

SCAN CONTROLLER EXTERNAL EQUIPMENT DEVICES



■ Motion Interface



■ Extended I/O Interface



■ 24V Interface

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PREFACE

Ensure you read and understand this User Guide in its entirety and familiarize yourself with the operating and maintenance instructions before you use the product. IPG strongly recommends that all operators of the product read and pay particular attention to all safety information contained herein prior to operating the product.

This User Guide should stay with the product to provide you and all future operators, users, and owners of the product with important operating, safety, and other information.

Audience

The audience for this User Guide is system integrators and technicians responsible for installing and operating the product in industrial and non-industrial installations.

Language

English.

CHAPTER

1

GENERAL OVERVIEW

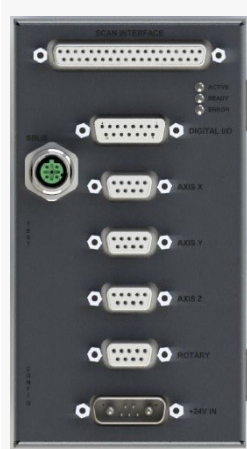
1.1 | Product Description

1.2 | Manufacturer Information

1.1 PRODUCT DESCRIPTION

IPG Scan Controller External Equipment Devices are optional accessories for IPG Scan Controllers (sold separately). Each device enables different capabilities for robot, programmable logic controllers (PLCs), gantries, rotaries, or similar equipment to operate with the IPG Scan Controller.

1.1.1 MOTION INTERFACE



The **Motion Interface** (item #P30-003779/CMUS1001478XXXXU) is designed for use with 5V signal devices in typical applications involving gantries, linear stages, rotaries, encoder devices, or similar equipment.

1.1.2 EXTENDED I/O INTERFACE



The **Extended I/O Interface** (item #CDSBEM000017XXXXU) is designed for use with an IPG Scan Controller for additional general purpose digital inputs and outputs (compared to the interface boards mentioned above and below).

This device can be used at any voltage between 5V and 24V inclusive. The active level for the inputs and outputs can independently be set as active high or active low; however, the communication rate between the IPG Scan Controller and this device is slower than the Motion Interface and 24V Interface boards.

Note: This interface is not compatible with robotic on-the-fly.

1.1.3 24V INTERFACE



The **24V Interface** (item #P30-003943/CDSBEM000001XXXXU) is designed for use with 24V signal devices in typical applications involving robots or programmable logic controllers (PLCs).

1.2 MANUFACTURER INFORMATION

IPG products are designed, engineered, and manufactured by IPG Photonics Corporation. All products have been thoroughly tested, inspected, and meets the published specifications prior to shipping. See chapter 2 for important safety and compliance information.

IPG Photonics Corporation

50 Old Webster Road
Oxford, MA 01540 USA
www.ipgphotonics.com

For more information about the IPG Scanner Series and IPGScan Software, please contact IPG Customer Service for the following documents:

- IPG Scanner Series User Guide
- IPGScan Software User Guide

IPG Customer Service can be contacted by phone at 1-508-373-1157 or email support@ipgphotonics.com.

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CHAPTER

2

SAFETY AND COMPLIANCE

2.1 | Introduction

2.2 | Regulatory Compliance Requirements

2.3 | General Safety Recommendations

2.1 INTRODUCTION

Safety precautions must be observed during all phases of operation, maintenance, and service of this product. Operators are urged to adhere to these recommendations and to apply safety practices at all times.

If this product is used in a manner not specified in this document, the protection provided by design may be impaired and the warranty will be voided. Never open the device as there are no serviceable parts (equipment or assemblies) associated with this product. All internal service and maintenance shall be performed by IPG personnel.

2.2 REGULATORY COMPLIANCE REQUIREMENTS

2.2.1 Class A Digital Device

This equipment is tested and complies with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules and Canadian ICES-003 when marked as such. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this guide, can cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the users are required to correct the interference at their own expense.

2.2.2 Electromagnetic Compatibility

Compliance with EMC requirements is certified by the CE mark, if marked on the product. The European requirements for Electromagnetic Compliance are specified in the EMC Directive. Conformance to the EMC Directive is achieved through compliance with the harmonized standards identified herein this chapter.

| ■ EMC Emission | ■ EMC Immunity | ■ Electrical Safety |
|---|--------------------------------------|---------------------|
| EN 61000-6-4:2007 EN 55011:2009 + A1:2010 CISPR 11:2009 + A1:2010 FCC and ICES-003 Class A | EN 61326-1:2013 EN 61000-6 2:2005 | EN 61010-1:2010 |

IMPORTANT



Modifications of this product could result in non-compliance with FCC rules.

