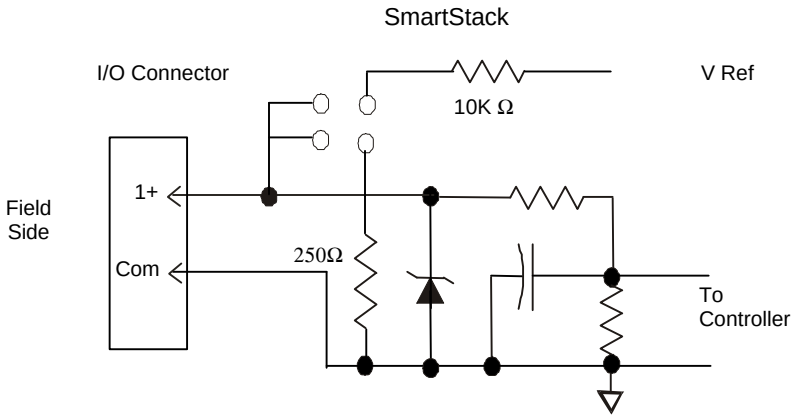
For more information, refer to *Section 4.2 (b), Hardware Configuration.*



OCS Bottom View – Shows Corresponding I/O Pin

Pin #	ADC920
1	Input 1
2	Input 2
3	Input 3
4	Input 4
5	Input 5
6	Input 6
7	Input 7
8	Input 8
9	Input 9
10	Input 10
11	Input 11
12	Input 12
C1	Thermistor Common
C1	
C2	0 – 5VDC Common
C2	
C3	20mA Common
C3	
C3	

3 INTERNAL CIRCUIT SCHEMATIC



4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

4.1 Software Configuration

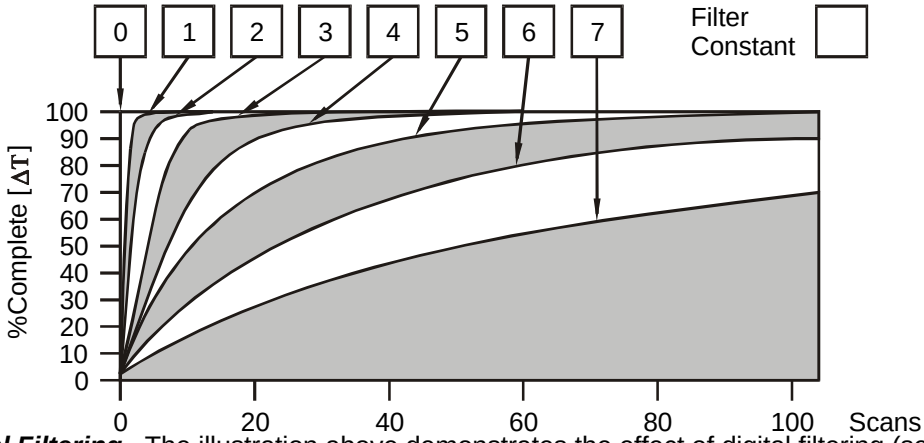
Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

I/O Map Tab

The I/O Map describes which I/O registers are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

Module Setup Tab

a. Input range for each channel may be selected independently.
b. Filter Constant sets the level of digital filtering according to the following chart.
c. In addition to configuring the module setup, the hardware must be jumpered to select the appropriate range for each channel.



Digital Filtering. The illustration above demonstrates the effect of digital filtering (set with Filter Constant) on module response to a temperature change.

4.2 Hardware Configuration

a. Inputs

The inputs are referenced to the bus common. Each of the inputs can be jumper-selected for one of the three input types. Behind each of the input pins is a corresponding group of four jumper pins with a programming plug.

a. To select 5V input: Connect the two pins nearest the connector.
b. To select thermistor input: Connect the two pins nearest input 1.
c. To select 20mA input: Connect the two pins nearest input 12.

Note: It is also necessary to specify the input channel type in Cscape along with the temperature format.

Thermistor Curve for PreCon TYPE III (Model 3)					
Temperature °F	**Resistance**	**Temperature °F**	**Resistance**	**Temperature °F**	**Resistance**
-35	203.6K	**60**	14.78K	**155**	2.098K
-30	173.6K	**65**	13.15K	**160**	1.920K
-25	148.3K	**70**	11.72K	**165**	1.759K
-20	127.1K	**75**	10.46K	**170**	1.614K
-15	109.2K	**80**	9.354K	**175**	1.482K
-10	94.07K	**85**	8.378K	**180**	1.362K
-5	81.23K	**90**	7.516K	**185**	1.254K
0	70.32K	**95**	6.754K	**190**	1.156K
5	61.02K	**100**	6.078K	**195**	1.066K
10	53.07K	**105**	5.479K	**200**	984.0
15	46.27K	**110**	4.947K	**205**	909.8
20	40.42K	**115**	4.472K	**210**	841.9
25	35.39K	**120**	4.049K	**215**	779.8
30	31.06K	**125**	3.671K	**220**	723.0
35	27.31K	**130**	3.333K	**225**	671.0
40	24.06K	**135**	3.031K	**230**	623.3
45	21.24K	**140**	2.759K	**235**	579.5
50	18.79K	**145**	2.515K	**240**	539.4
55	16.65K	**150**	2.296K		

b. Outputs

Each **output** can be independently programmed for 0-10 volts or 0-20mA. There are two jumpers to be set for each output. Six jumper pins in two rows of three are associated with each output. For voltage output, out of each group of six, the two pins nearest connector pin 1 (marked with *) in each row are to be jumpered. For current output, out of each group of six, the two pins in each row near connector pin 8 are to be jumpered. The mode for each output must also be specified in the module setup in Cscape.

5 INPUT CONVERSION FACTOR

The following table describes how real-world inputs are scaled into the controller. Given a known input voltage, the data value is configured by using the conversion factor from the table. The following formula is used: **Data = Voltage In (Vin) / Conversion Factor**

Example: The user selects a voltage range of 0 to +5 VDC:

1. The known input voltage is 3 VDC.
2. Using the table, the conversion factor for the voltage range of 0 to +5 VDC is 0.00015625.
3. To determine the data value, the formula is used:
   Data = Vin / Conversion Factor
   19200 = 3 VDC / 0.00015625

Conversion of Real-World Inputs into Controller			
Selected Voltage Range	**Voltage In (Vin) VDC**	**Data Out**	**Conversion Factor**
0 to +5.00 VDC	+5.11	32704	0.00015625
	+5.00	32000	
	0	0	
	NA	NA	
	NA	NA	
0 to +20mA	+20.47	32736	0.000625
	+20.00	32000	
	0	0	
	NA	NA	
	NA	NA	
°C	+115	1150	0.1
	0	0	
	-37	-370	
°F	+240	2400	0.1
	0	0	
	-35	-350	

6 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards should be followed in the installation of this product.
b. Shielded, twisted-pair wiring should be used for best performance.
c. Shields may be terminated at the module terminal strip.
d. In severe applications, shields should be tied directly to the ground block within the panel.
e. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

7 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

RTD Input Module

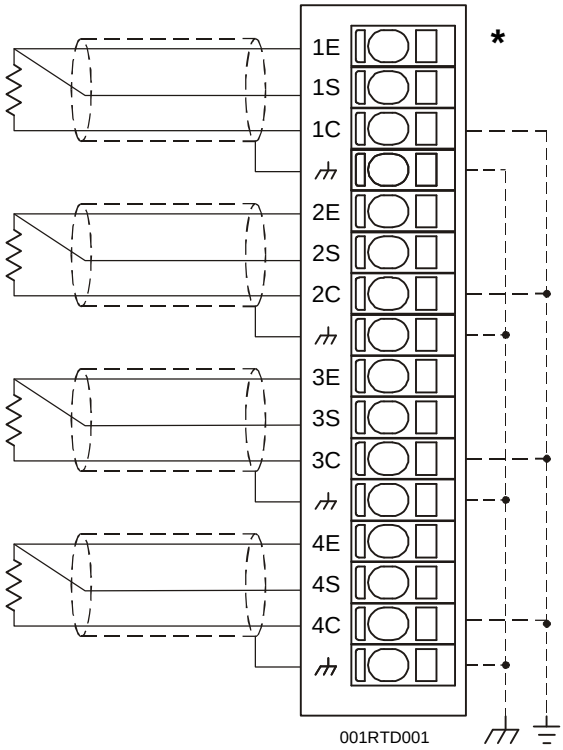
IC300RTD000 / IC300RTD100

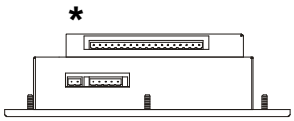
1 SPECIFICATIONS

	RTD000	RTD100
Number of Channels	2	4
RTD Types	100, 200, 500, 1000 Ohms at 0°C, Platinum, Alpha 0.00385, DIN43760	
Input Range	-200°C to +850°C	
Input Impedance	>100Meg Ohm 0-4VDC Clamped @ 0 and 4VDC	
RTD Excitation Current	2.2, 1.1, 0.44, 0.22mA, 25% duty cycle	
RTD Short	Indefinite	
Channel-to-Channel Tracking	0.1°C	
Update Time	16 channels/second	
Input Transient Protection	Zener/Capacitor	
Notch Filter	50-60 Hz. Software Selectable	
Resolution	0.05°C	

	RTD000	RTD100
Required Power (Steady State)	0.10W (4.2mA @ 24VDC)	
Required Power (Inrush)	Negligible	
Average RTD Current	0.44mA (100 Ohm Range)	
I/O Points Required	2	4
Converter Type	Integrating	
Types Supported	DIN43760	
Accuracy	± 0.5°C	
CE	Refer to GFK-1755	
UL	Refer to GFK-1754	
Operating Temperature	0° to 60° Celsius	
Relative Humidity	5 to 95% Non-condensing	
Terminal Type	Spring Clamp, Removable	
Weight	9.5 oz. (270 g)	

2 WIRING





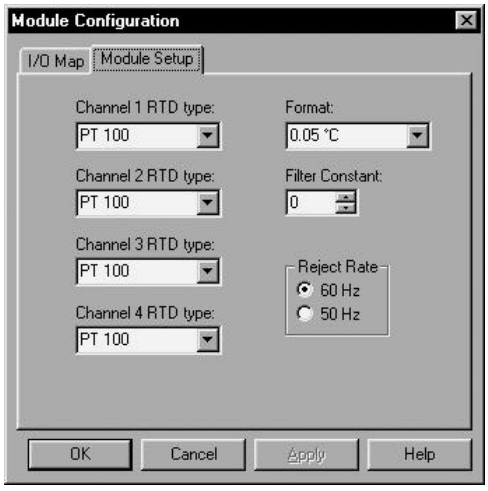
OCS Bottom View – Shows Corresponding I/O Pin

Pin	Signal	
	RTD100	RTD000
1E	RTD1 Excitation	RTD1 Excitation
1S	RTD1 Sense	RTD1 Sense
1C	RTD1 Common	RTD1 Common
⏚	Shield	Shield
2E	RTD2 Excitation	RTD2 Excitation
2S	RTD2 Sense	RTD2 Sense
2C	RTD2 Common	RTD2 Common
⏚	Shield	Shield
3E	RTD3 Excitation	
3S	RTD3 Sense	
3C	RTD3 Common	
⏚	Shield	
4E	RTD4 Excitation	
4S	RTD4 Sense	
4C	RTD4 Common	
⏚	Shield	

3 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).



Module Setup Tab

a. Sensor Type for each channel may be selected independently.

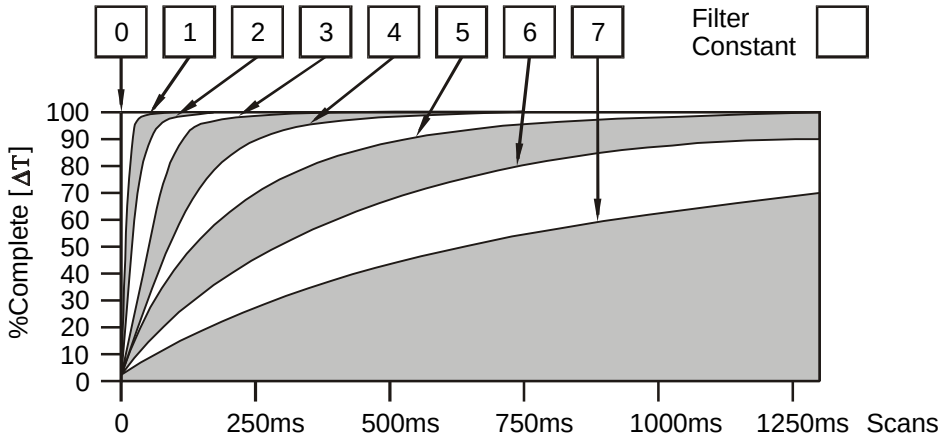
b. Temperature format may be set for various C° or F° ranges.

c. Filter Constant sets the level of digital filtering according to the chart below.

d. Reject Rates sets the frequency level for noise rejection at 50 or 60HZ.

I/O Map Tab

The I/O Map describes which I/O registers are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.



Digital Filtering. The illustration above demonstrates the effect of digital filtering (set with Filter Constant) on module response to a temperature change.

4 TEMPERATURE CONVERSION

For a given module configuration, use the appropriate formula in the table to obtain the actual temperature (°C or °F) that is represented by the value in the %AI register.

Module Configuration	Temperature Conversion	
	Celsius	Fahrenheit
0.05°	°C = %AI / 20	°F = %AI / 20
0.1°	°C = %AI / 10	°F = %AI / 10
0.5°	°C = %AI / 2	°F = %AI / 2

5 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards should be followed in the installation of this product.
b. Shielded, twisted-pair wiring should be used for best performance.
c. Shields may be terminated at the module terminal strip.
d. In severe applications, shields should be tied directly to the ground block within the panel.
e. Interposing electrical devices (such as relays) in the signal path can cause errors due to resistive imbalance.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

6 TECHNICAL SUPPORT

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

Thermocouple / Millivolt Input Module

IC300THM000 / IC300THM100

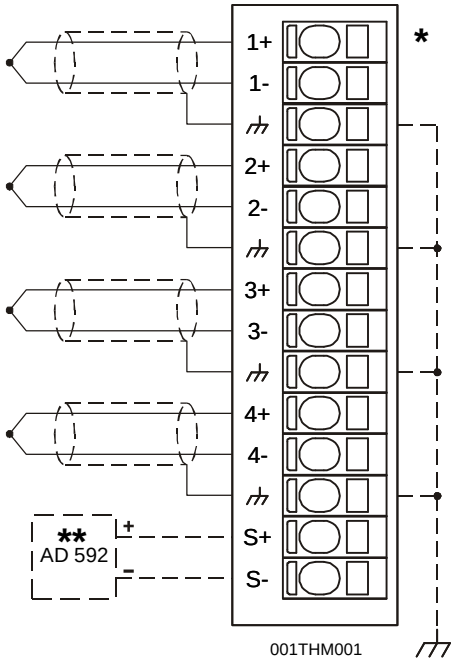
1 SPECIFICATIONS

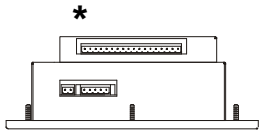
	THM000	THM100		THM000	THM100
Number of Channels	2	4	PLC Update Rate	Set by PLC Scan Rate	
Resolution	0.05°C		Analog Input Points Required	2	4
Input Impedance	10Meg Ohm clamped @ ±24VDC		Cold Junction Compensation	Internal or External; Automatically Selected	
A/D Conversion Type	Integrating		Maximum Sustained Differential O/L	Limited by Common Mode Range	
Required Power (Steady State)	0.34W (14.3mA @ 24VDC)		CE	Refer to GFK-1755	
Required Power (Inrush)	Negligilble		UL	Refer to GFK-1754	
Types Supported	J,K,T,E		Open Thermocouple Response	High Temperature	
Millivolt Ranges	±25mv, ±50mv, ±100mv		Operating Temperature	0° to 60° Celsius	
Millivolt Accuracy	0.1% Full Scale		Relative Humidity	5 to 95% Non-condensing	
Common Channel Points	None		Weight	9.5 oz. (270 g)	
Common Mode Range	± 12VDC Max.				
A/D Conversion Time	16 channels per second				

Thermocouple Type:	**J**	**K**	**T**
Input Range Temperature	-210°C to 770°C (-346°F to 1418°F)	-270°C to 1380°C (-454°F to 2516°F)	-270°C to 410°C (-454°F to 770°F)
	E	**R**	**S**
	-270°C to 1010°C (-454°F to 1850°F)	0°C to 1760°C (32°F to 3200°F)	0°C to 1760°C (32°F to 3200°F)
Accuracy Types **J,K,T, & E** Types **R & S**	±1°C ±4°C		
Note: Accuracy Specifications not guaranteed below –200°C.			

GFK-1617D

2 WIRING





OCS Bottom View – Shows Corresponding I/O Pin

Pin	Signal	
	THM100	THM000
1+	Thermocouple 1 +	Thermocouple 1 +
1-	Thermocouple 1 -	Thermocouple 1 -
⏚	Shield	Shield
2+	Thermocouple 2 +	Thermocouple 2 +
2-	Thermocouple 2 -	Thermocouple 2 -
⏚	Shield	Shield
3+	Thermocouple 3 +	
3-	Thermocouple 3 -	
⏚	Shield	
4+	Thermocouple 4 +	
4-	Thermocouple 4 -	
⏚	Shield	
S+	External AD592 +	
S-	External AD592 -	

****** The AD592 is a 1uA/°K integrated circuit temperature sensor manufactured by Analog Devices. It may be used for external cold junction compensation for the THM100. The THM100 needs to be calibrated with a specific AD592 to meet accuracy specifications in external compensation mode.

3 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Module Setup Tab

a. Sensor Type for each channel must match what is physically attached.

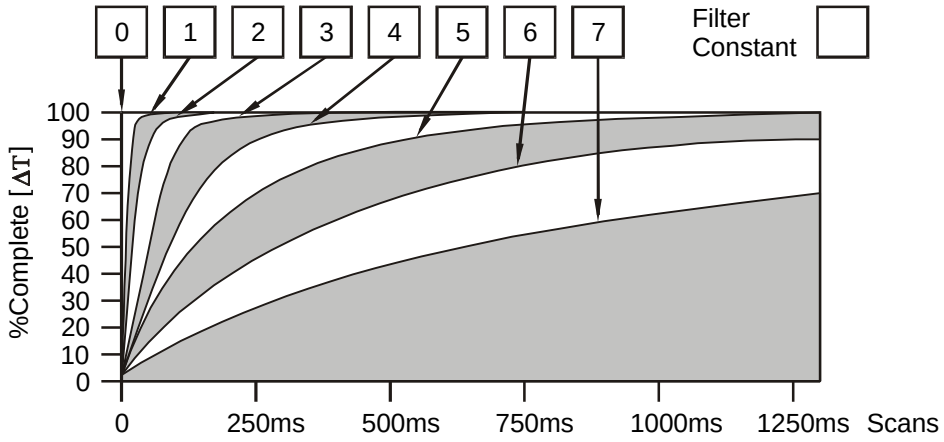
b. Temperature format may be set for various C° or F° ranges. (This does not apply to millivolt ranges.)

c. Filter Constant sets the level of digital filtering according to the chart below.

d. Reject Rates sets the frequency level for noise rejection at 50 or 60HZ.

I/O Map Tab

The I/O Map describes which I/O registers are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.



Digital Filtering. The illustration above demonstrates the effect of digital filtering (set with Filter Constant) on module response to a temperature change.

4 INPUT AND OUTPUT CONVERSIONS

For a given module configuration, use the appropriate formula in the table to obtain the actual temperature (°C or °F) that is represented by the value in the %AI register.

Thermocouple Configuration	**Temperature Conversion**	
	Celsius	**Fahrenheit**
0.05°	°C = %AI / 20 *****	°F = %AI / 20 *****
0.1°	°C = %AI / 10	°F = %AI / 10
0.5°	°C = %AI / 2	°F = %AI / 2
***** Maximum reading in 0.05°F or 0.05°C format is limited to 1638.3 because of %AI resolution.		

The following table describes how real-world inputs are scaled into the controller. Given a known input voltage, the data value is configured by using the conversion factor from the table. The following formula is used: **Data = Voltage In (Vin) / Conversion Factor**

Example: The user selects a voltage of 25mV.

1. The known input voltage is 25mV.
2. Using the table, the conversion factor for the voltage range of ± 25mV is 0.00078125.
3. To determine the data value, the formula is used: Data = Vin / Conversion Factor
   32000 = 25mV / 0.00078125.

Conversion of Real-World Inputs to the Controller			
	%AI Value		
Selected Voltage Range	Voltage In (Vin) VDC	Data Out	Conversion Factor
± 25mv	-25mv	-32000	0.00078125
	0	0	
	+25mv	+32000	
± 50mv	-50mv	-32000	0.0015625
	0	0	
	+50mv	+32000	
± 100mv	-100mv	-32000	0.003125
	0	0	
	+100mv	+32000	

5 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards should be followed in the installation of this product.
b. Shielded, twisted-pair wiring should be used for best performance.
c. Shields may be terminated at the module terminal strip
d. In severe applications, shields should be tied directly to the ground block within the panel.
e. Ungrounded thermocouple sensors are preferred due to their isolated electrical characteristics
f. Interposing terminal strips between the sensor and the module can cause errors due to cold junction effect.
g. If Interposing terminal strips must be used, use specially constructed terminal blocks which match the material characteristics of the thermocouple sensor.
h. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

6 TECHNICAL SUPPORT

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

+/-10V Analog Output Module

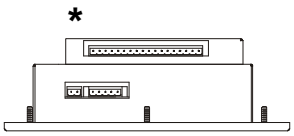
IC300DAC001 / IC300DAC101
14-Bit Resolution

1 SPECIFICATIONS

	DAC001	DAC101
Number of Channels	2	4
Output Range (including over-range)	± 10.23V	
Resolution	14-Bit	
Peak Output Voltage	10.24V	
Load Impedance	2K Ohms Min.	
Load Capacitance	0.01µF Max.	
PLC Update Rate	Set by PLC Scan Time	
Voltage Output Resolution	14-Bits	
Required Power (Steady State)	0.79W (33mA @ 24VDC)	
Required Power (Inrush)	Negligible	
Maximum Error at 25°C	0.05% Full Scale	

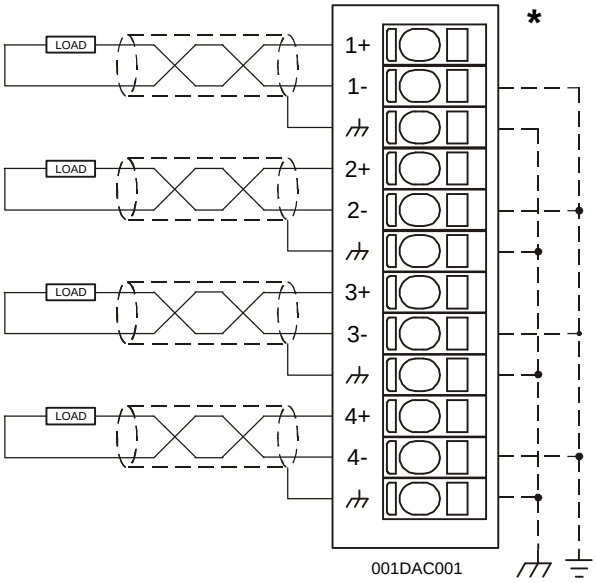
	DAC001	DAC101
Analog Outputs; Output Points Required	2	4
Additional error for temperatures other than 25°C	0.005% / °C	
Conversion Settling Time	1ms.	
Transient Voltage Suppressor	11VDC @ 600W	
External Power Supply	None	
Operating Temperature	0° to 60° Celsius	
Relative Humidity	5 to 95% Non-condensing	
CE	Refer to GFK-1755	
UL	Refer to GFK-1754	
Terminal Type	Spring Clamp, Removable	
Weight	9.5 oz. (270 g)	

2 WIRING

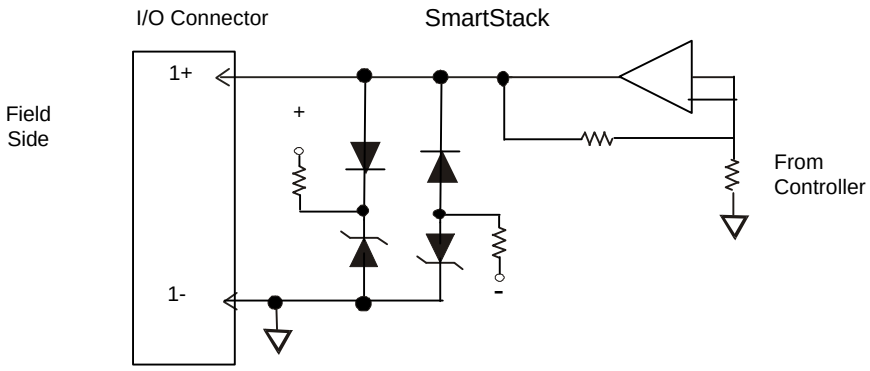


OCS Bottom View – Shows Corresponding I/O Pin

Signal		Pin
DAC001	**DAC101**	
Channel 1+	Channel 1+	1+
Common	Common	1-
Shield	Shield	⏚
Channel 2+	Channel 2+	2+
Common	Common	2-
Shield	Shield	⏚
	Channel 3+	3+
	Common	3-
	Shield	⏚
	Channel 4+	4+
	Common	4-
	Shield	⏚



3 INTERNAL CIRCUIT SCHEMATIC



Specification for transient voltage suppressors (transorbs) used on output circuitry is 11V, 600W.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default values of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default sets the output values to zero when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to a specific value or hold the last value. Generally, most applications use the default settings.