If this product is used in a manner not specified in this document, the protection provided by the instrument may be impaired and the warranty will be voided.



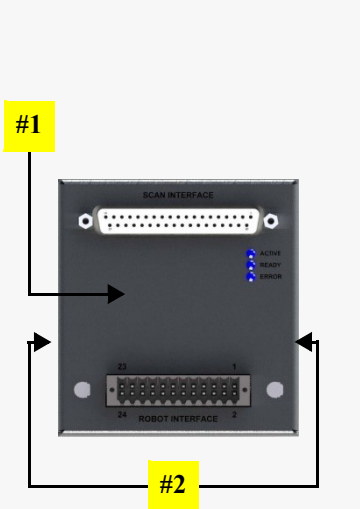
2.2.3 Safety Labels and Locations

Required safety labels are affixed on the product in various locations. Do not attempt to remove or replace these labels.

■ SAFETY LABEL DESCRIPTIONS

| Item #1 Identification Label | Item #2 Warranty Seal | Item #3 Danger Label |
|---|---|---|
|  <p>(example only - see product for details)</p> |  |  |

■ SAFETY LABEL LOCATIONS

| Motion Interface | Extended I/O Interface | 24V Interface |
|--|--|--|
|  |  |  |

2.3 GENERAL SAFETY RECOMMENDATIONS

2.3.1 Electrical Safety

- There are no operator serviceable parts inside. Refer all servicing to qualified IPG personnel. Do not remove covers. Any tampering with the product voids the warranty.
- The external connections between this product and other external devices are PELV (Protective Extra-Low Voltage), as defined by IEC 61140. Non-Mains outputs of other devices connected to this product should also be PELV or SELV (Safety Extra-Low Voltage).

2.3.2 Environmental Safety

The equipment is designed for: (1) indoor use, (2) operation at less than 2,000 meters altitude, (3) over voltage category I, (4) pollution degree 2 environment, (5) 10-40°C operating temperature, (6) 10-90% operating relative humidity.

- Do not expose the device to a high moisture environment (> 95% humidity).

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CHAPTER
3

PACKING CONTENTS

IMPORTANT

If any items are missing or if evident damage is suspected, immediately contact IPG Customer Service at 1-508-373-1157 or email support@ipgphotonics.com. Please prepare to have your order information available for reference.

3.1 | Motion Interface

3.2 | Extended I/O Interface

3.3 | 24V Interface

3.1 MOTION INTERFACE

The following accessory is included with this device:

- +24V IN Power Supply Connector Kit
 - Item #P40-005817: Connector
 - Item #P40-005818: Pins
 - Item #P40-017530: Shell



Note: No cables supplied. If assistance is required, please contact IPG Customer Service at 1-508-373-1157 or email service@ipgphotonics.com.

3.2 EXTENDED I/O INTERFACE

The following accessories are included with this device:

- Item #P40-001940: Robot Interface DB24 Connector Kit
- Item #P40-007062: Extended I/O DB26 Connector Kit



Note: No cables supplied. If assistance is required, please contact IPG Customer Service at 1-508-373-1157 or email service@ipgphotonics.com.

3.3 24V INTERFACE

The following accessory is included with this device:

- Item #P40-001940: Robot Interface DB24 Connector Kit



Note: No cables supplied. If assistance is required, please contact IPG Customer Service at 1-508-373-1157 or email service@ipgphotonics.com.