Module Setup Tab

a. Output range for each channel may be selected independently.
b. Filter Constant sets the level of digital filtering according to the following chart.

Warning: The default sets the output values to zero when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 OUTPUT CONVERSION FACTOR

The following table describes how program data values are scaled to real-world analog voltage outputs by the module. Given a desired output voltage, the data value is converted by using the conversion factor from the table. The following formula is used: **Data = Voltage Out (V out) / Conversion Factor**

Example: The user selects ± 10 VDC Output range:

1. The desired voltage is 3 VDC.
2. Using the table, the conversion factor for the voltage range of 0 to +10 VDC is 0.0003125.
3. To determine the data value, the formula is used:
   Data = V out / Conversion Factor
   9600 = 3 VDC / 0.0003125

Conversion of Real-World Outputs into Controller			
Selected Voltage Output Range	**Data**	**Voltage Out (V out) VDC**	**Conversion Factor**
± 10 VDC Analog Out	+ 32736	+10.23	0.0003125
	+ 32000	+10.00	
	0	0.00	
	- 32000	-10.00	
	- 32736	-10.23	

6 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.
c. Shielded, twisted-pair wiring should be used for best performance.
d. Shields may be terminated at the module terminal strip.
e. In severe applications, shields should be tied directly to the ground block within the panel.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

7 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

4-20mA Analog Output Module

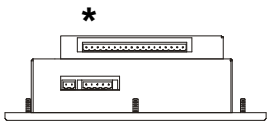
IC300DAC002 / IC300DAC102
14-Bit Resolution

1 SPECIFICATIONS

	DAC002	DAC102
Number of Channels	2	4
Output Ranges (including over-range)	20.47mA; Clamped @-0.5 - +38VDC Nominal	
Resolution	14-Bits	
Peak Output Voltage	36VDC Max.	
PLC Update Rate	Set by PLC Scan Rate	
Current Output Resolution	14-Bits	
Required Power (Steady State)	1.7W (72.6mA @ 24VDC)	
Required Power (Inrush)	Negligible	
Maximum Error at 25°C	0.05% Full Scale	
Maximum Loop Supply	36VDC	

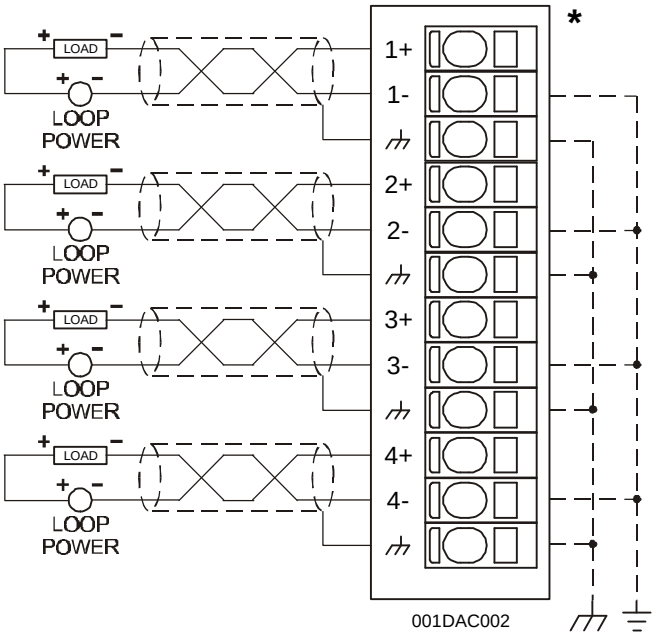
	DAC002	DAC102
Additional error for temperatures other than 25°C	0.005% / °C	
Analog Outputs; Output Points Required	2	4
Power Budget Requirement	60mA Max. from the Bus Controller	
Operating Temperature	0° to 60° Celsius	
Maximum Load/Power Supply	36VDC	
External Power Supply	None	
UL	Operating Temperature Code T4A; Also refer to GFK-1754	
CE	Refer to GFK-1755	
Terminal Type	Spring Clamp, Removable	
Weight	9.5 oz. (270 g)	

2 WIRING

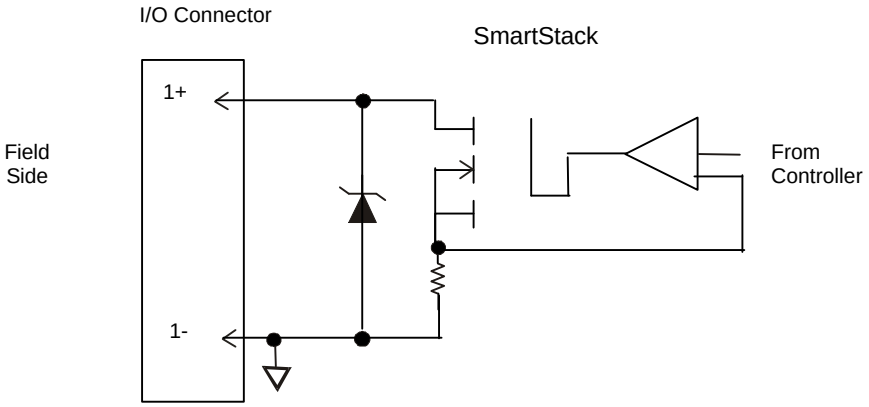


OCS Bottom View – Shows Corresponding I/O Pin

Signal		Pin
DAC002	**DAC102**	
Channel 1+	Channel 1+	1+
Common	Common	1-
Shield	Shield	⏚
Channel 2+	Channel 2+	2+
Common	Common	2-
Shield	Shield	⏚
	Channel 3+	3+
	Common	3-
	Shield	⏚
	Channel 4+	4+
	Common	4-
	Shield	⏚



3 INTERNAL CIRCUIT SCHEMATIC



Specification for transient voltage suppressors (transorbs) used on output circuitry is 43V, 1500W.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default values of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default sets the output values to zero when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to a specific value or hold the last value. Generally, most applications use the default settings.

Module Setup Tab

a. Output range for each channel may be selected independently.
b. Filter Constant sets the level of digital filtering according to the following chart.

> **Warning:** The default sets the output values to zero when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 OUTPUT CHARACTERISTICS

5.1 Output Conversion Factor

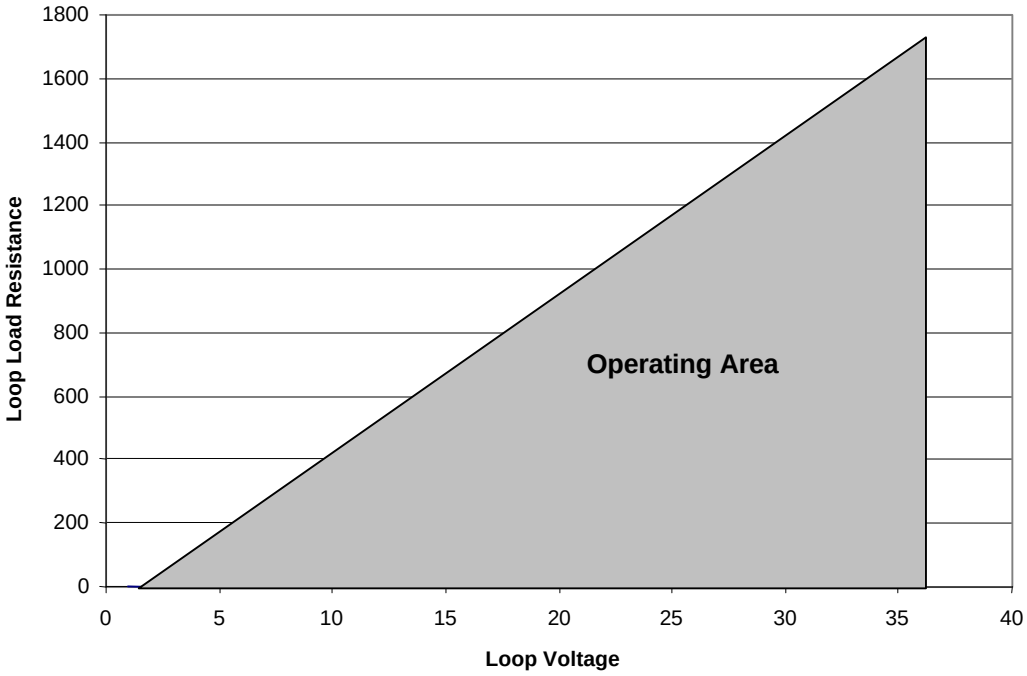
The following table describes how program data values are scaled to real-world analog voltage outputs by the module . Given a desired output current, the data value is converted by using the conversion factor from the table. The following formula is used: **Data = Output Current (mA) / Conversion Factor**

Example: The user selects a current range of +20mA:

1. The desired output current is 12mA.
2. Using the table, the conversion factor for the current range of +20 mA is 0.000625.
3. To determine the data value, the formula is used:
   Data = Output Current (mA) / Conversion Factor
   19200 = 12mA / 0.000625

Conversion of Real-World Outputs into Controller			
Selected Current Range	**Output Current (mA)**	**Data**	**Conversion Factor**
0 to +20mA	+20.47	32752	0.000625
	+20.00	32000	
	0	0	

5.2 Operating Area



6 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.
c. Shielded, twisted-pair wiring should be used for best performance.
d. Shields may be terminated at the module terminal strip.
e. In severe applications, shields should be tied directly to the ground block within the panel.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

6 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

0-10V or 0-20mA Analog Output Module

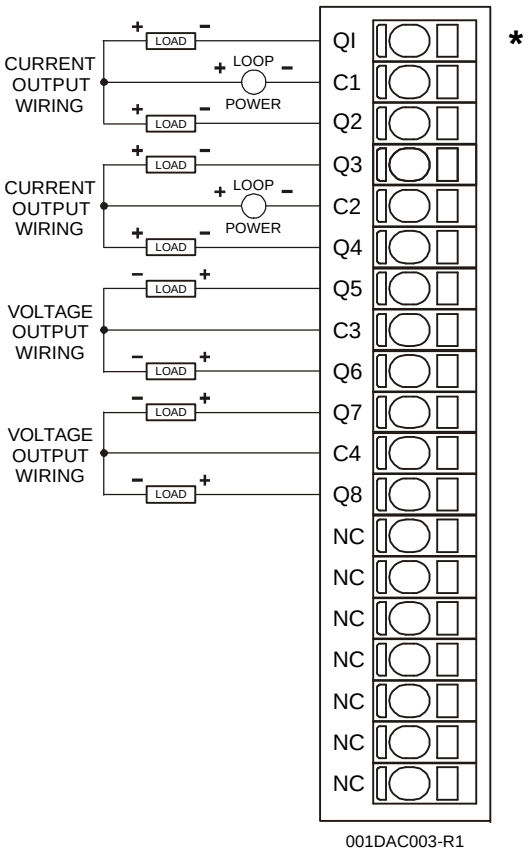
IC300DAC202
12-Bit Resolution

1 SPECIFICATIONS

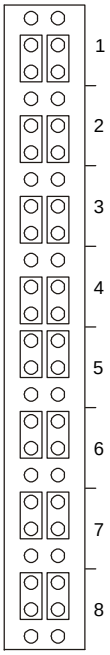
	DAC202		DAC202
Number of Channels	8	Maximum Error at 25°C	0.05% Full Scale
Current Output Range (including over-range)	20.47mA; Clamped @ -0.5 to- +33VDC Nominal	PLC Update Rate	Set by PLC Scan Rate
Peak Output Voltage	30VDC Max.	Resolution	12-Bits
Current Output Voltage Compliance	4-30VDC	Additional error for temperatures other than 25°C	0.005% / °C
Voltage Output Range (including over-range)	0-10.23V; Clamped @ -0.5 to +11VDC Nominal	Analog Outputs; Output Points Required	8
External Power Supply (See Section 2 - Wiring Diagram for current loop power.)	None	Operating Temperature	0° to 60° Celsius
		UL	GFK-1754
Required Power (Steady State)	0.48W (20mA @ 24VDC)	CE	GFK-1755
Required Power (Inrush)	Negligible	Terminal Type	Spring Clamp, Removable
		Weight	9.5 oz. (270 g)

GFK-1816A

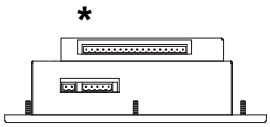
2 WIRING



001DAC003-R1



Jumper Block

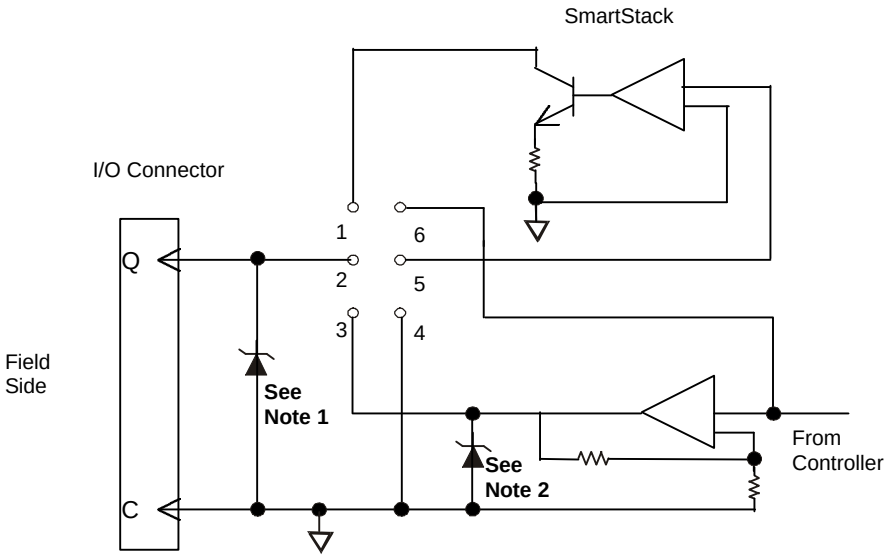


OCS Bottom View – Shows Corresponding I/O Pin

DAC202 Signal	Pin
Output 1	Q1
Common 1	C1
Output 2	Q2
Output 3	Q3
Common 2	C2
Output 4	Q4
Output 5	Q5
Common 3	C3
Output 6	Q6
Output 7	Q7
Common 4	C4
Output 8	Q8
No Connection	NC
No Connection	NC
No Connection	NC
No Connection	NC
No Connection	NC
No Connection	NC
No Connection	NC

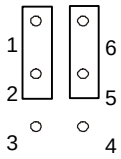
The jumper block indicates the correct jumper positions for the wiring shown above. Each output can be independently programmed for 0-10 volts or 0-20mA. There are two jumpers to be set for each output. Six jumper pins in two rows of three are associated with each output. For voltage output, out of each group of six, the two pins nearest connector pin 1 (marked with *) in each row are to be jumpered. For current output, out of each group of six, the two pins in each row near connector pin 19 are to be jumpered. The mode for each output must also be specified in the module setup in Cscape.

3 INTERNAL CIRCUIT SCHEMATIC

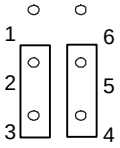


Jumper Positions

20mA



10VDC



Jumper Positions
See Section 2 for physical location.

Note 1: Specification for transient voltage suppressors (transorbs) used on output circuitry is 30V, 300W.

Note 2: Specification for transient voltage suppressors (transorbs) used on output circuitry is 11V, 400W.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Selecting the **I/O Map** tab provides information about the I/O registers, which are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

The **Module Setup** is used in applications where it is necessary to change the default values of the outputs when the controller (e.g., OCS100) enters idle/stop mode. The default sets the output values to zero when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to a specific value or hold the last value. Generally, most applications use the default settings.

Module Setup Tab
Output range for each channel may be selected independently.

Warning: The default sets the output values to zero when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

5 OUTPUT CHARACTERISTICS

5.1 Output Conversion

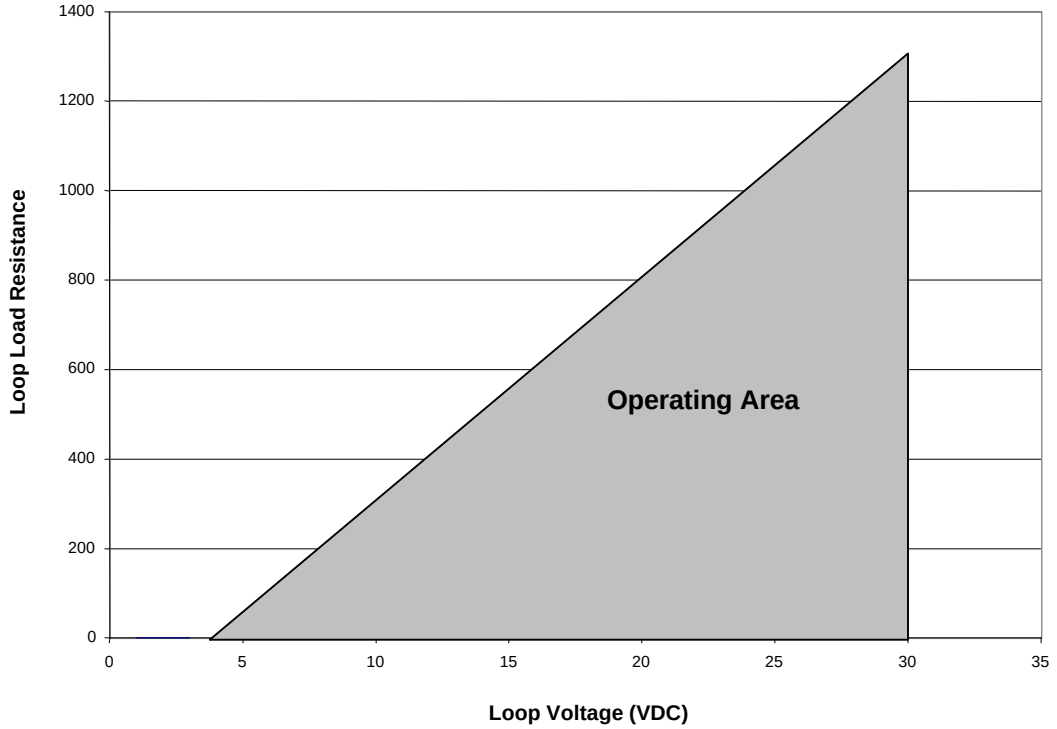
The following table describes how program data values are scaled to real-world analog voltage outputs by the module. Given a desired output current, the data value is converted by using the conversion factor from the table. The following formula is used: **Data = Output Current (mA) / Conversion Factor**

Example: The user selects a current range of +20mA:

1. The desired output current is 12mA.
2. Using the table, the conversion factor for the current range of +20 mA is 0.000625.
3. To determine the data value, the formula is used:
   Data = Output Current (mA) / Conversion Factor
   19200 = 12mA / 0.000625

Conversion of Real-World Outputs into Controller			
Selected Current Range	**Output Current (mA)**	**Data**	**Conversion Factor**
0 to +20mA	+20.47	32752	0.000625
	+20.00	32000	
	0	0	
Selected Voltage Range	**Output Voltage (V)**	**Data**	**Conversion Factor**
0 to +10V	10.23	32736	0.0003125
	10.00	32000	
	0	0	

5.2 Operating Area



6 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.
c. Shielded, twisted-pair wiring should be used for best performance.
d. Shields may be terminated at the module terminal strip.
e. In severe applications, shields should be tied directly to the ground block within the panel.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1601). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

7 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

NOTES

+/- 10V Analog Input / Output Module

IC300MIX011/ IC300MIX111
12-Bit Resolution

1 SPECIFICATIONS

INPUT	MIX011	MIX111
Number of Channels	1	2
Input Ranges (including over-range)	±10.23VDC; ±5.11, 0- +10.23, 0-5.11	
Resolution	12-Bit	
Input Impedance	10Meg Ohm <12VDC or 6Meg Ohm >12VDC Nom.	
Usable Resolution	12- Bits	
Maximum Error at 25°C	0.1%	

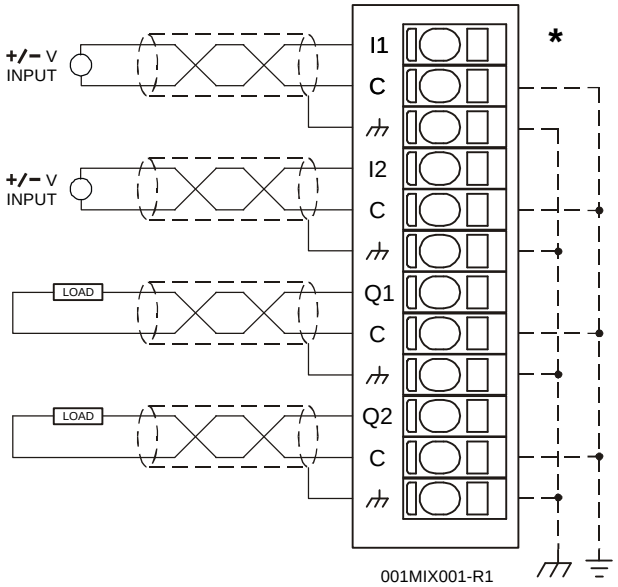
	MIX011	MIX111
Analog Inputs Input Points Required	1	2
Maximum Over-Voltage	350VDC Max.	
Additional error for temperatures other than 25°C	0.01% / °C	
External Power Supply	None	
Converter Type	Successive Approximation	

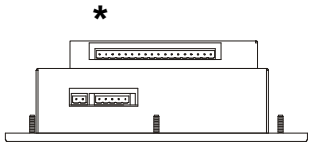
OUTPUT	MIX011	MIX111
Number of Channels	1	2
Output Ranges (including over-range)	± 10.23V	
Resolution	12-Bits	
Peak Output Voltage	10.24V	
Load Impedance	2K Ohms Min.	
Load Capacitance	.01µF Max.	
PLC Update Rate	Set by PLC Scan Time	

	MIX011	MIX111
Analog Outputs; Output Points Required	1	2
Additional error for temperatures other than 25°C	0.01% / °C	
Power Budget Requirement	150mA Max.	
Conversion Settling Time	1ms.	
Digital Filtering	Yes	
External Power Supply	None	
Maximum Error at 25°C	0.1%	
Voltage Output Resolution	12 Bits	

General Specifications					
	MIX011	MIX111		MIX011	MIX111
Required Power (Steady State)	1.32W (55mA @ 24VDC)		CE	Refer to GFK-1755	
Required Power (Inrush)	Negligible		UL	Refer to GFK-1754	
Relative Humidity	5 to 95% Non-condensing		Terminal Type	Spring Clamp, Removable	
Operating Temperature	0° to 60° Celsius		Weight	9.5 oz. (270 g)	

2 WIRING

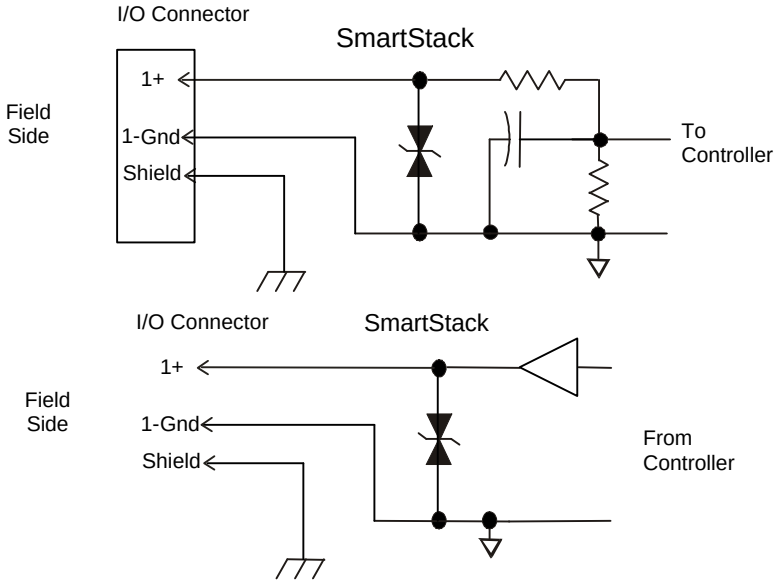




OCS Bottom View – Shows Corresponding I/O Pin

Pin	Signal	
	MIX011	MIX111
I1+	Channel 1+	Channel 1+
C	Common	Common
⏚	Shield	Shield
I2+		Channel 2+
C		Common
⏚		Shield
Q1+	Channel 1+	Channel 1+
C	Common	Common
⏚	Shield	Shield
Q2+		Channel 2+
C		Common
⏚		Shield

3 INTERNAL CIRCUIT SCHEMATIC



Specification for transient voltage suppressors (transorbs) used on output circuitry is 11VDC, bi-directional 500 watts.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

I/O Map Tab

The I/O Map describes which I/O registers are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

Module Setup Tab

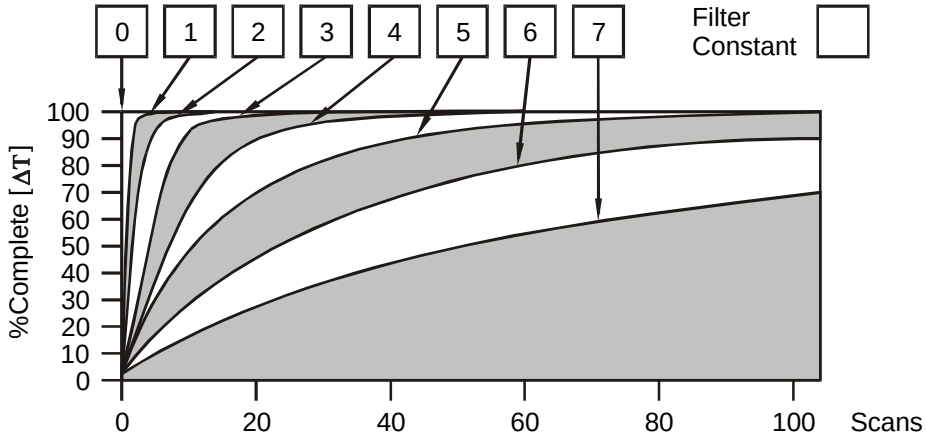
The **Module Setup** is used in applications where it is necessary to change the default states or values of the outputs when the controller (e.g., OCS100) enters idle/stop mode.

1. For Analog Outputs: The default sets the output values to zero when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to a specific value or hold the last value. Generally, most applications use the default settings.

Warning:	The default sets the output values to zero when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

2. Analog Inputs

a. Input range for each channel can be selected independently.
b. Filter Constant sets the level of digital filtering according to the following chart.



Digital Filtering. The illustration above demonstrates the effect of digital filtering (set with Fillter Constant) on module response to a temperature change.

5 INPUT CONVERSION FACTOR

The following table describes how real-world inputs are scaled into the controller. Given a known input voltage, the data value is configured by using the conversion factor from the table. The following formula is used: **Data = Voltage In (Vin) / Conversion Factor**

Example: The user selects a voltage range of 0 to +5 VDC:

1. The known input voltage is 3 VDC.
2. Using the table, the conversion factor for the voltage range of 0 to +5 VDC is 0.00015625.
3. To determine the data value, the formula is used:
   Data = Vin / Conversion Factor
   19200 = 3 VDC / 0.00015625

Conversion of Real-World Inputs into Controller			
Selected Voltage Range	**Voltage In (Vin) VDC**	**Data Out**	**Conversion Factor**
0 to +5.00 VDC	+5.11	32704	.00015625
	+5.00	32000	
	0.00	0	
	NA	NA	
	NA	NA	
0 to +10.00 VDC	+10.23	32736	.0003125
	+10.00	32000	
	0.00	0	
	NA	NA	
	NA	NA	
+/-5.00 VDC	+5.11	32704	.00015625
	+5.00	32000	
	0	0	
	-5.00	-32000	
	-5.11	-32704	
+/-10.00 VDC	+10.23	32736	.0003125
	+10.00	32000	
	0	0	
	-10.00	-32000	
	-10.23	-32736	

6 OUTPUT CONVERSION FACTOR

The following table describes how program data values are scaled to real-world analog voltage outputs by the module. Given a desired output voltage, the data value is converted by using the conversion factor from the table. The following formula is used: **Data = Voltage Out (V out) / Conversion Factor**

Example: The user selects ± 10 VDC output range:

1. The desired voltage is 3 VDC.
2. Using the table, the conversion factor for the voltage range of 0 to +10 VDC is 0.0003125.
3. To determine the data value, the formula is used:
   Data = V out / Conversion Factor
   9600 = 3 VDC / 0.0003125

Conversion of Real-World Outputs into Controller			
Selected Voltage Output Range	**Data**	**Voltage Out (V out) VDC**	**Conversion Factor**
± 10 VDC Analog Out	+ 32736	+10.23	0.0003125
	+ 32000	+10.00	
	0	0.00	
	- 32000	-10.00	
	- 32736	-10.23	

7 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.
c. Shielded, twisted-pair wiring should be used for best performance.
d. Shields may be terminated at the module terminal strip.
e. In severe applications, shields should be tied directly to the ground block within the panel.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-163). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

8 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

NOTES

4-20mA Analog Input / Output Module

IC300MIX022 / IC300MIX122
12-Bit Resolution

1 SPECIFICATIONS

INPUT	MIX022	MIX122
Number of Channels	1	2
Input Ranges (including over-range)	Nominal: ±0-20.47mA, Optional: ±20.47mA.	
Resolution	12-Bit	
Input Impedance	100 Ohm < 12VDC, Clamped @ 12VDC, 35mA Max. Continuous	
Maximum Error at 25°C	0.3%	
Maximum Over-Current	35mA	
Input Current	0-20mA (.48mA)	

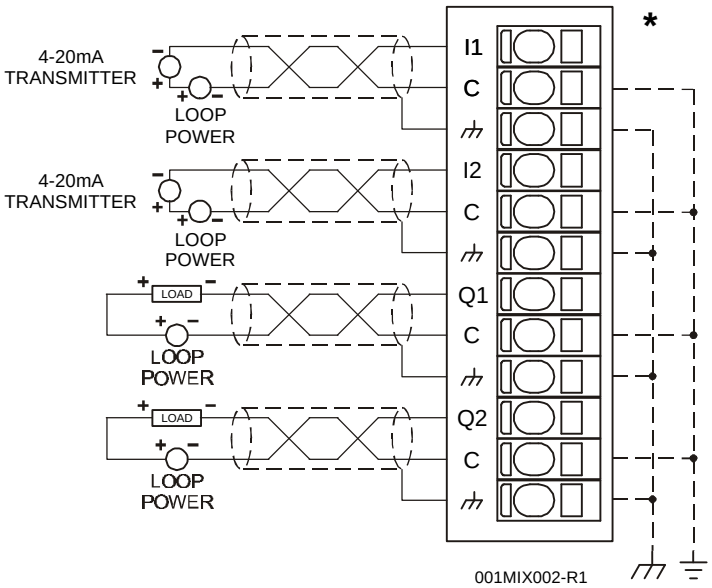
	MIX022	MIX122
Analog Inputs Input Points Required	1	2
Conversion Time (PLC Update Rate)	Set by PLC Scan Time	
Converter Type	Successive Approximation	
Additional error for temperatures other than 25°C	0.01% / °C	
External Power Supply	None	

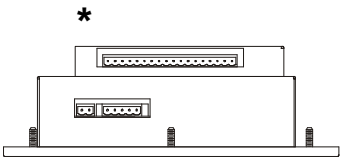
OUTPUT	MIX022	MIX122
Number of Channels	1	2
Output Ranges (including over-range)	20.47mA; Clamped @-0.5 - +38VDC Nominal	
Resolution	12 Bits	
Peak Output Voltage	36VDC Max.	
Current Output Resolution	12 Bits	

	MIX022	MIX122
Analog Outputs; Output Points Required	1	2
Additional error for temperatures other than 25°C	0.01% / °C	
External Power Supply	None	
Maximum Error at 25°C	0.1%	
Loop Voltage	1.5 – 36VDC	

GENERAL SPECIFICATIONS	MIX022	MIX122		MIX022	MIX122
Required Power (Steady State)	1.32W (55mA @ 24VDC)		CE	Refer to GFK-1755	
Required Power (Inrush)	Negligible		UL	Refer to GFK-1754	
Relative Humidity	5 to 95% Non-condensing		Terminal Type	Spring Clamp, Removable	
Operating Temperature	0° to 60° Celsius		Weight	9.5 oz. (270 g)	

2 WIRING

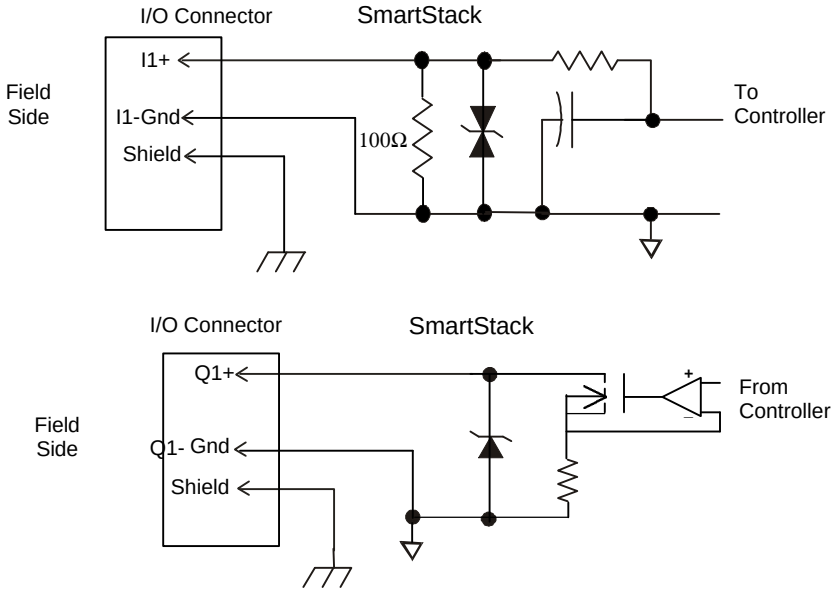




OCS Bottom View – Shows Corresponding I/O Pin

Pin	Signal	
	MIX022	MIX122
I1+	Channel 1+	Channel 1+
C	Common	Common
⏚	Shield	Shield
I2+		Channel 2+
C		Common
⏚		Shield
Q1+	Channel 1+	Channel 1+
C	Common	Common
⏚	Shield	Shield
Q2+		Channel 2+
C		Common
⏚		Shield

3 INTERNAL CIRCUIT SCHEMATIC



Specification for transient voltage suppressors (transorbs) used on output circuitry is 43VDC, 1500 watts.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

I/O Map Tab

The I/O Map describes which I/O registers are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

Module Setup Tab

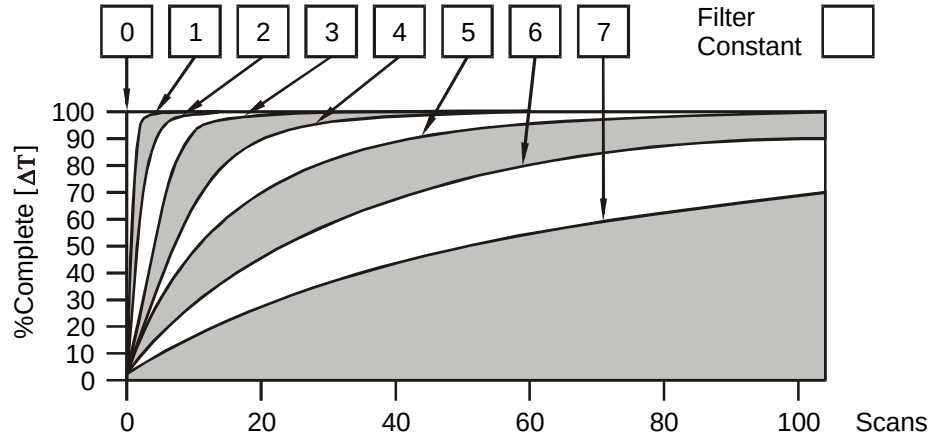
The **Module Setup** is used in applications where it is necessary to change the default states or values of the outputs when the controller (e.g., OCS100) enters idle/stop mode.

1. For Analog Outputs: The default sets the output values to zero when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to a specific value or hold the last value. Generally, most applications use the default settings.

Warning: The default sets the output values to zero when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

2. Analog Inputs:

a. Input and output range for each channel can be selected independently.
b. Filter Constant sets the level of digital filtering according to the following chart.



Digital Filtering. The illustration above demonstrates the effect of digital filtering (set with Filter Constant) on module response to a temperature change.

5 INPUT CONVERSION FACTOR

The following table describes how real-world inputs are scaled into the controller. Given a known input current, the data value is configured by using the conversion factor from the table. The following formula is used: **Data = Input Current (mA) / Conversion Factor**

Example: The user selects a current range of 0 to +20mA:

1. The known input current is 14mA.
2. Using the table, the conversion factor for the current range of 0 to +20mA is 0.000625.
3. To determine the data value, the formula is used:
   Data = Input Current (mA) / Conversion Factor
   22400 = 14mA / 0.000625

Conversion of Real-World Inputs into Controller			
Selected Current Range	**Input Current (mA)**	**Data**	**Conversion Factor**
0 to +20mA	+20.47	32752	0.000625
	+20.00	32000	
	0	0	
-20 to +20mA	-20.00	-32000	0.000625
	-20.47	-32752	

6 OUTPUT CHARACTERISTICS

6.1 Output Conversion Factor

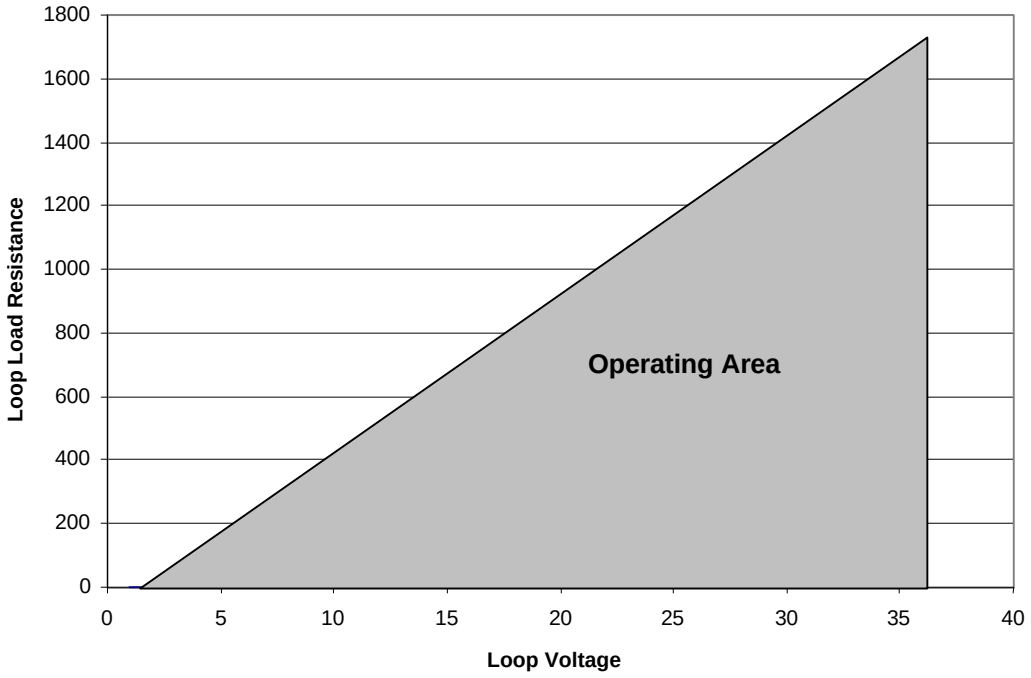
The following table describes how program data values are scaled to real-world analog voltage outputs by the module. Given a desired output current, the data value is converted by using the conversion factor from the table. The following formula is used: **Data = Output Current (mA) / Conversion Factor**

Example: The user selects a current range of +20mA:

1. The desired output current is 12mA.
2. Using the table, the conversion factor for the current range of +20 mA is 0.000625.
3. To determine the data value, the formula is used:
   Data = Output Current (mA) / Conversion Factor
   19200 = 12mA / 0.000625

Conversion of Real-World Outputs into Controller			
Selected Current Range	**Output Current (mA)**	**Data**	**Conversion Factor**
0 to +20mA	+20.47	32752	0.000625
	+20.00	32000	
	0	0	

6.2 Operating Areas



6 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.
c. Shielded, twisted-pair wiring should be used for best performance.
d. Shields may be terminated at the module terminal strip.
e. In severe applications, shields should be tied directly to the ground block within the panel.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

7 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

NOTES

24VDC Bipolar Digital In
10-28VDC, 0.5A Sourcing Digital Out
IC300MIX901
+/- 10V Analog In/Out

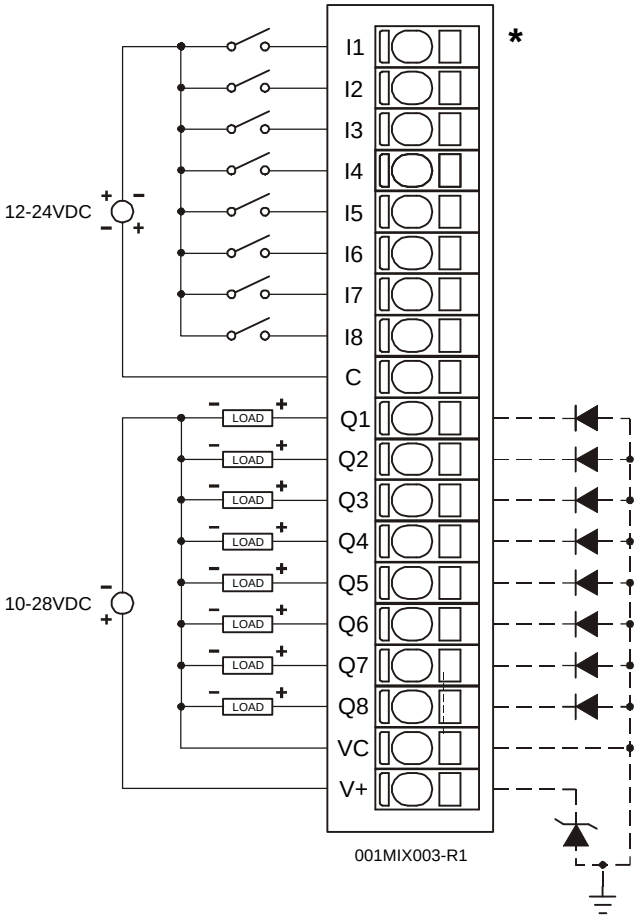
1 SPECIFICATIONS

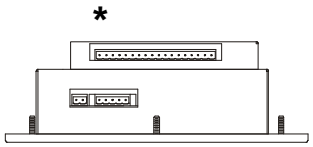
ANALOG INPUT	MIX901			MIX901
Number of Channels	4		Analog Inputs Input Points Required	4
Input Ranges (including over-range)	±10.23VDC		Usable Resolution	12- Bits
Resolution	12-Bit		Digital Filtering	Yes
Input Impedance	1Meg Ohm <12VDC or clamped @ 12VDC Nom.		Additional error for temperatures other than 25°C	0.01% / °C
Maximum Clamp Current	75mA.		Maximum Error at 25°C	0.1%
DIGITAL INPUT	**MIX901**			**MIX901**
Inputs per Module	8		Input Characteristics	Bidirectional
Commons per Module	1		Input Impedance	10K Ohms
Input Voltage Range	12-24VDC		Minimum ON Current	1mA
Peak Voltage	35VDC Max.		Maximum OFF Current	200µA
Isolation (Channel to Bus)	500VDC		OFF to ON Response	1ms.
ON Voltage Level	9VDC		ON to OFF Response	1ms.
OFF Voltage Level	3VDC			
ANALOG OUTPUT	**MIX901**			**MIX901**
Number of Channels	2		Analog Outputs; Output Points Required	2
Output Ranges (including over-range)	± 10.23V		Additional error for temperatures other than 25°C	0.01% / °C
Resolution	12-Bits		PLC Update Rate	Set by PLC Scan Time
Peak Output Voltage	10.23V		Conversion Settling Time	1ms.
Load Impedance	2K Ohms Min.		Voltage Output Resolution	12 Bits
Load Capacitance	.01µF MAX		Maximum Error at 25°C	0.1%
DIGITAL OUTPUT	**MIX901**			**MIX901**
Outputs per Module	8		Maximum Inrush Current	650mA per channel
Commons per Module	1		Minimum Load	None
Operating Voltage	10 - 28VDC		OFF to ON Response	1ms.
Output Type	Sourcing / 10K Pull-Down		ON to OFF Response	1ms.
Peak Voltage	28VDC Max.		Output Characteristics	Current Sourcing
Maximum Load Current per Output	0.5A Max.		Output Protection	Short Circuit

General Specifications			
	MIX901		**MIX901**
Required Power (Steady State)	0.33W (13.75mA @ 24VDC)	CE	Refer to GFK-1755
Required Power (Inrush)	Negligible	UL	Operating Temperature Code T4A; Also refer to GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
Operating Temperature	0° to 60° Celsius	Weight	9.5 oz. (270 g)

2 WIRING

2.1 Digital Input / Output (P1)

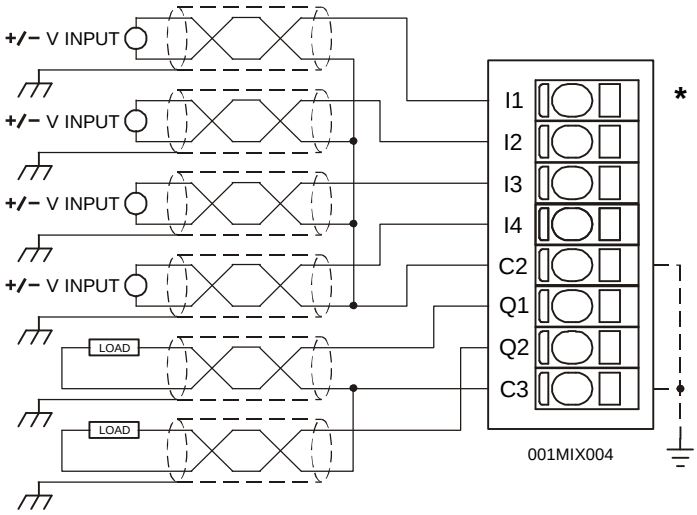


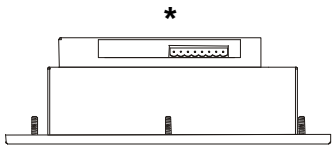


OCS Bottom View – Shows Corresponding I/O Pin

Pin	Digital Input /Output MIX901 - P1
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C1	Common (Isolated)
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
VC	Load Power Common
V+	Load Voltage +