CHAPTER

4

SETUP AND CONNECTIONS

4.1 | Mounting Locations

- 4.1.1 Motion Interface
- 4.1.2 Extended I/O Interface
- 4.1.3 24V Interface

4.2 | Connectors and Pin Assignments

- 4.2.1 Motion Interface
 - 4.2.1-A: Scan Interface
 - 4.2.1-B: Digital I/O
 - 4.2.1-C: SBUS or Interlock
 - 4.2.1-D: Axis XYZ
 - 4.2.1-E: Rotary
 - 4.2.1-F: +24V IN
 - 4.2.1-G: Test and Configuration

- 4.2.2 Extended I/O Interface
 - 4.2.2-A: Scan Interface
 - 4.2.2-B: Robot Interface
 - 4.2.2-C: Extended I/O

- 4.2.3 24V Interface
 - 4.2.3-A: Scan Interface
 - 4.2.3-B: Robot Interface

4.3 | LED Status Indicators

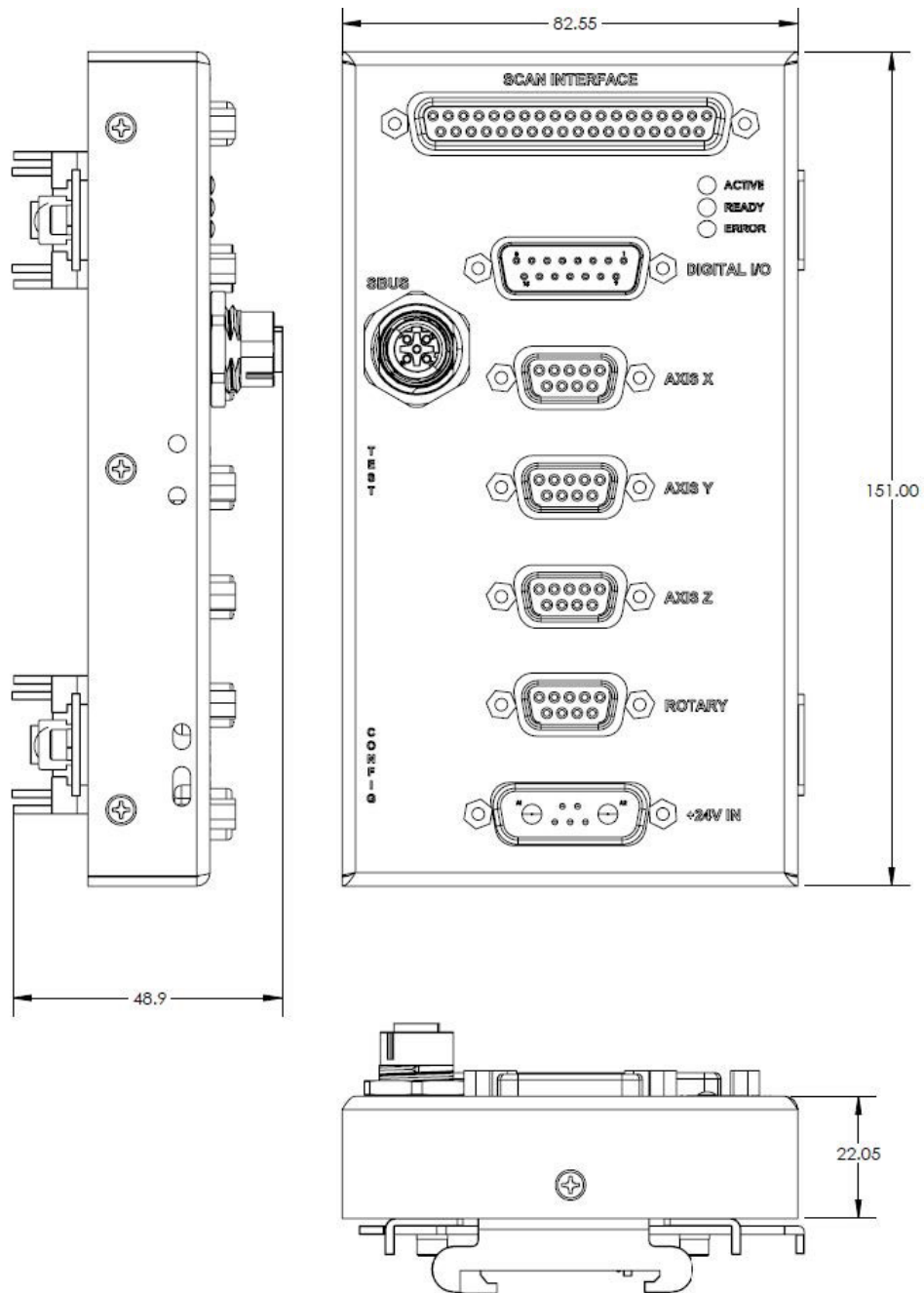
- 4.3.1 Active
- 4.3.2 Ready
- 4.3.3 Error

4.1 MOUNTING LOCATIONS

Each device is designed for rear mounting with either DIN rail clips or screw terminals which can be used to mount the equipment inside standard racks.