2.2 Analog Input / Output (P2)

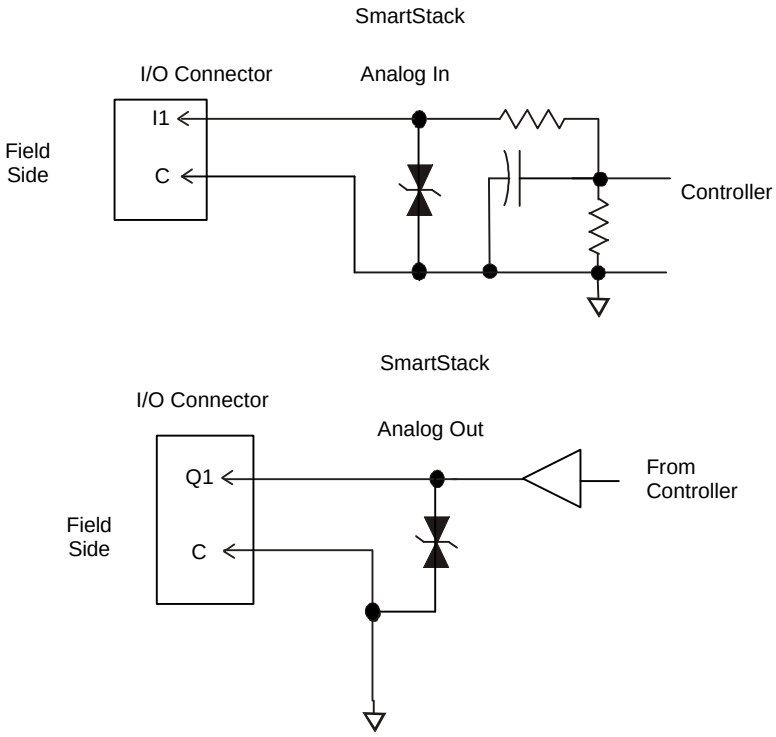




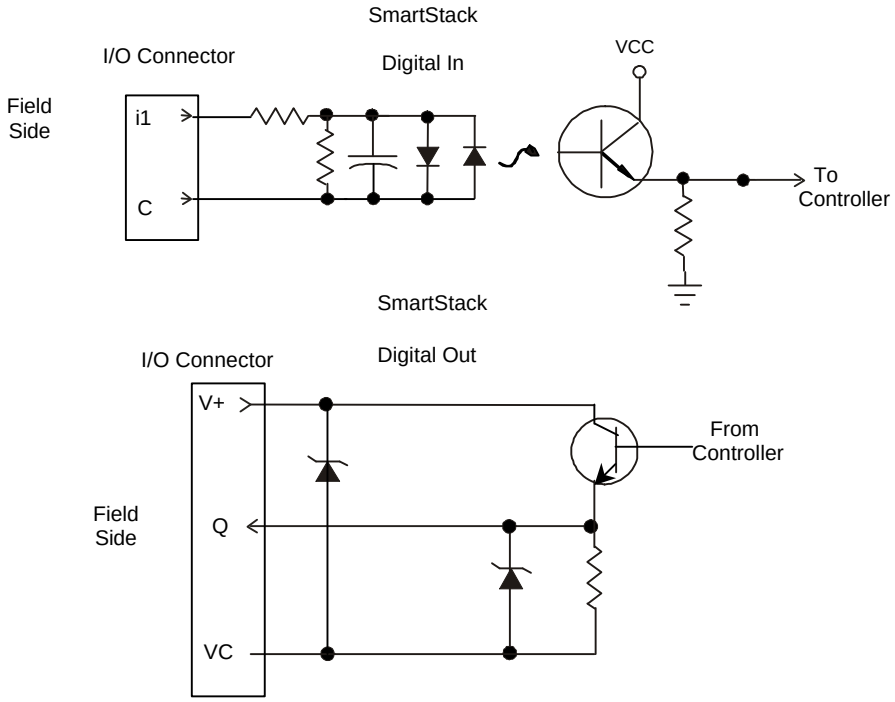
OCS Top View – Shows Corresponding I/O Pin

Pin	Analog In and Out MIX901 P2
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
C2	Input Common
Q1	Output 1
Q2	Output 2
C3	Output Common

INTERNAL CIRCUIT SCHEMATIC



Specification for transient voltage suppressors (transorbs) used on output circuitry is 12VDC, 600 watts.



Specification for transient voltage suppressors (transorbs) used on output circuitry is 33VDC, 300 watts.

Note: Electro-mechanical relays comply with IEC1131-2.

CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Module Setup Tab
The **Module Setup** is used in applications where it is necessary to change the default states or values of the outputs when the controller (e.g., OCS100) enters idle/stop mode.

1. For Digital Outputs: The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

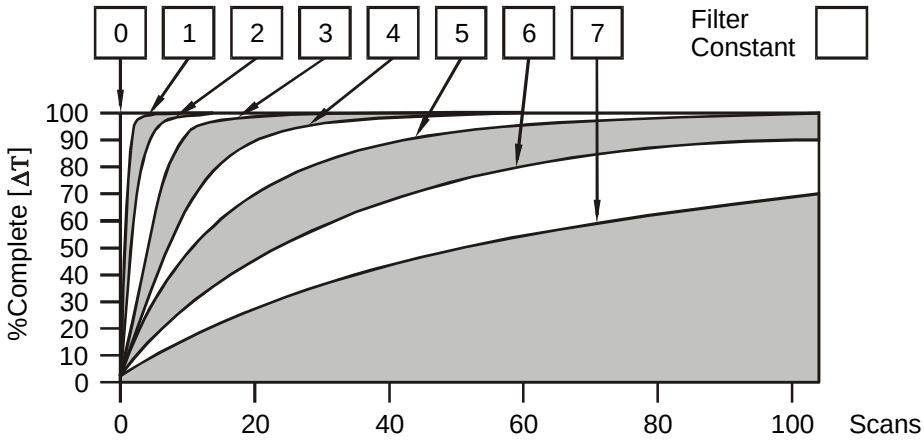
> **Warning:** The default turns the digital outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default settings.

2. For Analog Outputs: The default sets the output values to zero when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to a specific value or hold the last value. Generally, most applications use the default settings.

> **Warning:** The default sets the output values to zero when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

3. For Analog Inputs:
a. Filter Constant sets the level of digital filtering according to the following chart.

I/O Map Tab
The I/O Map describes which I/O registers are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.



Digital Filtering. The illustration above demonstrates the effect of digital filtering (set with Fillter Constant) on module response to a temperature change.

5 ANALOG INPUT and OUTPUT CONVERSIONS

5.1 Input Conversion Factor

The following table describes how real-world inputs are scaled into the controller. Given a known input voltage, the data value is configured by using the conversion factor from the table. The following formula is used: **Data = Voltage In (Vin) / Conversion Factor**

Example: The voltage range is +/-10VDC:

1. The known input voltage is 3 VDC.
2. Using the table, the conversion factor for the voltage range of +/-10VDC is 0.0003125.
3. To determine the data value, the formula is used:
   Data = Vin / Conversion Factor
   9600 = 3 VDC / 0.0003125

Conversion of Real-World Inputs into Controller			
Selected Voltage Range	**Voltage In (Vin) VDC**	**Data Out**	**Conversion Factor**
+/-10.00 VDC	+10.23	32736	0.0003125
	+10.00	32000	
	0	0	
	-10.00	-32000	
	-10.23	-32736	

5.2 Output Conversion Factor

The following table describes how program data values are scaled to real-world analog voltage outputs by the module. Given a desired output voltage, the data value is converted by using the conversion factor from the table. The following formula is used: **Data = Voltage Out (V out) / Conversion Factor**

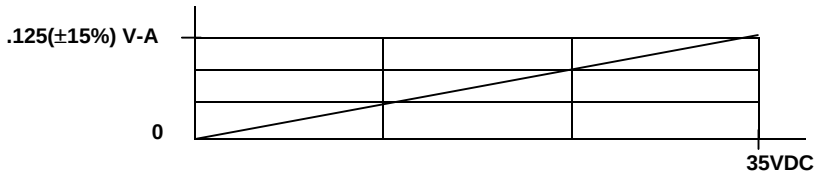
Example: The user selects ± 10 VDC output range:

1. The desired voltage is 3 VDC.
2. Using the table, the conversion factor for the voltage range of +/-10 VDC is 0.0003125
3. To determine the data value, the formula is used:
   Data = V out / Conversion Factor
   9600 = 3 VDC / 0.0003125

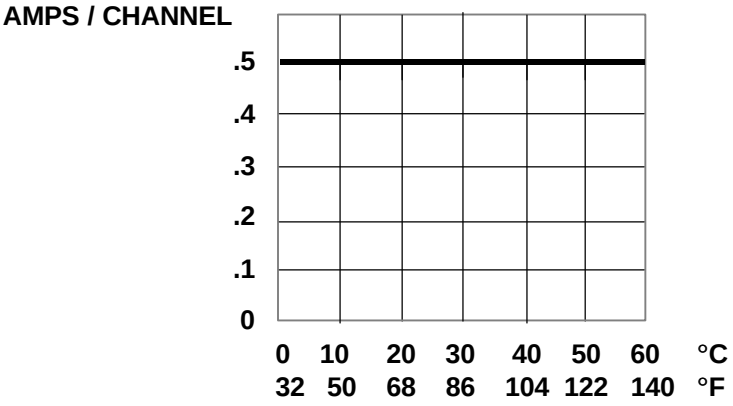
Conversion of Real-World Outputs into Controller			
Selected Voltage Output Range	**Data**	**Voltage Out (V out) VDC**	**Conversion Factor**
± 10 VDC Analog Out	+ 32736	+10.23	0.0003125
	+ 32000	+10.00	
	0	0.00	
	- 32000	-10.00	
	- 32736	-10.23	

6 DIGITAL INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart



Derating Chart



7 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards should be followed in the installation of this product.
b. Shielded, twisted-pair wiring should be used for best performance.
c. Shields may be terminated at the module terminal strip.
d. In severe applications, shields should be tied directly to the ground block within the panel.
e. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

8 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

NOTES

24VDC Bipolar Digital In
10-28VDC, 0.5A Sourcing Digital Out
4-20mA Analog In/Out
IC300MIX902

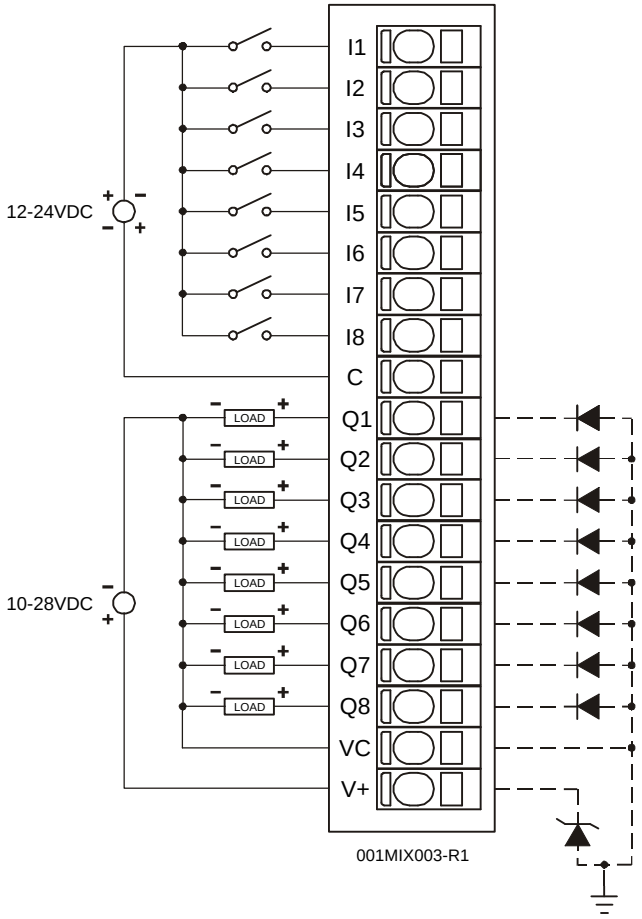
1 SPECIFICATIONS

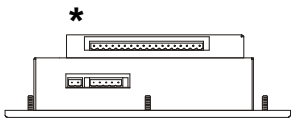
ANALOG INPUT	MIX902		MIX902
Number of Channels	4	Analog Inputs Input Points Required	4
Input Ranges (including over-range)	Nominal: 0-20.47mA	Conversion Time (PLC Update Rate)	Set by PLC Scan Time
Resolution	12-Bit	Converter Type	Successive Approximation
Input Impedance	200 Ohms < 12VDC, Clamped @ 12VDC, 35mA Max. Continuous	Additional error for temperatures other than 25°C	0.01% / °C
Maximum Error at 25°C	0.1%	Maximum Over-Current	35mA
DIGITAL INPUT			
Inputs per Module	8	Input Characteristics	Bidirectional
Commons per Module	1	Input Impedance	10K Ohms
Input Voltage Range	12-24VDC	Minimum ON Current	1mA
Peak Voltage	35VDC Max.	Maximum OFF Current	200µA
Isolation (Channel to Channel and Channel to Common)	500VDC	OFF to ON Response	1ms.
ON Voltage Level	9VDC	ON to OFF Response	1ms.
OFF Voltage Level	3VDC		
ANALOG OUTPUT			
Number of Channels	2	Analog Outputs; Output Points Required	2
Output Ranges (including over-range)	20.47mA; Clamped @-0.5 - +33VDC Nominal	Additional error for temperatures other than 25°C	0.01% / °C
Resolution	12 Bits	Maximum Error at 25°C	0.1% (Note: Used 2% error under EMC testing.)
Output Voltage	4 - 30VDC		
DIGITAL OUTPUT	**MIX902**		**MIX902**
Outputs per Module	8	Maximum Inrush Current	650mA
Commons per Module	1	Minimum Load	None
Operating Voltage	10 - 28VDC	OFF to ON Response	1ms.
Output Type	Sourcing / 10K Pull-Down	ON to OFF Response	1ms.
Peak Voltage	28VDC Max.	Output Characteristics	Current Sourcing
Maximum Load Current per Output	0.5A Max.	Output Protection	Short Circuit

General Specifications			
Required Power (Steady State)	0.03W (1.65MA @ 24VDC)	CE	Refer to GFK-1755
Required Power (Inrush)	Negligible	UL	Refer to GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
Operating Temperature	0° to 60° Celsius	Weight	9.5 oz. (270 g)

2 WIRING

2.1 Digital Input / Output (P1)

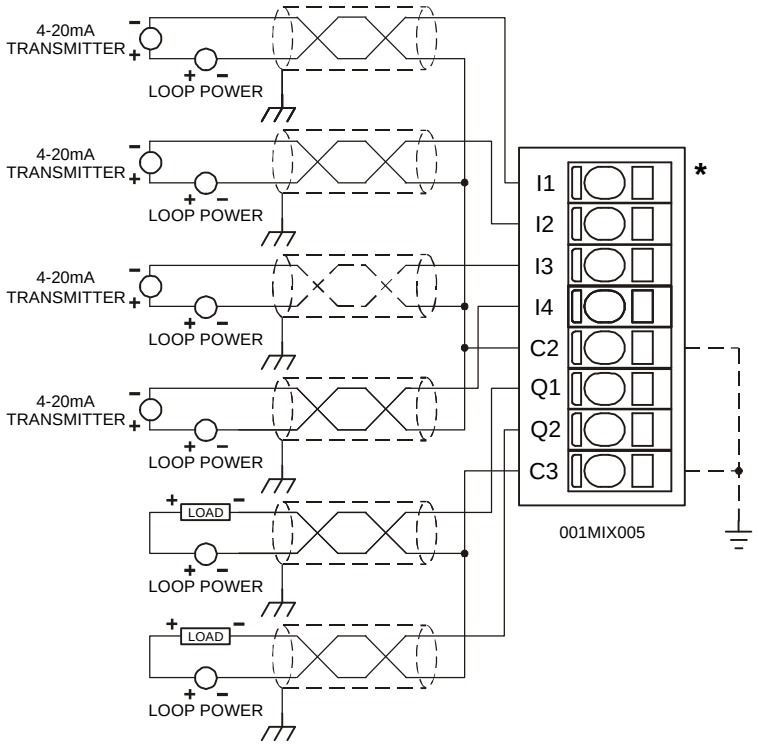


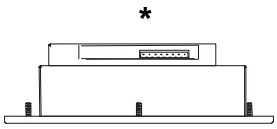


OCS Bottom View – Shows Corresponding I/O Pin

Pin	Digital Input / Output MIX902 - P1
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C1	Common (Isolated)
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
VC	Load Power Common
V+	Load Voltage +

2.2 Analog Input / Output (P2)

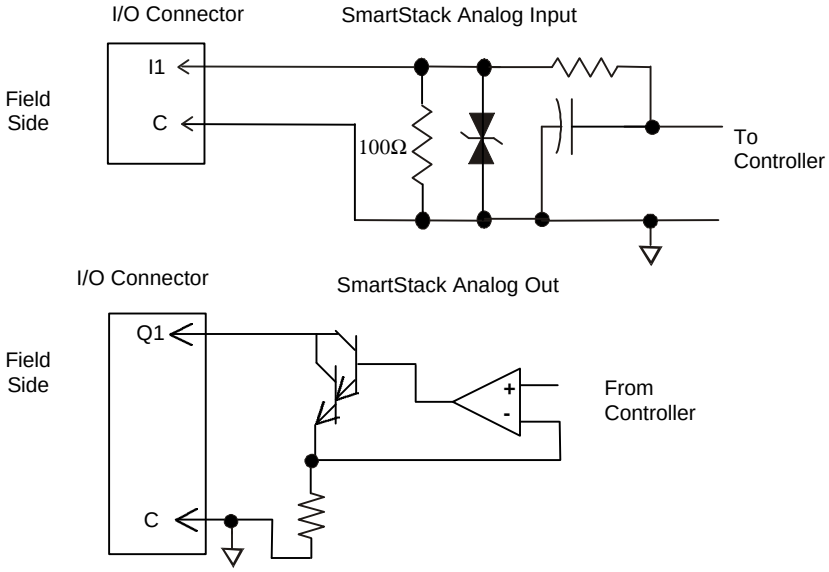




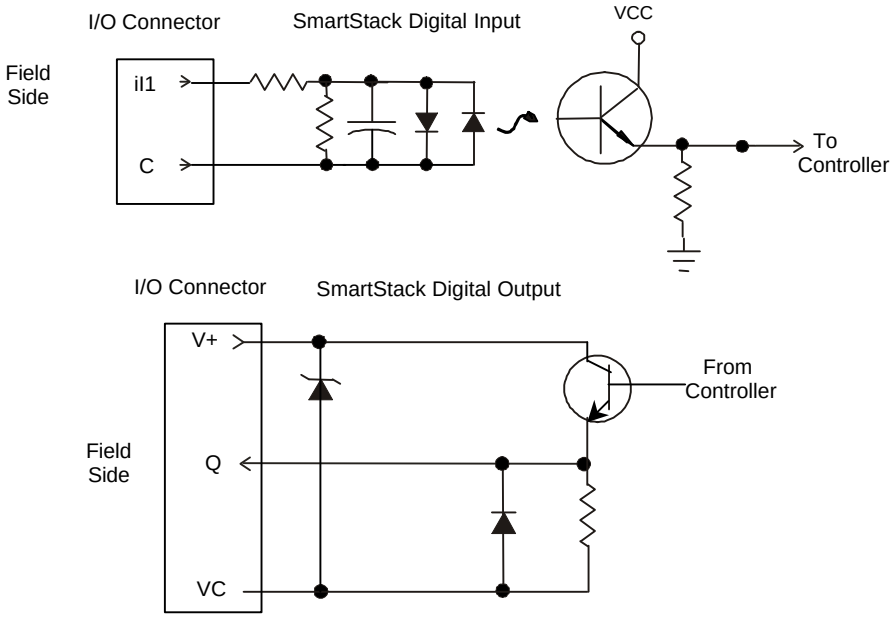
OCS Top View – Shows Corresponding I/O Pin

Pin	Analog In and Out MIX902 P2
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
C2	Input Common
Q1	Output 1
Q2	Output 2
C3	Output Common

3 INTERNAL CIRCUIT SCHEMATIC



Specification for transient voltage suppressors (transorbs) used on output circuitry is 30V, 300W.



Specification for transient voltage suppressors (transorbs) used on output circuitry is 33V, 300W.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Module Setup Tab

The **Module Setup** is used in applications where it is necessary to change the default states or values of the outputs when the controller (e.g., OCS100) enters idle/stop mode.

1. For Digital Outputs: The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

> **Warning:** The default turns the digital outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default settings.

2. For Analog Outputs: The default sets the output values to zero when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to a specific value or hold the last value. Generally, most applications use the default settings.

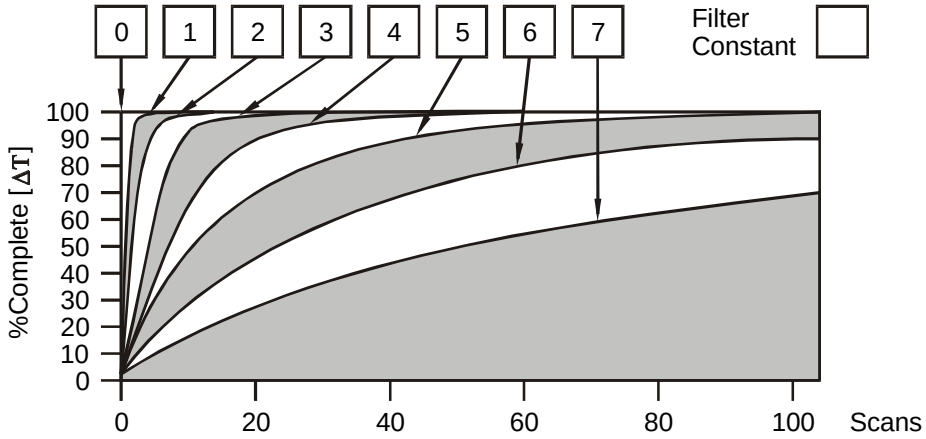
> **Warning:** The default sets the output values to zero when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

3. For Analog Inputs:

Filter Constant sets the level of digital filtering according to the following chart.

I/O Map Tab

The I/O Map describes which I/O registers are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.



Digital Filtering. The illustration above demonstrates the effect of digital filtering (set with Fillter Constant) on module response to a temperature change.

5 ANALOG INPUT CONVERSION FACTOR

The following table describes how real-world inputs are scaled into the controller. Given a known input current, the data value is configured by using the conversion factor from the table. The following formula is used: **Data = Input Current (mA) / Conversion Factor**

Example: The user selects a current range of 0 to +20mA:

1. The known input current is 14mA.
2. Using the table, the conversion factor for the current range of 0 to +20mA is .000625.
3. To determine the data value, the formula is used:
   Data = Input Current (mA) / Conversion Factor
   22400 = 14mA / 0.000625

Conversion of Real-World Inputs into Controller			
Selected Current Range	**Input Current (mA)**	**Data**	**Conversion Factor**
0 to +20mA	+20.47	32752	0.000625
	+20.00	32000	
	0	0	

6 ANALOG CONVERSION OUTPUT FACTOR

The following table describes how program data values are scaled to real-world analog voltage outputs by the module. Given a desired output current, the data value is converted by using the conversion factor from the table. The following formula is used: **Data = Output Current (mA) / Conversion Factor**

Example: The user selects a current range of +20mA:

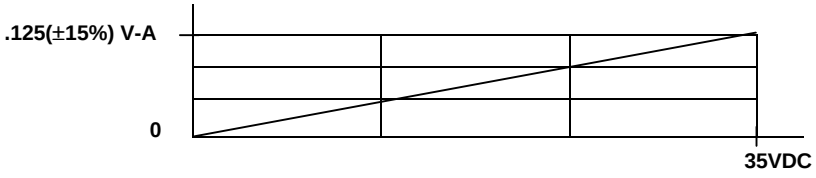
1. The desired output current is 12mA.
2. Using the table, the conversion factor for the current range of +20 mA is 0.000625.
3. To determine the data value, the formula is used:
   Data = Output Current (mA) / Conversion Factor
   19200 = 12mA / 0.000625

Conversion of Real-World Outputs into Controller			
Selected Current Range	**Output Current (mA)**	**Data**	**Conversion Factor**
0 to +20mA	+20.47	32752	0.000625
	+20.00	32000	
	0	0	

7 DIGITAL INPUT / OUTPUT CHARACTERISTICS

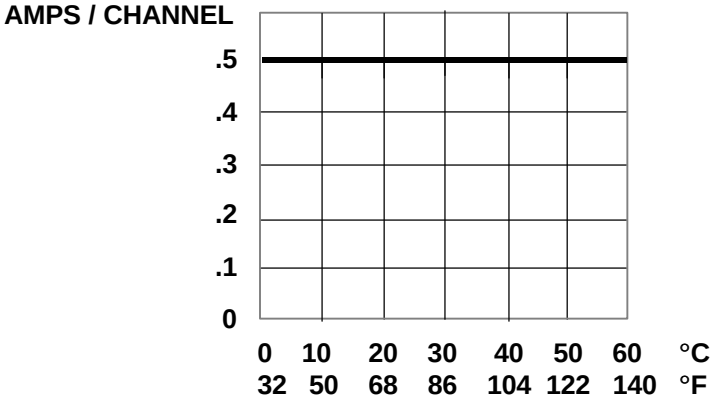
7.1 Digital Input

Digital Input Chart

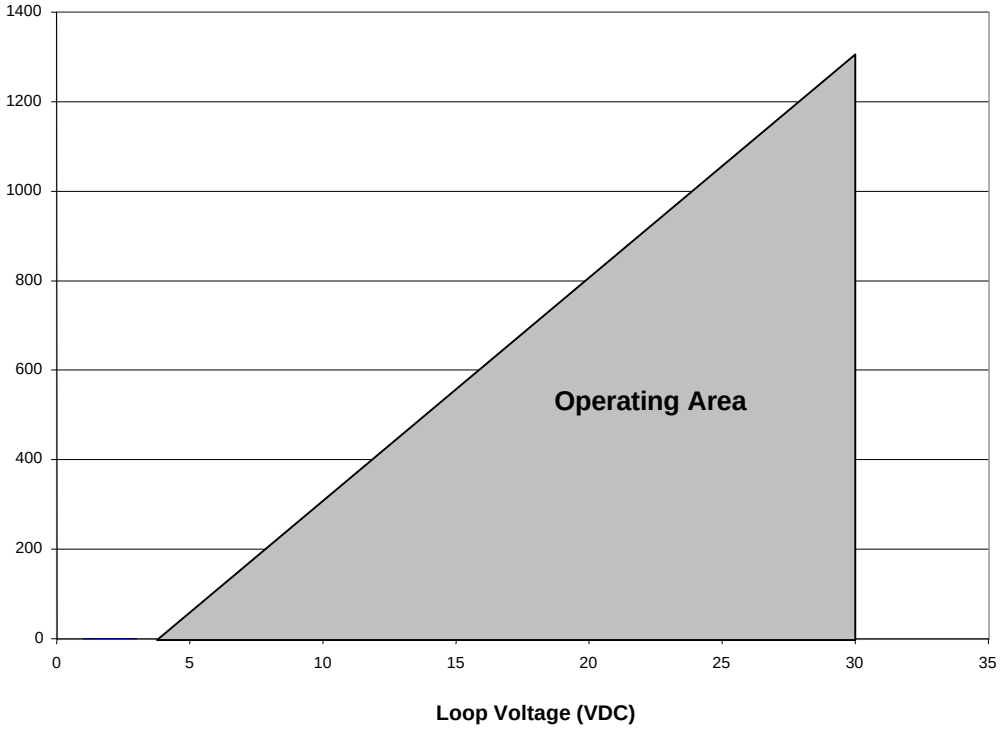


7.2 Digital Output

Derating Chart for MIX902



6.3 Operating Area



7 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards should be followed in the installation of this product.
b. Shielded, twisted-pair wiring should be used for best performance.
c. Shields may be terminated at the module terminal strip.
d. In severe applications, shields should be tied directly to the ground block within the panel.
e. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

8 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

NOTES

24VDC Bipolar Digital In
10-28VDC, 0.5A Sinking Digital Out
4-20mA Analog In/Out
IC300MIX904

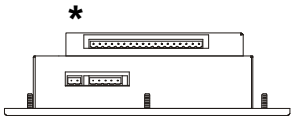
1 SPECIFICATIONS

ANALOG INPUT			
Number of Channels	4	Analog Inputs Input Points Required	4
Input Ranges (including over-range)	Nominal: 0-20.47mA	Conversion Time (PLC Update Rate)	Set by PLC Scan Time All channels updated to once per scan.
Resolution	12-Bit	Converter Type	Successive Approximation
Input Impedance	200 Ohms < 12VDC, Clamped @ 12VDC, 35mA Max. Continuous	Additional error for temperatures other than 25°C	0.01% / °C
Maximum Error at 25°C	0.1%	Maximum Over-Current	35mA
DIGITAL INPUT			
Inputs per Module	8	Input Characteristics	Bidirectional
Commons per Module	1	Input Impedance	10K Ohms
Input Voltage Range	12-24VDC	Minimum ON Current	1mA
Peak Voltage	35VDC Max.	Maximum OFF Current	200µA
Isolation (Channel to Common)	500VDC	OFF to ON Response	1ms.
ON Voltage Level	9VDC	ON to OFF Response	1ms.
OFF Voltage Level	3VDC		
ANALOG OUTPUT			
Number of Channels	2	Analog Outputs; Output Points Required	2
Output Ranges (including over-range)	0-20.47mA; Clamped @-0.5 - +33VDC Nominal	Additional error for temperatures other than 25°C	0.01% / °C
Resolution	12 Bits	Maximum Error at 25°C	0.1% (Note: Used 2% error under EMC testing.)
Output Voltage	4 - 30VDC		
DIGITAL OUTPUT			
Outputs per Module	8	Output Protection	Short Circuit
Commons per Module	1	Maximum Leakage Current	100µA
Operating Voltage	5 - 35VDC	Maximum Inrush Current	600mA. per channels
Output Type	Sinking / 10K Pull-Up	Minimum Load	None
Peak Voltage	35VDC Max.	OFF to ON Response	1ms.
Output Characteristics	Current Sinking	ON to OFF Response	1ms.
ON Voltage Level	1.5VDC Max.	Maximum Current per Channel	500mA
		Total Maximum Current	4A

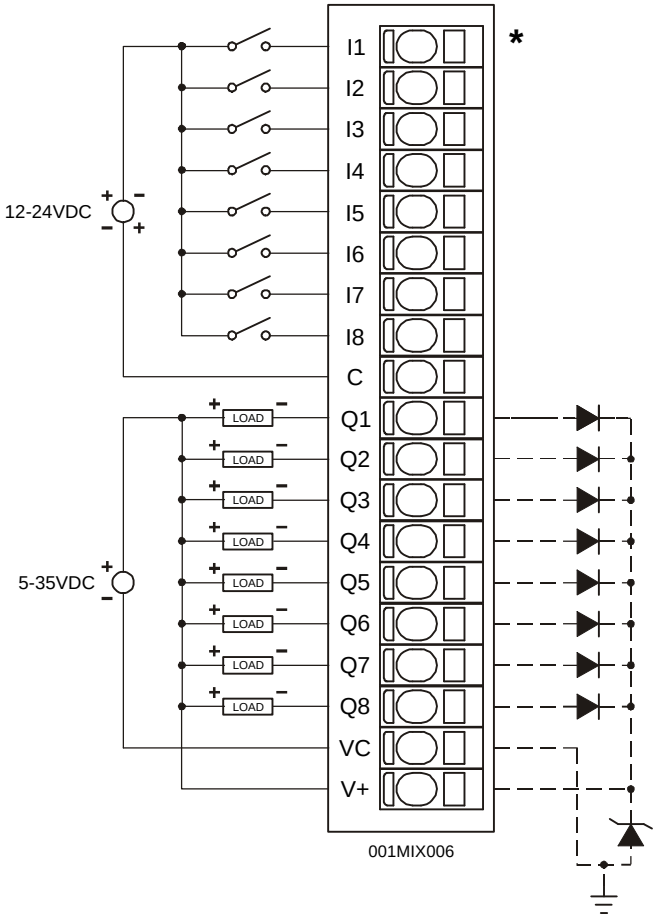
General Specifications			
Required Power (Steady State)	0.1W (4mA @ 24VDC)	UL	GFK-1754
Required Power (Inrush)	Negligible	Terminal Type	Spring Clamp, Removable
Relative Humidity	5 to 95% Non-condensing	Weight	9.5 oz. (270 g)
Operating Temperature	0° to 60° Celsius		

2 WIRING

2.1 Digital Input / Output (P1)



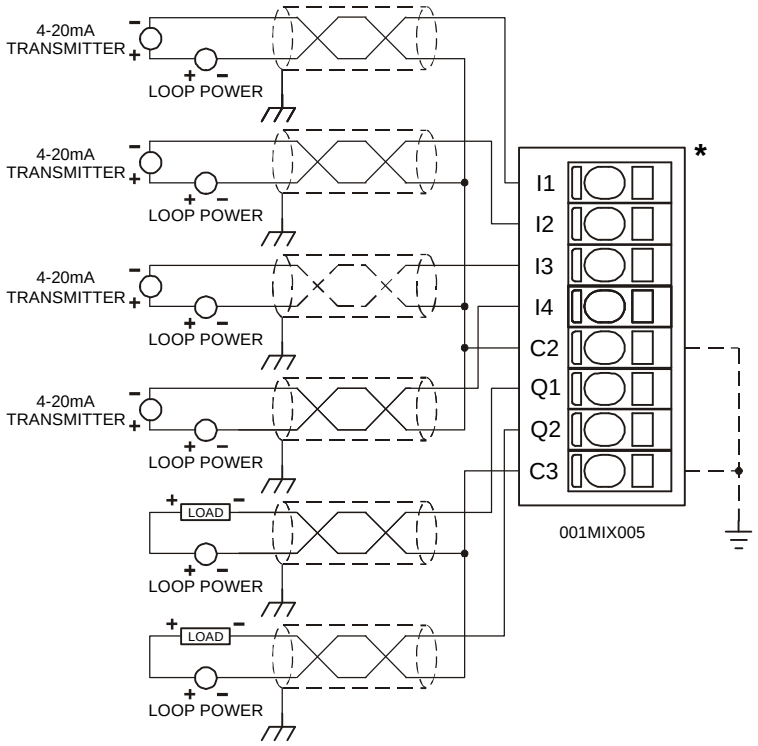
OCS Bottom View – Shows Corresponding I/O Pin

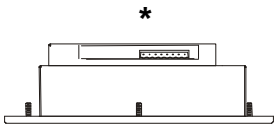


Pin	Digital Input / Output
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C	Common
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
VC	Common
V+	Load Voltage +

Warning: This is a negative logic device. Use of it may be considered an unsafe practice under CE directives.

2.2 Analog Input / Output (P2)

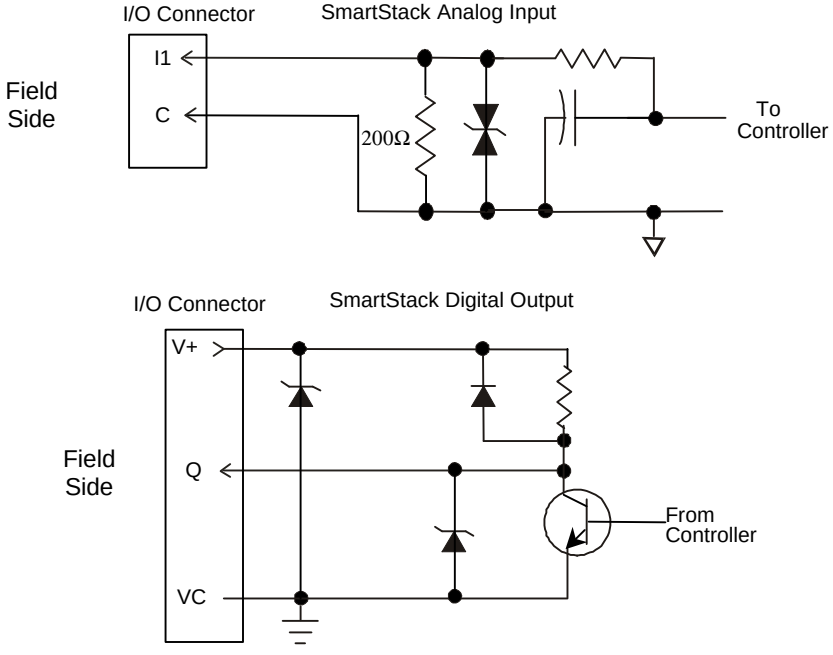




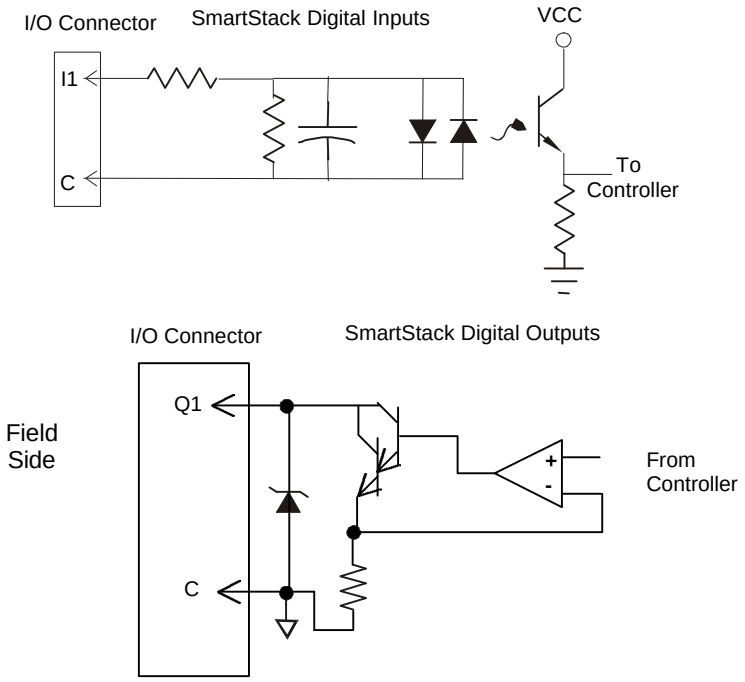
OCS Top View – Shows Corresponding I/O Pin

Pin	Analog In and Out
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
C2	Input Common
Q1	Output 1
Q2	Output 2
C3	Output Common

3 INTERNAL CIRCUIT SCHEMATIC



Specification for transient voltage suppressors (transorbs) used on output circuitry is 36VDC, 300 watts.



Specification for transient voltage suppressors (transorbs) used on output circuitry is 30VDC, 300 watts.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Module Setup Tab

The **Module Setup** is used in applications where it is necessary to change the default states or values of the outputs when the controller (e.g., OCS100) enters idle/stop mode.

1. For Digital Outputs: The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

> **Warning:** The default turns the digital outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default settings.

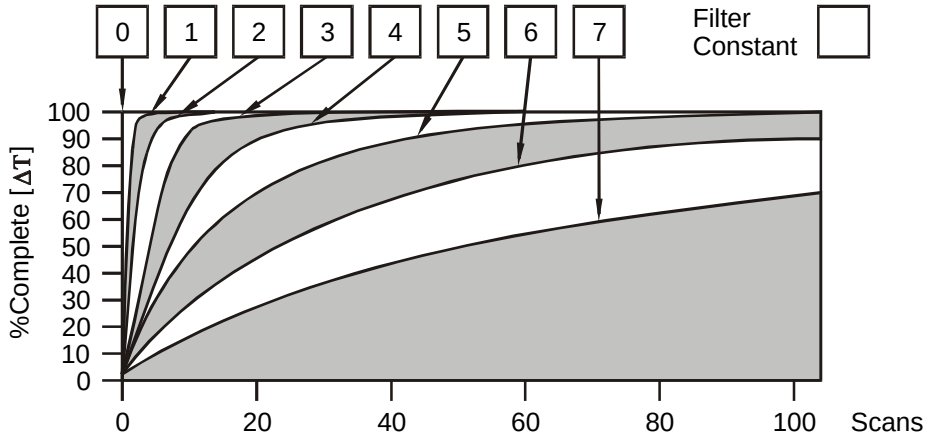
2. For Analog Outputs: The default sets the output values to zero when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to a specific value or hold the last value. Generally, most applications use the default settings.

> **Warning:** The default sets the output values to zero when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

3. For Analog Inputs:
Filter Constant sets the level of digital filtering according to the following chart.

I/O Map Tab

The I/O Map describes which I/O registers are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.



Digital Filtering. The illustration above demonstrates the effect of digital filtering (set with Fillter Constant) on module response to a temperature change.

5 ANALOG INPUT and OUTPUT CONVERSION FACTORS

5.1 Input Conversion Factor

The following table describes how real-world inputs are scaled into the controller. Given a known input current, the data value is configured by using the conversion factor from the table. The following formula is used: **Data = Input Current (mA) / Conversion Factor**

Example: The user selects a current range of 0 to +20mA:

1. The known input current is 14mA.
2. Using the table, the conversion factor for the current range of 0 to +20mA is 0.000625.
3. To determine the data value, the formula is used:
   Data = Input Current (mA) / Conversion Factor
   22400 = 14mA / 0.000625

Conversion of Real-World Inputs into Controller			
Selected Current Range	**Input Current (mA)**	**Data**	**Conversion Factor**
0 to +20mA	+20.47	32752	0.000625
	+20.00	32000	
	0	0	

5.2 Output Conversion Factor

The following table describes how program data values are scaled to real-world analog voltage outputs by the module. Given a desired output current, the data value is converted by using the conversion factor from the table. The following formula is used: **Data = Output Current (mA) / Conversion Factor**

Example: The user selects a current range of +20mA:

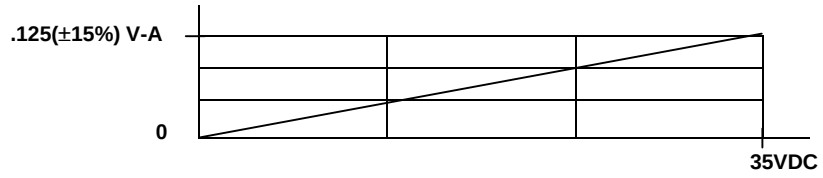
1. The desired output current is 12mA.
2. Using the table, the conversion factor for the current range of +20 mA is 0.000625.
3. To determine the data value, the formula is used:
   Data = Output Current (mA) / Conversion Factor
   19200 = 12mA / 0.000625

Conversion of Real-World Outputs into Controller			
Selected Current Range	**Output Current (mA)**	**Data**	**Conversion Factor**
0 to +20mA	+20.47	32752	0.000625
	+20.00	32000	
	0	0	

6 INPUT / OUTPUT CHARACTERISTICS

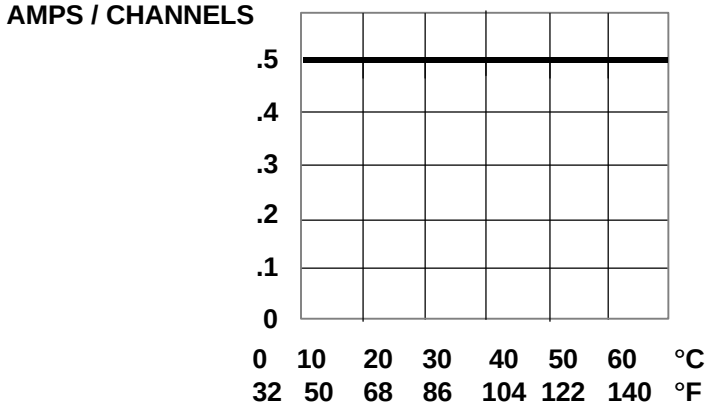
6.1 Digital Input

Digital Input Chart

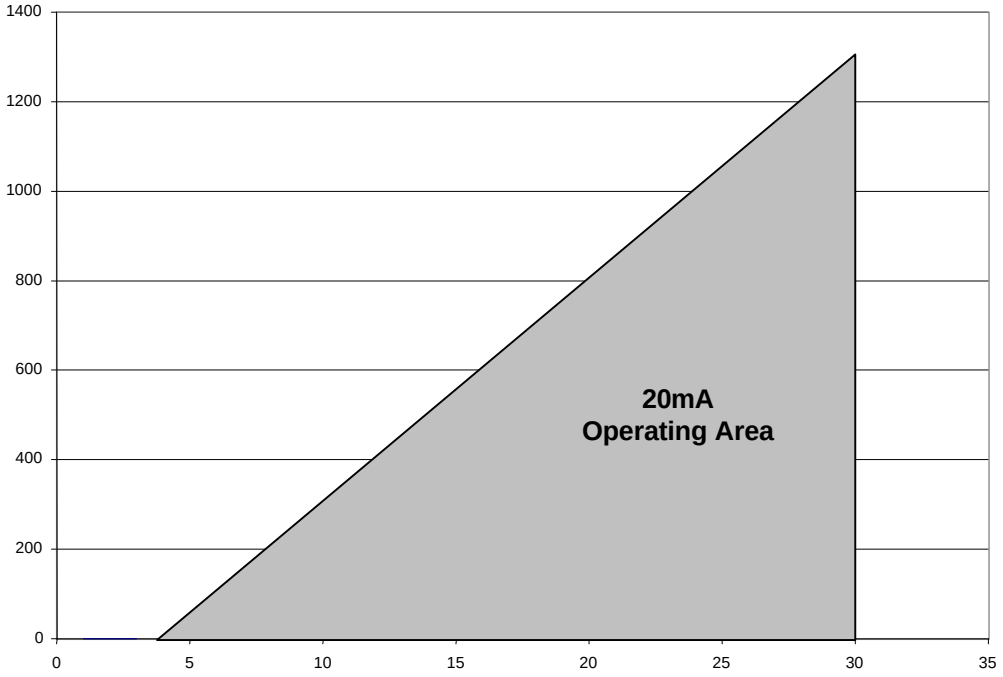


6.2 Digital Output

Derating Output Chart



6.3 Operating Area



7 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

8 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

NOTES

24VDC Bipolar Digital In
10-30VDC, 0.5A Sourcing Digital Out
4-20mA Isolated Analog In/Out
IC300MIX912

1 SPECIFICATIONS

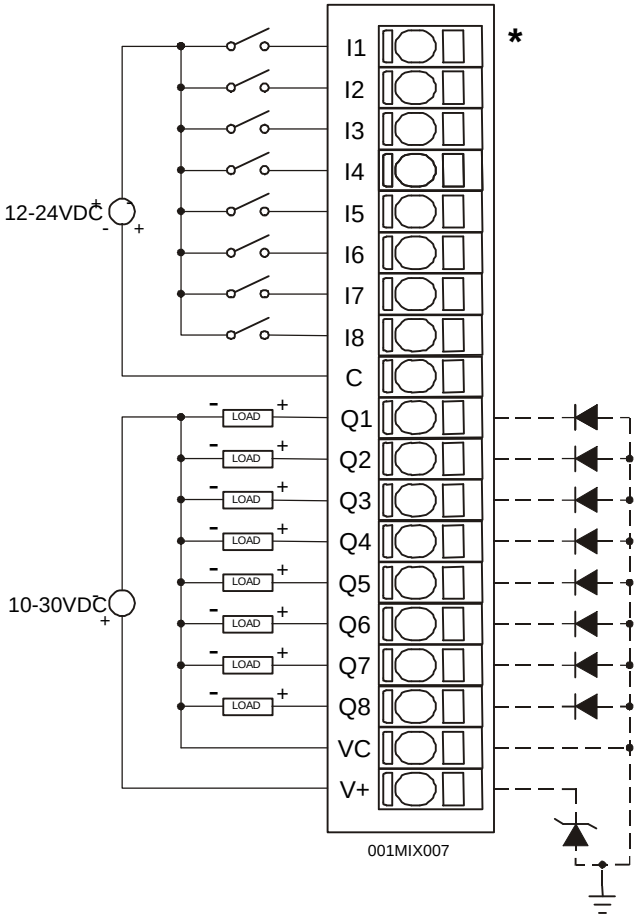
ANALOG INPUT	MIX912		MIX912
Number of Channels	4	Analog Inputs Input Points Required	4
Input Ranges	Nominal: 4-20mA	Conversion Time (PLC Update Rate)	All channels updated once per PLC scan.
Resolution	12-Bits	Analog Isolation Channel to Channel and Channel to Common	1000VDC
Input Burden	50 Ohms + 3VDC, Clamped @ 6VDC, 35mA Max. Continuous	Additional error for temperatures other than 25°C	0.01% / °C
Maximum Error at 25°C	0.1%	Maximum Over-Current	35mA
DIGITAL INPUT	**MIX912**		**MIX912**
Inputs per Module	8	Input Characteristics	Bidirectional
Commons per Module	1	Input Impedance	10K Ohms
Input Voltage Range	12-24VDC	Minimum ON Current	1mA
Peak Voltage	35VDC Max.	Maximum OFF Current	200µA
Channel to channel and Channel to common	500VDC	OFF to ON Response	1ms.
ON Voltage Level	9VDC Minimum	ON to OFF Response	1ms.
OFF Voltage Level	3VDC Maximum		
ANALOG OUTPUT	**MIX912**		**MIX912**
Number of Channels	2	Analog Outputs; Output Points Required	2
Output Range	Nominal: 4-20mA Clamped @-0.5 - +30VDC	Conversion Time (PLC Update Rate)	All channels updated once per PLC scan.
Resolution	12 Bits	Isolation Channel to Channel and Channel to Common	1000VDC
Maximum Error at 25°C	0.3%	Additional error for temperatures other than 25°C	0.01% / °C
		Output Voltage	4 - 30VDC
DIGITAL OUTPUT	**MIX912**		**MIX912**
Outputs per Module	8	Maximum Inrush Current	650mA per channel
Commons per Module	1	Minimum Load	None
Operating Voltage	10 - 30VDC	OFF to ON Response	1ms.
Output Type	Sourcing / 10K Pull-Down	ON to OFF Response	1ms.
Peak Voltage	30VDC Max.	Output Characteristics	Current Sourcing
Maximum Load Current per Output	0.5A Max.	Output Protection	Short Circuit
Maximum Total Output	4A		

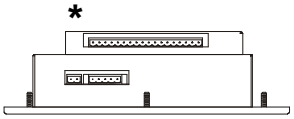
GFK-1840A

General Specifications			
	MIX912		**MIX912**
Required Power (Steady State)	0.48W (20mA @ 24VDC)	CE	GFK-1755
Required Power (Inrush)	Negligible	UL	GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
Operating Temperature	0° to 60° Celsius	Weight	9.5 oz. (270 g)

2 WIRING

2.1 Digital Input / Output (P1)

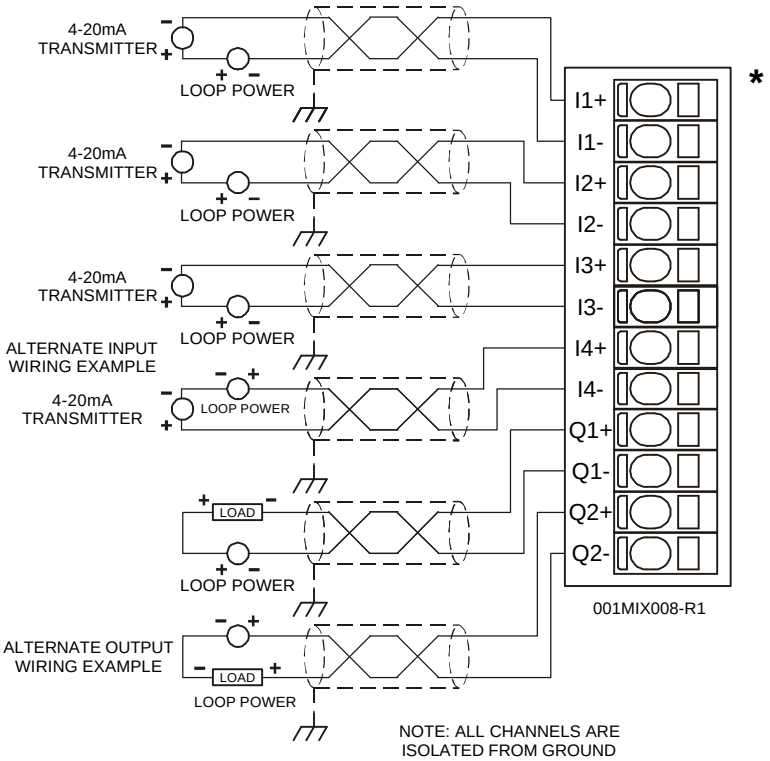


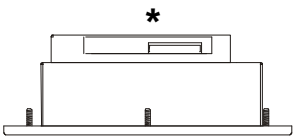


OCS Bottom View – Shows Corresponding I/O Pin

Pin	Digital Input / Output MIX912 - P1
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C1	Common (Isolated)
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
VC	Load Power Common
V+	Load Voltage +

2.2 Analog Input / Output (P2)

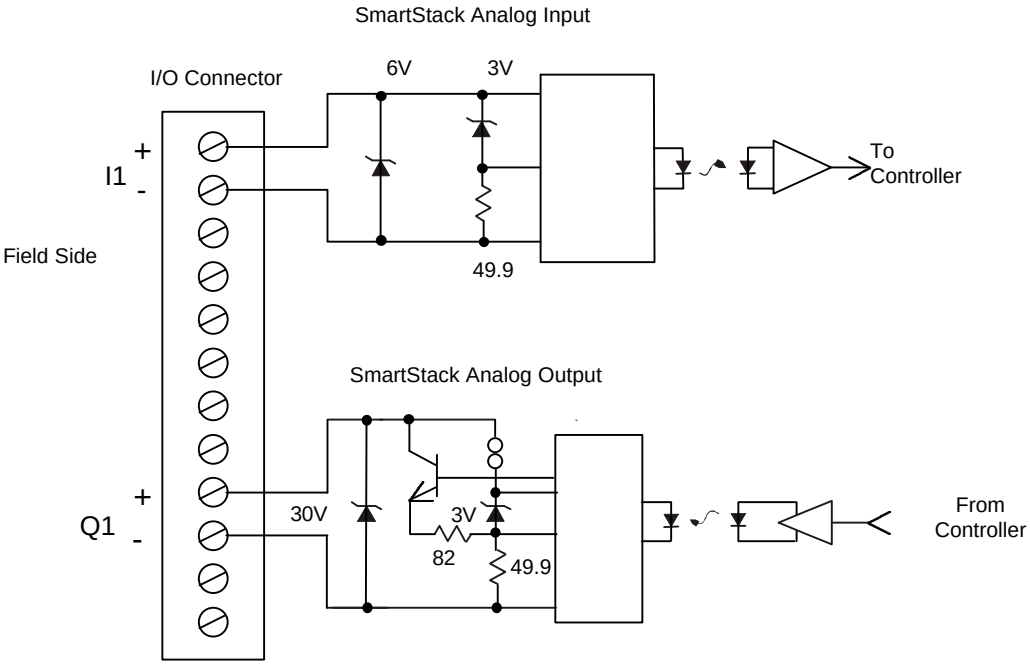




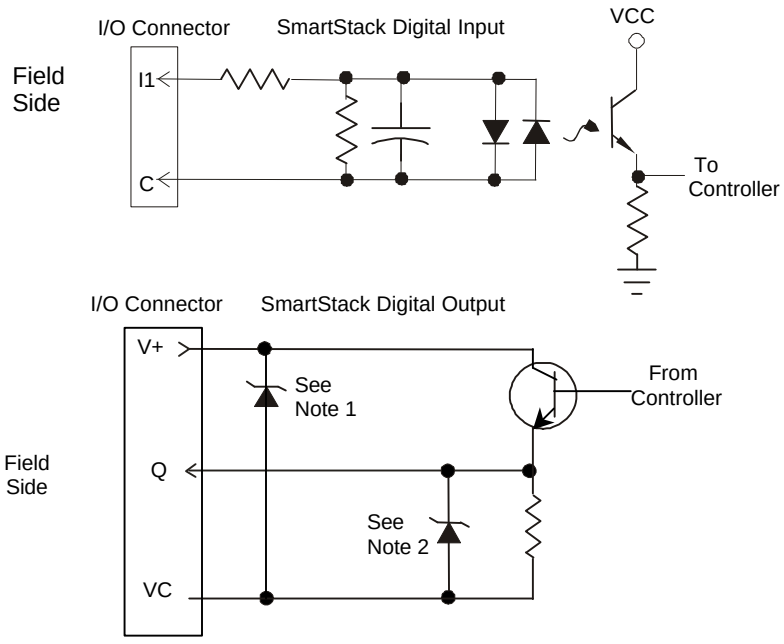
OCS Top View – Shows Corresponding I/O Pin

Pin	Analog Input / Output Signal
	MIX912
I1+	Input 1+
I1-	Input 1-
I2+	Input 2+
I2-	Input 2-
I3+	Input 3+
I3-	Input 3-
14+	Input 4+
14-	Input 4-
Q1+	Output 1+
Q1-	Output 1-
Q2+	Output 2+
Q2-	Output 2-

3 INTERNAL CIRCUIT SCHEMATIC



Specification for transient voltage suppressors (transorbs) used on output circuitry is 30V, 300W.



Note 1: Specification for transient voltage suppressors (transorbs) used on output circuitry is 33V, 1500W.

Note 2: Specification for transient voltage suppressors (transorbs) used on output circuitry is 33V, 300W.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Module Setup Tab

The **Module Setup** is used in applications where it is necessary to change the default states or values of the outputs when the controller (e.g., OCS100) enters idle/stop mode.

1. For Digital Outputs: The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

Warning: The default turns the digital outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default settings.

2. For Analog Outputs: The default sets the output values to zero when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to a specific value or hold the last value. Generally, most applications use the default settings.

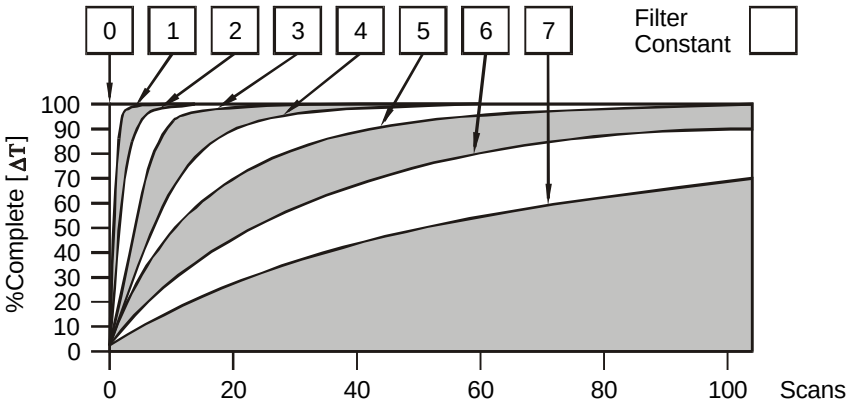
Warning: The default sets the output values to zero when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

3. For Analog Inputs:

Filter Constant sets the level of digital filtering according to the following chart.

I/O Map Tab

The I/O Map describes which I/O registers are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.



Digital Filtering. The illustration above demonstrates the effect of digital filtering (set with Filter Constant) on module response to an input change.

5 ANALOG INPUT / OUTPUT CHARACTERISTICS

5.1 Input Conversion Factor

The following table describes how real-world inputs are scaled into the controller. Given a known input current, the data value is configured by using the conversion factor from the table. The following formula is used: **Data = Input Current (mA) / Conversion Factor**

Example:

1. The known input current is 14mA.
2. Using the table, the conversion factor for the current range of 4 to +20mA is 0.000625.
3. To determine the data value, the formula is used:
   Data = Input Current (mA) / Conversion Factor
   22400 = 14mA / 0.000625

Conversion of Real-World Inputs into Controller			
Selected Current Range	**Input Current (mA)**	**Data**	**Conversion Factor**
4 – 20mA	20.00	32000	0.000625
	4.00	6400	

5.2 Output Conversion Factor

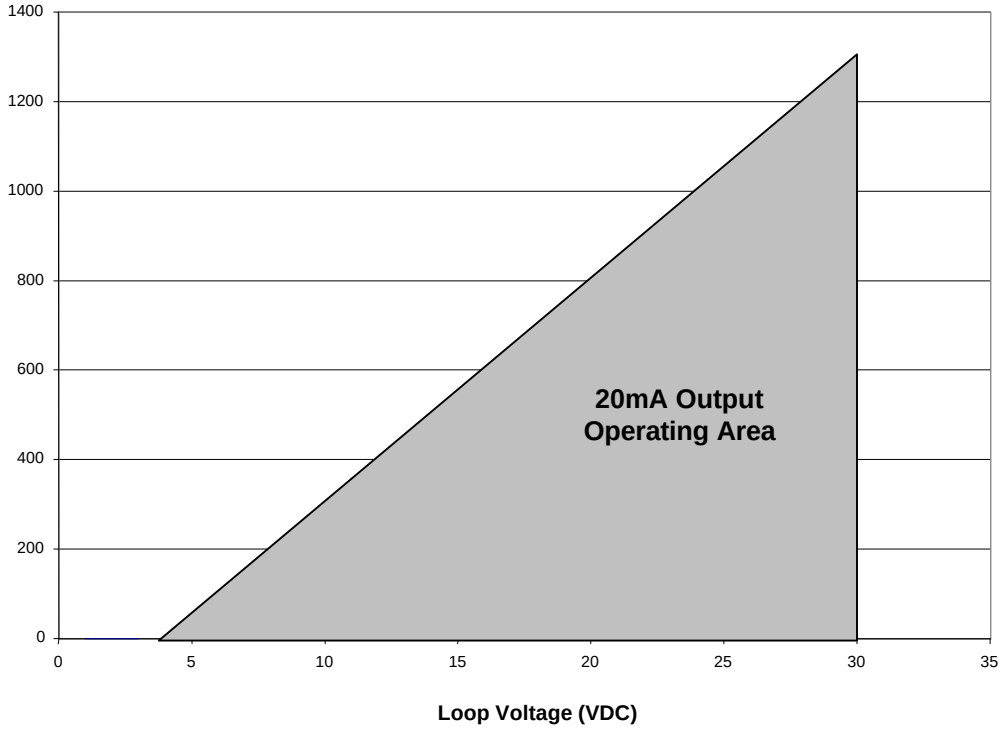
The following table describes how program data values are scaled to real-world analog voltage outputs by the module. Given a desired output current, the data value is converted by using the conversion factor from the table. The following formula is used: **Data = Output Current (mA) / Conversion Factor**

Example:

1. The desired output current is 12mA.
2. Using the table, the conversion factor for the current range of +20 mA is 0.000625.
3. To determine the data value, the formula is used:
   Data = Output Current (mA) / Conversion Factor
   19200 = 12mA / 0.000625

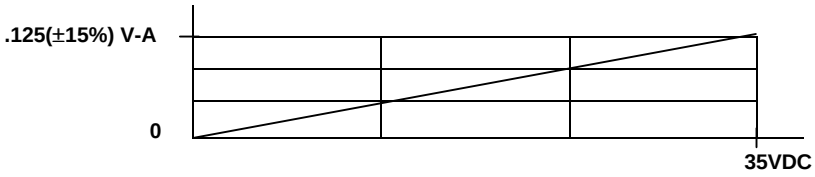
Conversion of Real-World Outputs into Controller			
Selected Current Range	**Output Current (mA)**	**Data**	**Conversion Factor**
4 to 20mA	20.00	32000	0.000625
	4.00	6400	

5.3 Output Operating Area

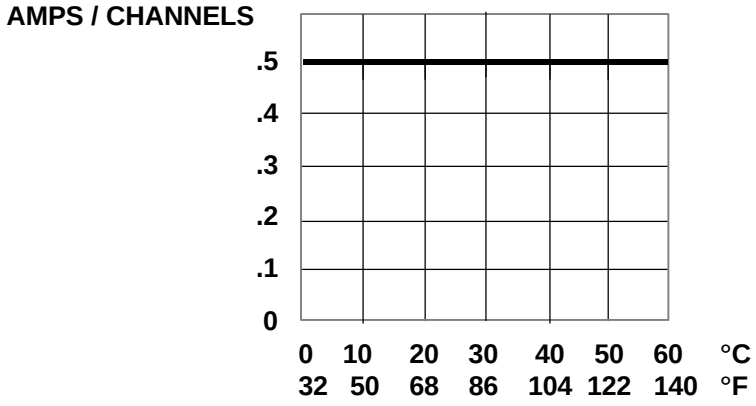


6 DIGITAL INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart



Derating Chart



7 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards should be followed in the installation of this product.
b. Shielded, twisted-pair wiring should be used for best performance.
c. Shields may be terminated at the module terminal strip.
d. In severe applications, shields should be tied directly to the ground block within the panel.
e. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

8 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

Temperature I/O Module

IC300MIX963

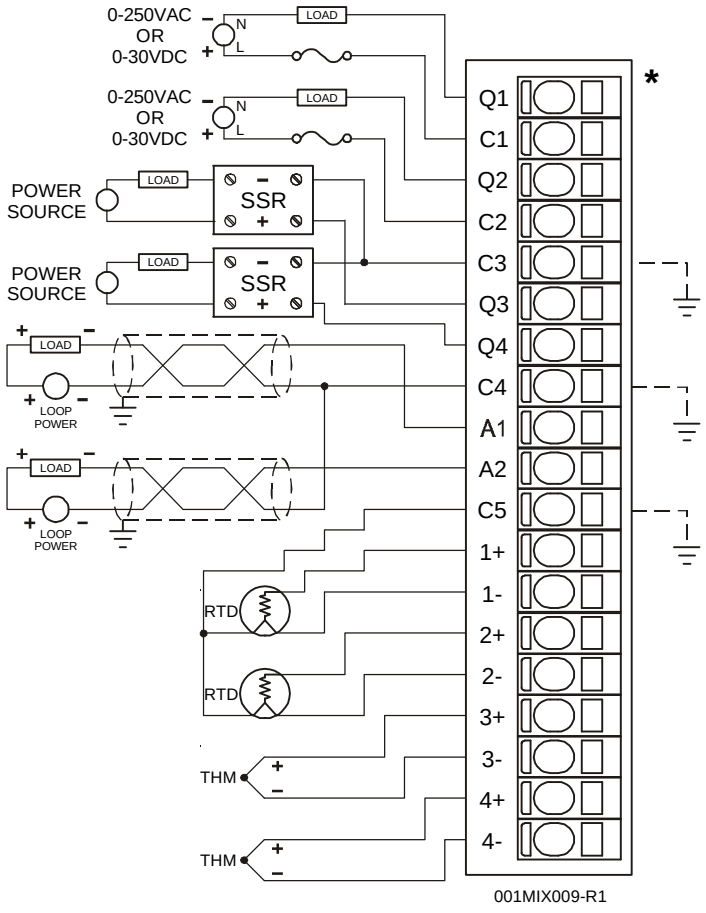
1 SPECIFICATIONS

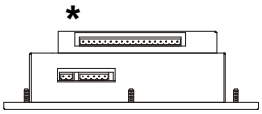
Relay Outputs	MIX963			MIX963
Number of Channels	2 N.O. Relays		Maximum Load Current (resistive) per channel	10A Max.
Commons per Module	2		Maximum Leakage Current	5µA
Digital Output Registers Consumed by Cscape (%Q)	1,2 of 8		ON Voltage Level	0.15V
Isolation (Channel to Channel) (Channel to Common)	500VDC 400VDC		OFF to ON Response	10ms Max.
Output Type	N.O.		ON to OFF Response	5ms. Max.
Maximum Load Voltage	250VAC or 30VDC Max.		Protection	Transient voltage suppressor across contacts.
Analog Outpus	**MIX963**			**MIX963**
Number of Channels	2		Analog Output Registers Consumed by Cscape (%AQ)	2
Commons per Module	1			
Output Ranges (including over-range)	20.47mA; Clamped @-0.5 - +33VDC Nominal		Additional error for temperatures other than 25°C	0.01% / °C
Resolution	12 Bits		Maximum Error at 25°C	0.1%
Output Voltage	4 - 30VDC		Load Impedance	≤ 1.1kΩ @ 24VDC Loop Voltage
SSR Driver	**MIX963**			**MIX963**
Number of Channels	2		Minimum Load	None
Commons per Module	1		OFF to ON Response	1ms.
Digital Output Registers Consumed by Cscape (%Q)	3,4 of 8		ON to OFF Response	1ms.
Output Type	Sourcing		Output Characteristics	Current Sourcing
Output Voltage	12VDC Min.		Output Protection	Transient voltage suppressors
Maximum Load Current per Output	15mA internally limited			

GFK-1817A

MIX963 Specifications Continued					
Thermocouple Inputs	**MIX963**			**MIX963**	
Number of Channels	4		A/D Conversion Time	16 channels/second	
Commons per Module	1 (for grounding shielded T/Cs only)		Analog Input Registers Consumed by Cscape (%AI)	4	
Input Impedance	20Meg Ohm clamped @ ±24VDC		PLC Update Rate	Set by PLC Scan Rate	
A/D Conversion Type	Integrating		Cold Junction	Internal	
Types Supported	J, K, T, & E				
Open Thermocouple Response	High Temperature		Maximum Sustained Differential O/L	±15VDC	
Thermocouple Common Mode Range	-10.5VDC to + 12VDC		Resolution	0.05°C	
Thermocouple Type	**J**	**K**		**T**	
Input Range Temperature	-210°C to 770°C (-346°F to 1418°F)	-270°C to 1380°C (-454°F to 2516°F)		-270°C to 410°C (-454°F to 770°F)	
	E				
	-270°C to 1010°C (-454°F to 1850°F)				
Accuracy of: Types J, K, T, & E	**Typical:** 25°C	±1°C	**Under Extremes:** 0°C, 60°C, or full load	**J:** ±5°C **K:** ±3°C	**E:** ±1°C **T:** ±4°C
Note: Accuracy Specifications not guaranteed below -100°C for Thermocouple.					
RTD Inputs					
Number of Channels	4		Input Transient Protection	Zener/Capacitor	
Commons per Module	1		Resolution	0.05°C	
Analog Input Registers Consumed by Cscape (%AI)	4		RTD Types Supported	PT100 (100 Ohms at 0°C, Platinum, Alpha 0.00385, DIN43760)	
RTD Excitation Current	200µA, 25% duty cycle		Input Impedance	10Meg Ohm clamped @ ±24VDC	
RTD Short	Indefinite		Input Range	-206.2°C to +856.8°C	
Notch Filter	50-60 Hz. Software Selectable		PLC Update Rate	Set by PLC Scan Rate	
A/D Conversion Time	8 channels/second		Accuracy	± 1°C	
A/D Conversion Type	Integrating		Channel-to-Channel Tracking	0.1°C	
General Specifications					
Required Power (Steady State)	1.92W (80mA @24VDC)		UL	GFK-1754	
Required Power (Inrush)	Negligible		Terminal Type	Spring Clamp, Removable	
Relative Humidity	5 to 95% Non-condensing		Weight	9.5 oz. (270 g)	
Operating Temperature	0° to 60° Celsius				

2 WIRING





OCS Bottom View – Shows Corresponding I/O Pin

Pin	MIX963 Signal
Q1	Relay 1 NO Contact
C1	Relay 1 NO Contact
Q2	Relay 2 NO Contact
C2	Relay 2 NO Contact
C3	SSR Common
Q3	SSR Source 1
Q4	SSR Source 2
C4	20mA Analog Output Common
A1	20 mA Analog Output 1
A2	20mA Analog Output 2
C5	THM Shield or RTD Common
1+	THM/RTD Channel 1+
1-	THM/RTD Channel 1-
2+	THM/RTD Channel 2+
2-	THM/RTD Channel 2-
3+	THM/RTD Channel 3+
3-	THM/RTD Channel 3-
4+	THM/RTD Channel 4+
4-	THM/RTD Channel 4-

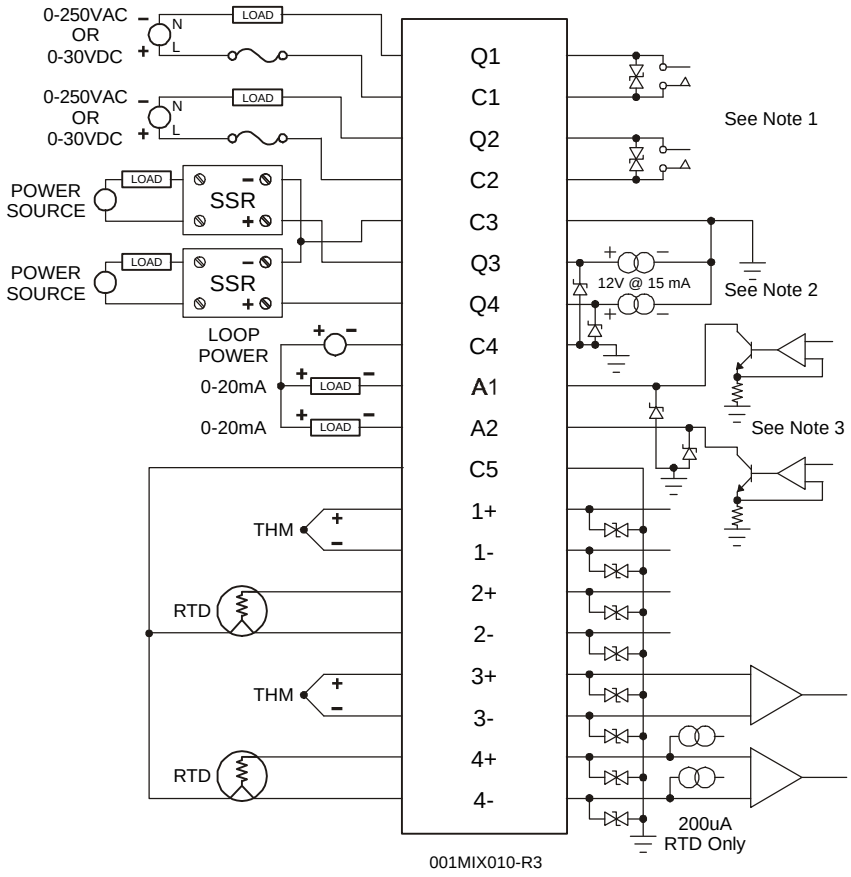
Note regarding Pin C5: The pin is not a THM common but is a thermocouple shielding termination point.

Note: All temperature inputs can be either Thermocouple or RTD inputs.

Warning: Connecting high voltage to any I/O pin may cause high voltage to appear at other I/O pins.

Warning: Wiring the line side of the AC source to loads connected to outputs Q1 through Q2 and the neutral side of the AC source to the output common(s) create a Negative Logic condition, which may be considered an unsafe practice.

3 INTERNAL CIRCUIT SCHEMATIC



Note 1: Specification for transient voltage suppressors (transorbs) used on output circuitry is 400VDC bi-directional 400 watts.

Note 2: Specification for transient voltage suppressors (transorbs) used on output circuitry is 15VDC, 300 watts.

Note 3: Specification for transient voltage suppressors (transorbs) used on output circuitry is 30VDC, 500 watts.

Electro-mechanical relays comply with IEC1131-2.

4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

Module Setup Tab

The **Module Setup** is used in applications where it is necessary to change the default states or values of the outputs when the controller (e.g., OCS100) enters idle/stop mode.

1. For Digital Outputs: The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

> **Warning:** The default turns the digital outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default settings.

The digital outputs are assigned as follows assuming a start at %Q1:

%Q1 Relay 1
%Q2 Relay 2
%Q3 SSR Drive 1
%Q4 SSR Drive 2

2. For Analog Outputs: The default sets the output values to zero when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to a specific value or hold the last value. Generally, most applications use the default settings.

> **Warning:** The default sets the output values to zero when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

3. For Temperature Setup

a. Sensor Type for each channel must match what is physically attached.

b. Temperature format may be set for various C° or F° ranges.

c. Filter Constant sets the level of digital filtering according to the chart below.

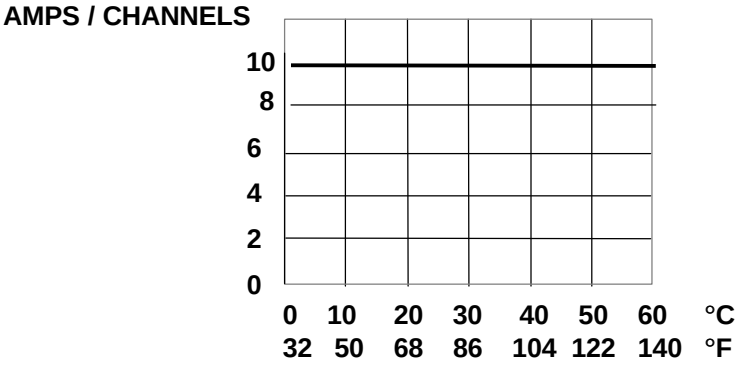
d. Reject Rates sets the frequency level for noise rejection at 50 or 60HZ.

I/O Map Tab

The I/O Map describes which I/O registers are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

5 RELAY OUTPUT CHARACTERISTICS

Derating Chart for Relay Outputs



Typical Relay Life (Number of Cycles)			
Voltage and Load Type	Load Current		
	1 Amp	5 Amp	10 Amp
30VDC Resistive	800K	180K	100K
30VDC Inductive	500K	100K	Not Rated
250VAC Resistive	800K	180K	100K
250VAC Inductive	500K	100K	Not Rated

6 ANALOG OUTPUTS

6.1 Conversion Factor

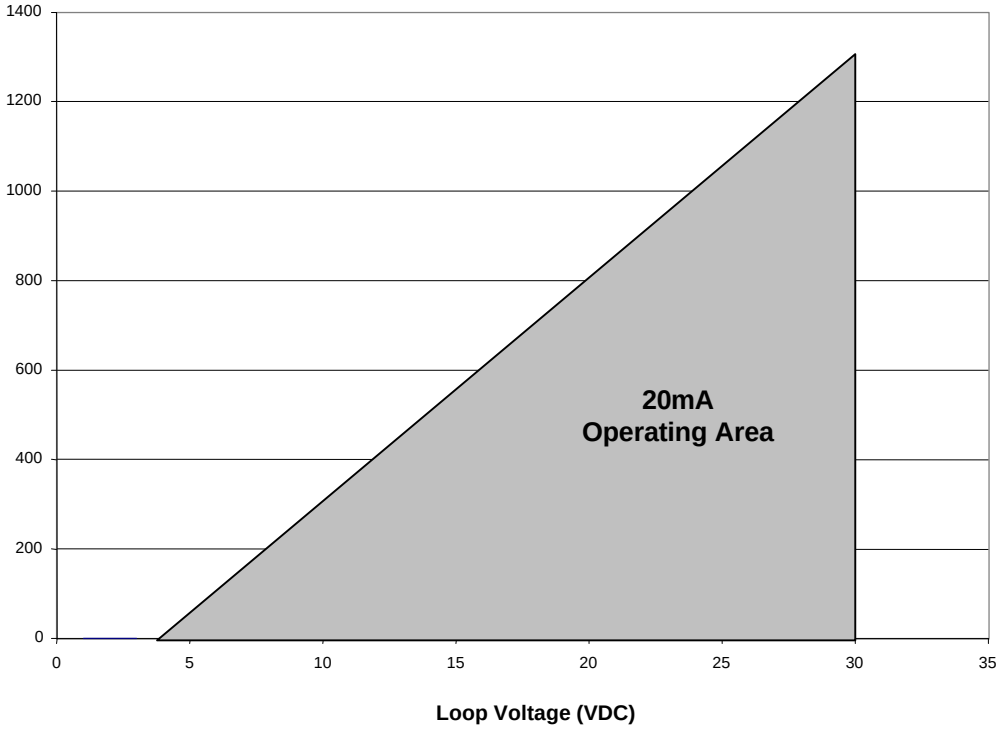
The following table describes how program data values are scaled to real-world analog voltage outputs by the module. Given a desired output current, the data value is converted by using the conversion factor from the table. The following formula is used: **Data = Output Current (mA) / Conversion Factor**

Example:

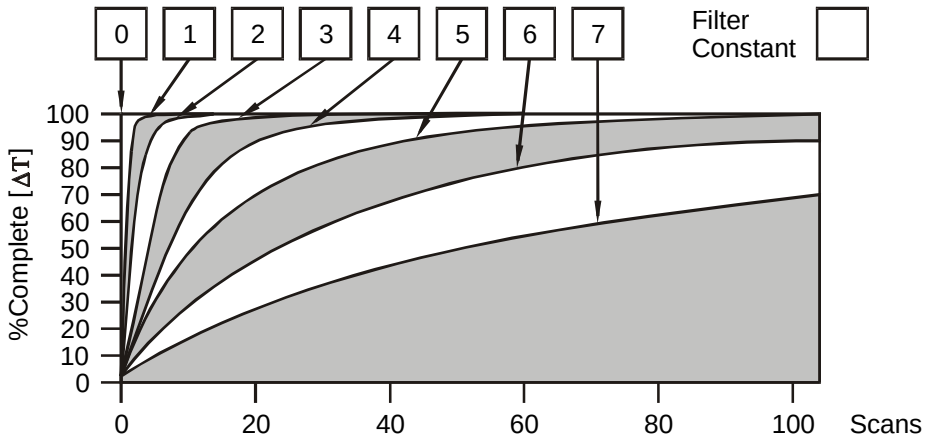
1. The desired output current is 12mA.
2. Using the table, the conversion factor for the current range of +20 mA is 0.000625.
3. To determine the data value, the formula is used:
   Data = Output Current (mA) / Conversion Factor
   19200 = 12mA / 0.000625

Conversion of Real-World Outputs into Controller			
Selected Current Range	Output Current (mA)	Data	Conversion Factor
0 to +20mA	+20.47	32752	0.000625
	+20.00	32000	
	0	0	

6.2 Operating Area



7 THERMOCOUPLE / RTD SCALING & CONVERSION FACTOR



Digital Filtering. The illustration above demonstrates the effect of digital filtering (set with Filter Constant) on module response to a temperature change.

For a given module configuration, use the appropriate formula in the table to obtain the actual temperature (°C or °F) that is represented by the value in the %AI register.

Thermocouple or RTD Configuration	Temperature Conversion	
	Celsius	Fahrenheit
0.05°	°C = %AI / 20 *	°F = %AI / 20 *
0.1°	°C = %AI / 10	°F = %AI / 10
0.5°	°C = %AI / 2	°F = %AI / 2
* Maximum reading in 0.05°F or 0.05°C format is limited to 1638.3 because of %AI resolution.		

8 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards should be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.
c. Shielded, twisted-pair wiring should be used for best performance.
d. Shields may be terminated at the module terminal strip.
e. In severe applications, shields should be tied directly to the ground block within the panel.
f. Interposing electrical devices (such as relays) in the analog signal path (RTD, Thermocouple) can cause errors due to resistive imbalance.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

When found on a product, the following symbols specify:

Warning: Consult user documentation.

Warning: Electrical Shock Hazard.

9 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

AC Power Monitor

Voltage Inputs
Current Inputs
IC300ACM200

1 SPECIFICATIONS

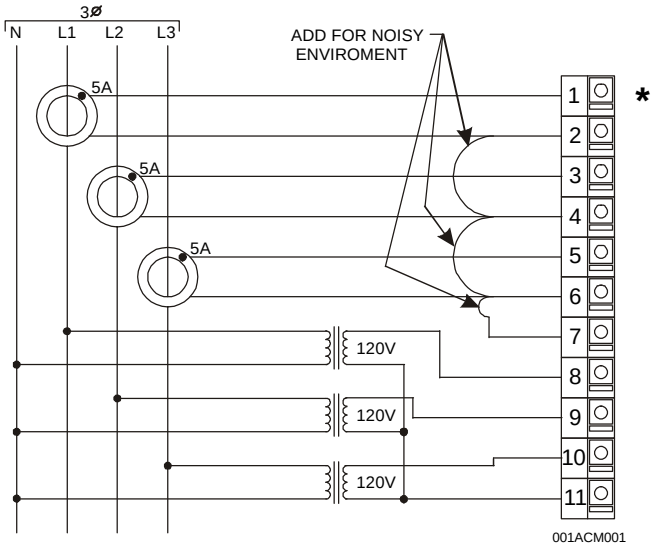
VOLTAGE INPUTS			
Input Range	120 three-phase Wye, 208V line to line	**Input Impedance**	1 Megohm to ground; External Potential Transformers (PTs) required
Overrange	50%	**Input Frequency**	50 to 70Hz
Conversion Time	Voltage values updated once per PLC scan	**Voltage Measurement**	Average scaled to RMS sine wave equivalent
Accuracy	0.2%	**Voltage Resolution**	0.1V
Filter Delay	Less than 2 line cycles	**Frequency**	Referenced to L1
Phase Accuracy	0.2°	**Frequency Resolution**	0.01Hz
Phase	Referenced to L1	**Frequency Accuracy**	0.1%
Phase Resolution	0.1°	**Frequency Measurement**	Values updated once per line cycle
Phase Measurement	Values updated once per line cycle		
CURRENT INPUTS			
AC Current	Three-phase 5A, External Current Transformers (CTs) required	**Common Mode**	1Vrms maximum to common. Each CT low input must be returned to common directly or through a suitable monitoring switch unit.
Overrange (See Note 1)	6A continuous 10A / 10 seconds.	**Input Frequency**	50 to 70Hz
Input Impedance	0.1 ohm, 1VA burden at 100%overload	**Current Measurement**	Average scaled to RMS sine wave equivalent
Accuracy	0.2%	**Resolution**	0.005A
Conversion Time	Current values updated once per PLC scan	**Filter Delay**	Less than 2 line cycles
Phase	Referenced to L1 voltage channel	**Phase Accuracy**	0.2°
Phase Resolution	0.1°	**Phase Measurement**	Values updated once per line cycle
Differential Phase	**See Note 2**	**Differential Phase Resolution**	0.1°
Differential Phase Accuracy	0.2°		
GENERAL SPECIFICATIONS			
Required Power (Steady State)	1.5 W (60mA @ 24VDC)	Relative Humidity	5 to 95% Non-condensing
Required Power (Inrush)	80mA @ 24VDC	Operating Temperature	0° to 60° Celsius
Connectors	Fixed, front access, spring	Weight	9 oz. (256 g)
Terminal Type	Spring Clamp, Removable	UL	GFK-1754

Note 1: As an option, a measured, 60A, 1 second overload is available on current inputs. For this option, current amplitude accuracy is 1.0% up to 60A. Current phase accuracy also changes to 1 degree. Voltage phase accuracy is not affected

Note 2: Unit reports phase difference between itself and the next lower adjacent unit on the stack. Phase difference is the relative phase between L1 channels. If all four modules on stack are AC Monitor modules, the bottom unit reports the phase difference between itself and the top unit.

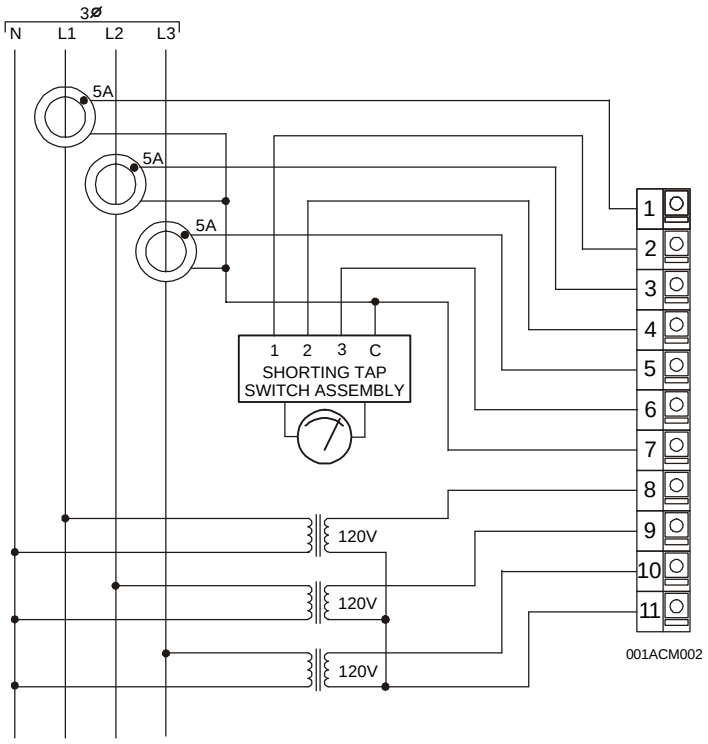
GFK-1815B

2 WIRING

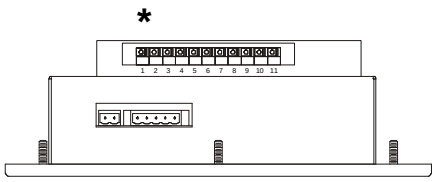


CT Mode: Return through Monitoring Switch

Warning: Connecting high voltage to any I/O pin may cause high voltage to appear at other I/O pins.



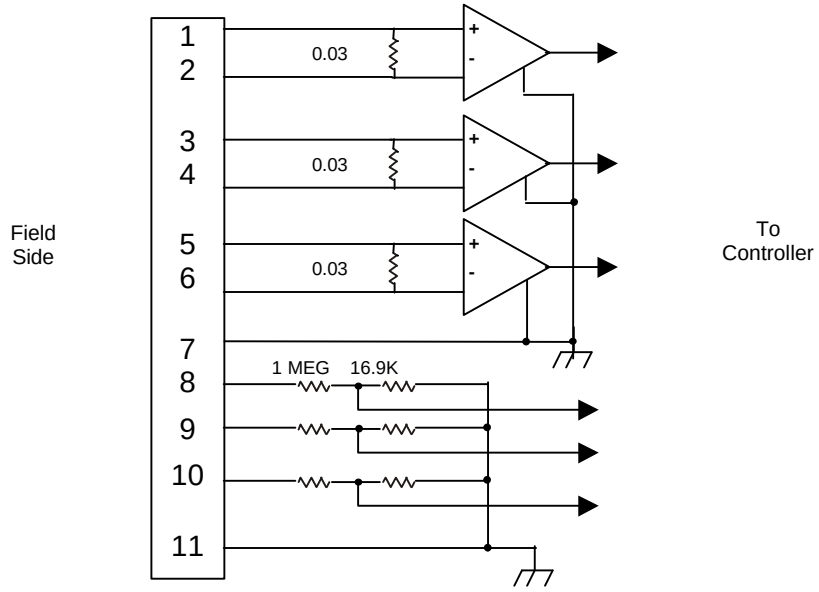
CT Mode: Return to Common Directly



OCS Bottom View – Shows corresponding I/O pin location for Pin 1. Also applies to RCS and Graphical OCS units.

Pin #	ACM200
1	Current Phase 1 In
2	Current Phase 1 Out
3	Current Phase 1 In
4	Current Phase 1 Out
5	Current Phase 1 In
6	Current Phase 1 Out
7	Current Sense Common (Connected to bus common)
8	Voltage Phase 1
9	Voltage Phase 2
10	Voltage Phase 3
11	Voltage Common (Connected to bus common)

3 INTERNAL CIRCUIT SCHEMATIC



4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

4.1 Software Configuration

Preliminary configuration procedures that are applicable to all SmartStack™ Modules are located in the Control Station Hardware Manual (GFK-1631).

I/O Map Tab

The I/O Map describes which I/O registers are assigned to a specific SmartStack™ Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack™. The I/O Map is not edited by the user.

Phase and frequency values are referenced to the L1 voltage input.

%AI1	L1 Voltage Value
%AI2	L2 Voltage Value
%AI3	L3 Voltage Value
%AI4	L1 Current Value
%AI5	L2 Current Value
%AI6	L3 Current Value
%AI7	Differential Phase
%AI8	L2 Voltage Phase
%AI9	L3 Voltage Phase
%AI10	L1 Current Phase
%AI11	L2 Current Phase
%AI12	L3 Current Phase
%AI13	Frequency

5 INPUT CONVERSION FACTOR

a. Scaling Inputs

The following table describes how real-world inputs are scaled into the controller. Given a known input voltage, the data value is configured by using the conversion factor from the table. The following formula is used: **Data = Voltage In (Vin) / Conversion Factor**

Example: The user selects a voltage of 120 Volts.

1. The known input voltage is 120 Volts.
2. Using the table, the conversion factor for 120 Volts is **0.1**.
3. To determine the data value, the formula is used: Data = Vin / Conversion Factor
   1200 = 120Volts / 0.1

Conversion of Real-World Inputs into Controller			
Range	**Input**	**%AI Value**	**Conversion Factor**
120 Volts	0	0	0.1
	120	1200	
5 Amps	0	0	0.005
	5	1000	
Frequency	60	6000	0.01
Phase	0	0	0.1
	- 180	- 1800	
	+ 180	+ 1800	

b. Calculation of Additional Power System Values

Using the %AI registers listed in Section 4.1:

Volt-Amperes for phase 1, VA1, is %AI1 times %AI4 divided by 2000
Volt-Amperes for phase 2, VA2, is %AI2 times %AI5 divided by 2000
Volt-Amperes for phase 3, VA3, is %AI3 times %AI6 divided by 2000
Total Volt-Amperes, VA, is the sum of VA1 plus VA2 plus VA3

Watts for phase 1, W1, is the product of VA1 and the cosine of the product of 0.0017453 and %AI10
Watts for phase 2, W2, is the product of VA2 and the cosine of the product of 0.0017453 and the difference between %AI8 and %AI11
Watts for phase 3, W3, is the product of VA3 and the cosine of the product of 0.0017453 and the difference between %AI9 and %AI12
Total power, W, is the sum of W1 plus W2 plus W3

Power Factor, PF, is W divided by VA
VAR is VA minus W

KWhr can be accumulated by setting a timer to trigger a calculation every 100 milliseconds for instance. The calculation consists of dividing W by 10, the reciprocal of the calculation interval in seconds and adding the result to a running Watt-second total, WS. Divide WS by 3,600,000 to display KWhr.

6 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards should be followed in the installation of this product.
b. Shielded, twisted-pair wiring should be used for best performance.
c. Shields may be terminated at the module terminal strip.
d. In severe applications, shields should be tied directly to the ground block within the panel.
e. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

7 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

NOTES

ASCII Basic Module

IC300ASC100

3 High Speed Communication Ports

This product also has a detailed supplement **(GFK-1666)** available.

1 SPECIFICATIONS

	ASC100			ASC100
Number of communication ports	3 (2 RS232, 1 RS485/422)		User Memory for BASIC ***program*** storage	32K bytes
Status LEDs	RXD/TXD for all ports RUN (BASIC program)		User Memory for BASIC ***data*** storage	32K bytes

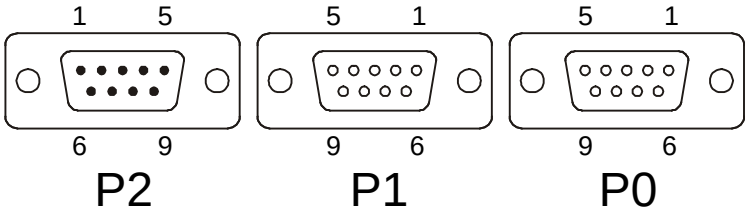
General Specifications			
Required Power (Steady State)	0.22W (9.35mA @ 24VDC)	CE	Refer to GFK-1755
Required Power (Inrush)	0.53W (22.4mA @ 24VDC)	UL	Refer to GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	9-Pin D-Subs
Operating Temperature	0° to 60° Celsius	Weight	9.5 oz. (270 g)

2 WIRING

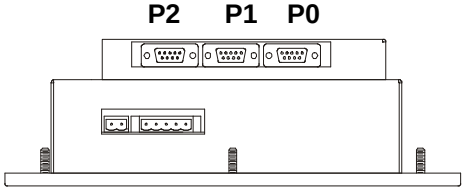
Note: Port 1 and Port 2 share internal communication circuitry. Only one of the ports can be used to transfer data at a time.

Direction	Pin	ASC100 Port 0/1
Output	1	**DCD** (Data Carrier Detect)
Output	2	**RXD** (Receive Data)
Input	3	**TXD** (Transmit Data)
Input	4	**DTR** (Data Terminal Ready)
GND	5	**Signal Ground**
Output	6	**DSR** (Data Set Ready)
Input	7	**CTS** (Clear to Send)
Output	8	**RTS** (Request to Send)
Output	9	**RI** (Ring Indicate)

Note: For ports 0 and 1, the signal names reflect the EIA RS232 signal names for a DCE device. The names do not necessarily reflect the signal direction with respect to the ASC100 module.



Direction	Pin	ASC100 Port 2
Input	1	**RXD-** (Receive Data -)
Output	2	**TXD-** (Transmit Data -)
Output	3	**CTS-** (Clear to Send -)
Input	4	**RTS-** (Request to Send -)
GND	5	**GND** (Signal Ground)
Input	6	**RXD+** (Receive Data +)
Output	7	**TXD+** (Transmit Data +)
Output	8	**CTS+** (Clear to Send +)
Input	9	**RTS+** (Request to Send +)



OCS Bottom View – Shows Corresponding I/O Pin

3 CONFIGURATION

See the Supplement for the SmartStack ASCII BASIC Module (GFK-1666**)** for configuration, wiring, and other pertinent data.

4 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

5 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

NOTES

Ethernet Communications Module

IC300ETN100
Ethernet Communications

This product has a detailed supplement available (GFK-1784).

1 SPECIFICATIONS

	ETN100			ETN100
Communication ports	10 Base-T Ethernet		Modes Supported	Half or Full Duplex
Status LEDs	Receive Transmit Collision Link OK		Size of a Single Exchange (Total size is the sum of data type lengths of all data elements within the list.)	1,400 Bytes
Maximum Exchanges per ETN100	127 possible exchanges (produced, consumed or any combination thereof)		Maximum Open Connections per ETN100 (An Open Connection is an IP Address or Group that is produced or consumed.)	32 Open Connections (produced, consumed or any combination thereof)
Network	10 BaseT - Ethernet		Global Data Buffer	64K Bytes
Produced Data Types	Data, Status		Consumed Data Types	Data, Status, Timestamp
General Specifications				
Required Power (Steady State)	1.44W (60mA @ 24VDC)		CE	GFK-1755
Required Power (Inrush)	Negligible		UL	GFK-1754
Relative Humidity	5 to 95% Non-condensing		Terminal Type	Shielded RJ-45
Operating Temperature	0° to 60° Celsius		Weight	1.9 g (9.5 oz.)

2 CONNECTOR / REGISTERS

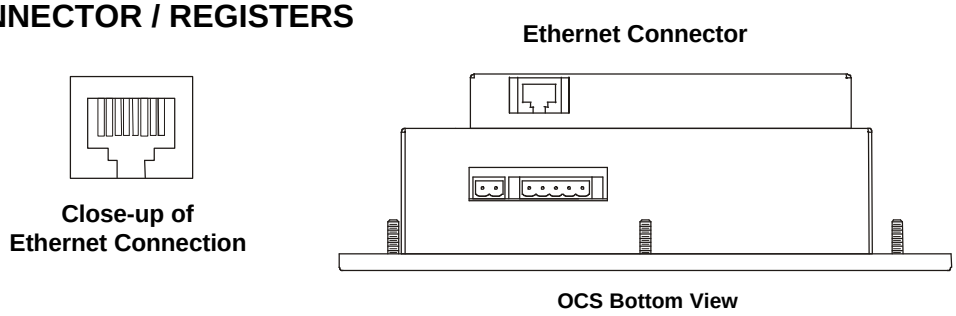


Figure 1 – Ethernet Connector

Note: The ETN100 must be installed in the first slot.

GFK-1785B

3 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

4 TECHNICAL SUPPORT

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:

(+) 353-21-4321-266

High Speed Counter

IC300HSC600
High Speed Counter Inputs
Sinking Pulse Outputs

This product also has a detailed supplement (GFK-1643) available.

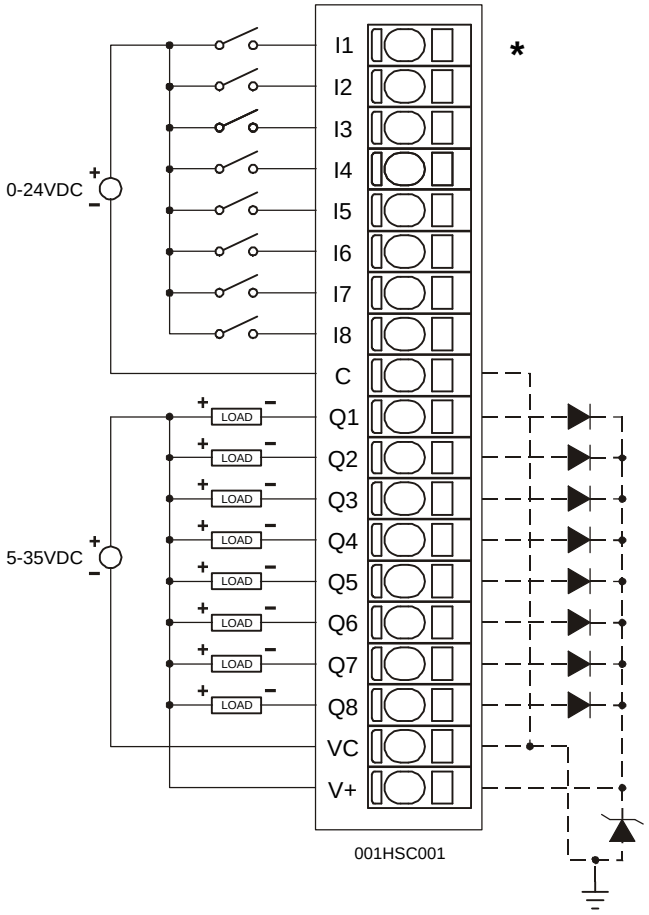
1 SPECIFICATIONS

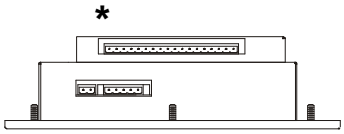
INPUT	HSC600					HSC600
Inputs per Module	8				Commons per Module	1
Programmable Input Voltage Ranges	Zero Crossing	TTL / 5 VDC	12 VDC	24 VDC	Input Type	Positive Logic
					Peak Voltage	35VDC Max.
ON Voltage Level	+ 0.1	+ 2	+ 8	+ 16	Input Impedance	10K Ohms
OFF Voltage Level	- 0.1	+ 0.8	+ 4	+ 8	Input Filter	500KHz, 50KHz, 5KHz

OUTPUT	HSC600		HSC600
Outputs per Module	8	Output Protection	Short Circuit
Commons per Module	1	Maximum Leakage Current	100µA
Operating Voltage	5 - 35VDC	Maximum Inrush Current	600mA. per channel
Output Type	Sinking / 10K Pull-Up Negative Logic	Minimum Load	None
Peak Voltage	35VDC Max.	OFF to ON Response	0.3µS.
Output Characteristics	Current Sinking	ON to OFF Response	2µS.
ON Voltage Level	1.5VDC Max. @ 500mA 0.7 VDC Max. @ 250mA	Maximum Load Current per Output	0.5A

General Specifications			
Required Power (Steady State)	0.29W (12.43mA @ 24VDC)	UL	Operating Temperature Code T4A; Also refer to GFK-1754
Required Power (Inrush)	0.44W (18.4mA @ 24VDC)	Terminal Type	Spring Clamp, Removable
Relative Humidity	5 to 95% Non-condensing	Weight	9.5 oz. (270 g)
Operating Temperature	0° to 60° Celsius		

2 WIRING





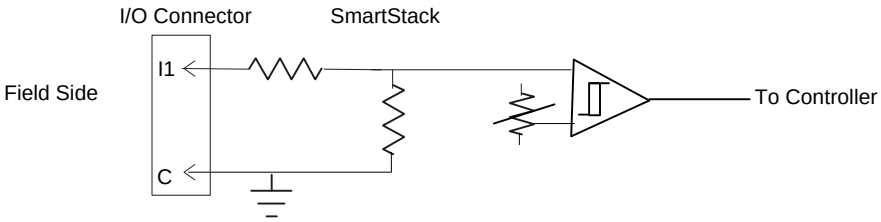
OCS Bottom View – Shows Corresponding I/O Pin

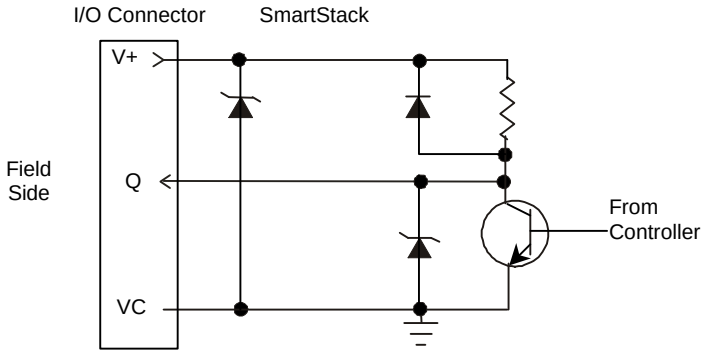
Pin	Signal HSC600
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C	Common[1]
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
VC	Common[1]
V+	Load Voltage +

[1] Internally Connected

Warning: Wiring the positive side of the DC source to loads connected to outputs 1 through 8 and the negative side of the DC source to the output common(s) would create a Negative Logic condition, which may be considered an unsafe practice under CE directives.

3 INTERNAL CIRCUIT SCHEMATIC





Specification for transient voltage suppressors (transorbs) used on output circuitry is 36VDC, 300 watts.

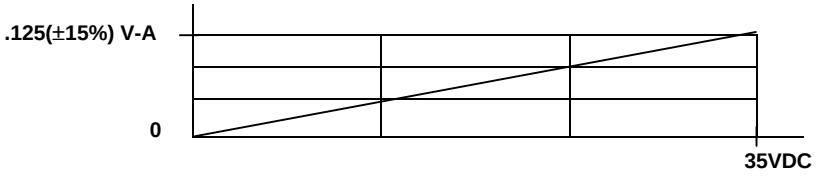
4 CONFIGURATION AND MODES

Note: The status of the I/O can be monitored in Cscape Software.

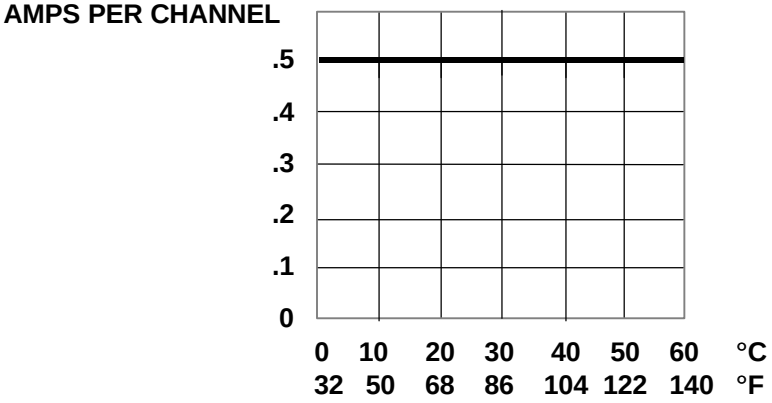
See the Supplement for the High Speed Counter Supplement (GFK-1643) for detailed information covering configuration and input/output modes.

5 INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart



Derating Chart



6 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

7 TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

North America:
1-800-433-2682 or visit our website at www.gefanuc.com.

Europe:
(+) 353-21-4321-266

High Speed Counter

High Speed Counter Inputs
Sourcing Pulse Outputs
IC300HSC601

This product also has a detailed supplement (GFK-1643) available.

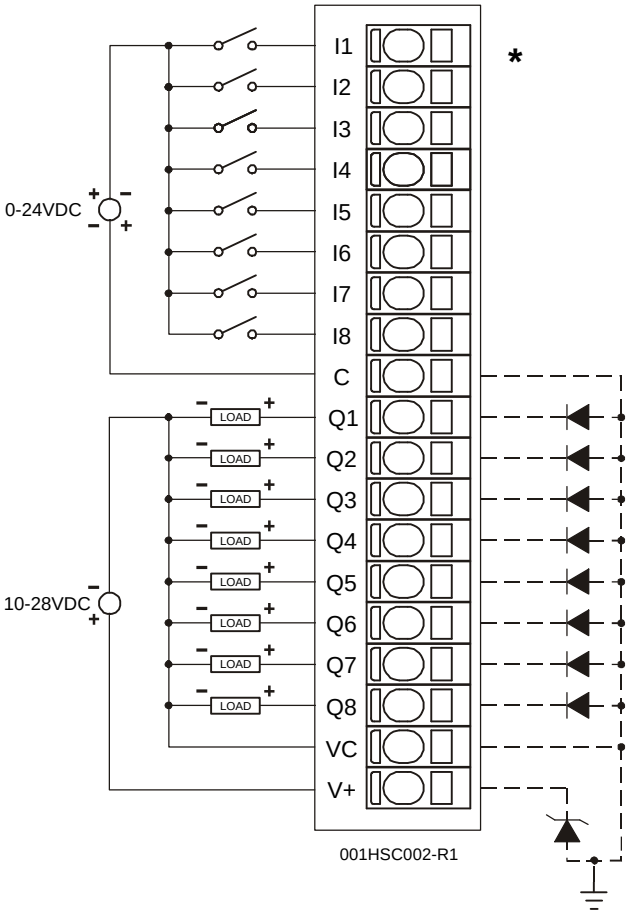
1 SPECIFICATIONS

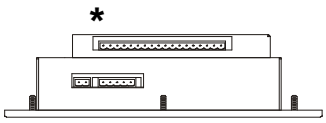
INPUT	HSC601						HSC601
Inputs per Module	8					Commons per Module	1
Programmable Input Voltage Ranges	Zero Crossing	TTL / 5 VDC	12 VDC	24 VDC		Input Type	Positive Logic
						Peak Voltage	35 VDC Max.
ON Voltage Level	+ 0.1	+ 2	+ 8	+ 16		Input Impedance	10K Ohms
OFF Voltage Level	- 0.1	+ 0.8	+ 4	+ 8		Input Filter	500KHz, 50KHz, 5KHz

OUTPUT	HSC601			HSC601
Outputs per Module	8		Maximum Inrush Current	650mA per channel
Commons per Module	1		Minimum Load	None
Operating Voltage	10 - 28VDC		OFF to ON Response	10µs.
Output Type	Sourcing / 10K Pull-Down Positive Logic		ON to OFF Response	10µs.
Peak Voltage	28VDC Max.		Output Characteristics	Current Sourcing
Maximum Load Current Per Output	0.5A Max.		Output Protection	Short Circuit

General Specifications			
Required Power (Steady State)	0.29W (12.43mA @ 24VDC)	CE	Refer to GFK-1755
Required Power (Inrush)	0.44W (18.4mA @ 24VDC)	UL	Operating Temperature Code T4A; Also refer to GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
Operating Temperature	0° to 60° Celsius	Weight	9.5 oz. (270 g)

2 WIRING

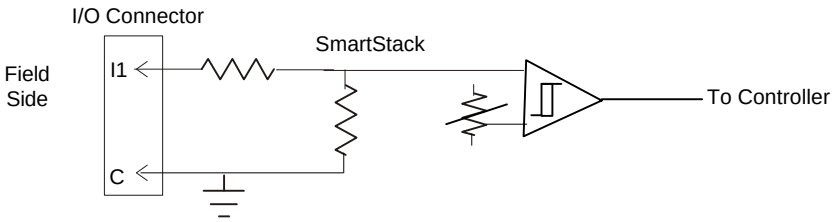


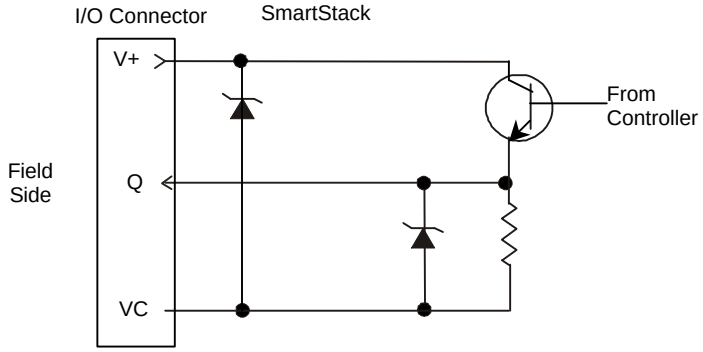


OCS Bottom View – Shows Corresponding I/O Pin

Pin	Signal HSC601
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C	Common
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
VC	Common
V+	Load Voltage +

3 INTERNAL CIRCUIT SCHEMATIC





Specification for transient voltage suppressors (transorbs) used on output circuitry is 33VDC, 300 watts.

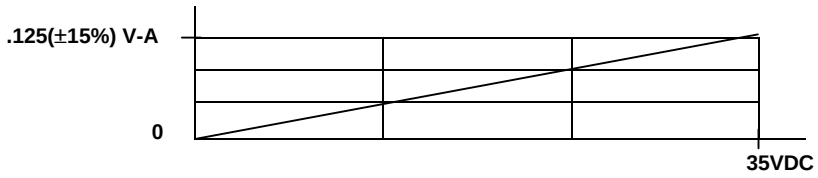
4 CONFIGURATION AND INPUT/OUTPUT MODES

Note: The status of the I/O can be monitored in Cscape Software.

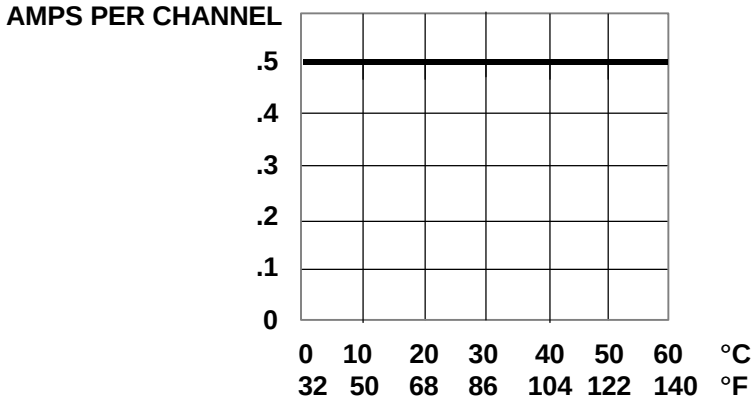
See the Supplement for the High Speed Counter Supplement (GFK-1643) for detailed information covering configuration and input/output modes.

5 INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart



Derating Chart



6 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

a. All applicable codes and standards are to be followed in the installation of this product.
b. Use the following wire type or equivalent: Belden 8917, 16 AWG or larger.

For detailed installation information, refer to Chapter Two in the Control Station Hardware Manual (GFK-1631). A handy checklist is provided that covers panel box layout requirements and minimum clearances.

7 TECHNICAL ASSISTANCE

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(+) 353-21-4321-266

Stepper Positioning Module

Inputs / Outputs

IC300STP100

This product has a detailed supplement (GFK-1644) available.

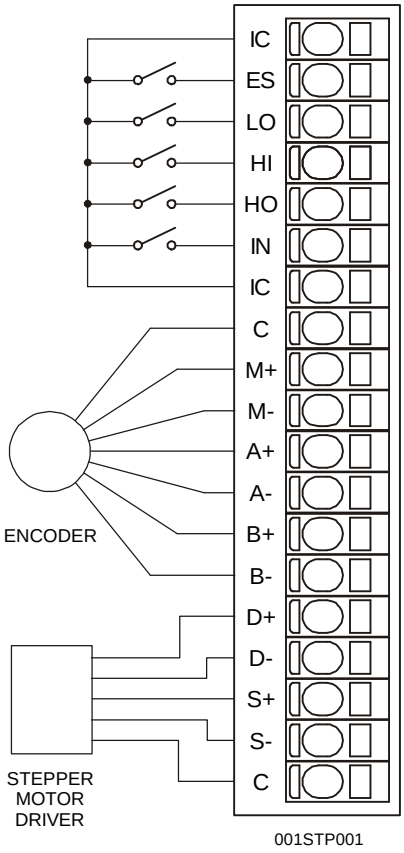
SPECIFICATIONS

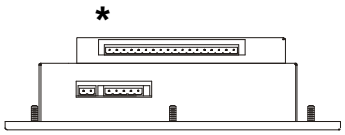
INPUT	STP100		STP100
ISOLATED INPUTS			
LOW LEVEL (+2mA)		**ISOLATION**	
Emergency Stop (ES)	0 - 9 VDC	Emergency Stop (ES)	500 VDC min.
Home (HO)		Home (HO)	
Index (IN)		Index (IN)	
High Limit (HILIM)		High Limit (HILIM)	
Low Limit (LOLIM)		Low Limit (LOLIM)	
DIFFERENTIAL INPUTS			
Encoder Frequency	0 - 1.0 MHz	Encoder Differential Threshold Low	-0.2 VDC min.
Encoder Single-Ended Threshold	1.2 – 1.6 VDC	Encoder Differential Threshold High	+0.2 VDC max.

OUTPUT	STP100		STP100
DIFFERENTIAL OUTPUTS			
Step Frequency	0 - 245 KHz	Direction Output Setup Time	2 ms. max.
Step Output High @ -20 mA	2.5 VDC min.	Direction Output High @ -20 mA	2.5 VDC min.
Step Output Low @ +20 mA	0.5 VDC max.	Direction Output Low @ +20 mA	0.5 VDC max.

GENERAL SPECIFICATIONS			
Required Power (Steady State)	0.17W (7.15mA @ 24VDC)	CE	Refer to GFK-1755
Required Power (Inrush)	0.38W (16.2mA @ 24VDC)	UL	Refer to GFK-1754
Relative Humidity	5 to 95% Non-condensing	Terminal Type	Spring Clamp, Removable
Operating Temperature	0° to 60° Celsius	Weight	9.5 oz. (270 g)
Storage Temperature	-40° to +85° Celsius		

2 WIRING



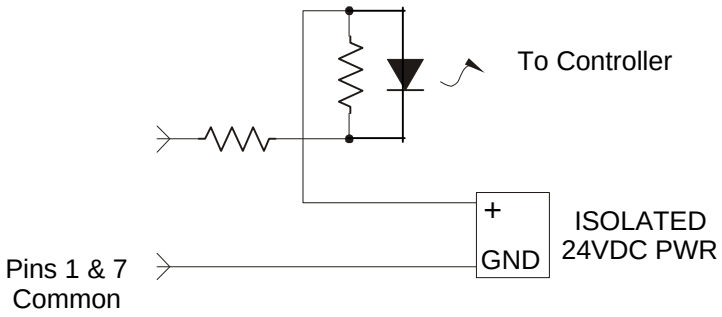


OCS Bottom View – Shows Corresponding I/O Pin

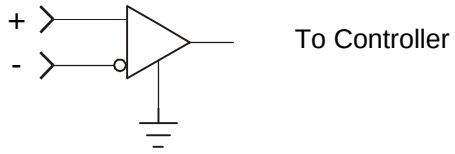
Pin	Signal	STP100 Description
ISOLATED		
1	IC	Isolated Common
2	ES	ESTOP+ Emergency Stop, Active High (Open), 24 Vdc Pull Up
3	LO	LOLIM- Lower limit, Active Low (Closed), 24 Vdc Pull Up
4	HI	HILIM- High limit, Active Low (Closed), 24 Vdc Pull Up
5	HO	HOME- Home, Active Low (Closed), 24 Vdc Pull Up
6	IN	INDEX- Index, Active Low (Closed), 24 Vdc Pull Up
7	IC	Isolated Common
NON-ISOLATED		
8	C	Common Connected internally to bus common
9	M+	MARK+ Encoder Marker Positive Input
10	M-	MARK- Encoder Marker Negative Input
11	A+	ENC A+ Encoder Channel A Positive Input
12	A-	ENC A- Encoder Channel A Negative Input
13	B+	ENC B+ Encoder Channel B Positive Input
14	B-	ENC B- Encoder Channel B Negative Input
15	D+	DIR+ Direction Positive Output
16	D-	DIR- Direction Negative Output
17	S+	STEP+ Step Positive Output
18	S-	STEP- Step Negative Output
19	C	Common Connected internally to bus common

3 INTERNAL CIRCUIT SCHEMATICS

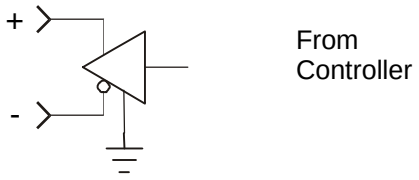
This circuit is typical of **ESTOP+ ,LOLIM-, HILIM-, HOME-, and INDEX-** ***inputs.***



This circuit is typical of **Encoder A, Encoder B, and Marker** ***inputs.***



This circuit is typical of **STEP** and **DIR o*utputs*.**



4 CONFIGURATION

Note: The status of the I/O can be monitored in Cscape Software.

See the Supplement for the Stepper Positioning Module (GFK-1644) for detailed information covering configuration and input/output modes.

5 INSTALLATION / SAFETY

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