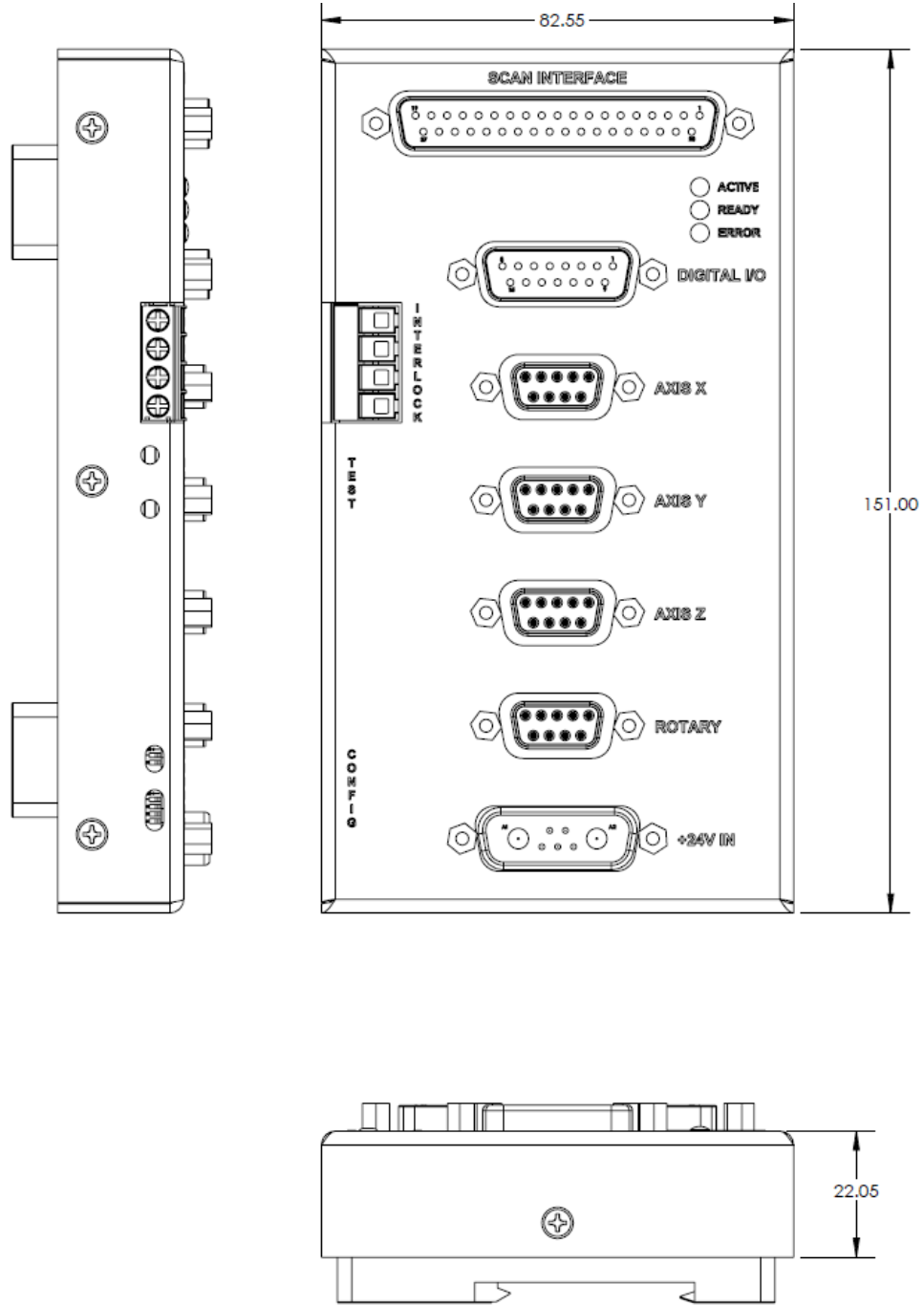
4.1.1 MOTION INTERFACE

The following illustrates the layout and dimensions of the Motion Interface with SBUS.



(dimensions in millimeters)

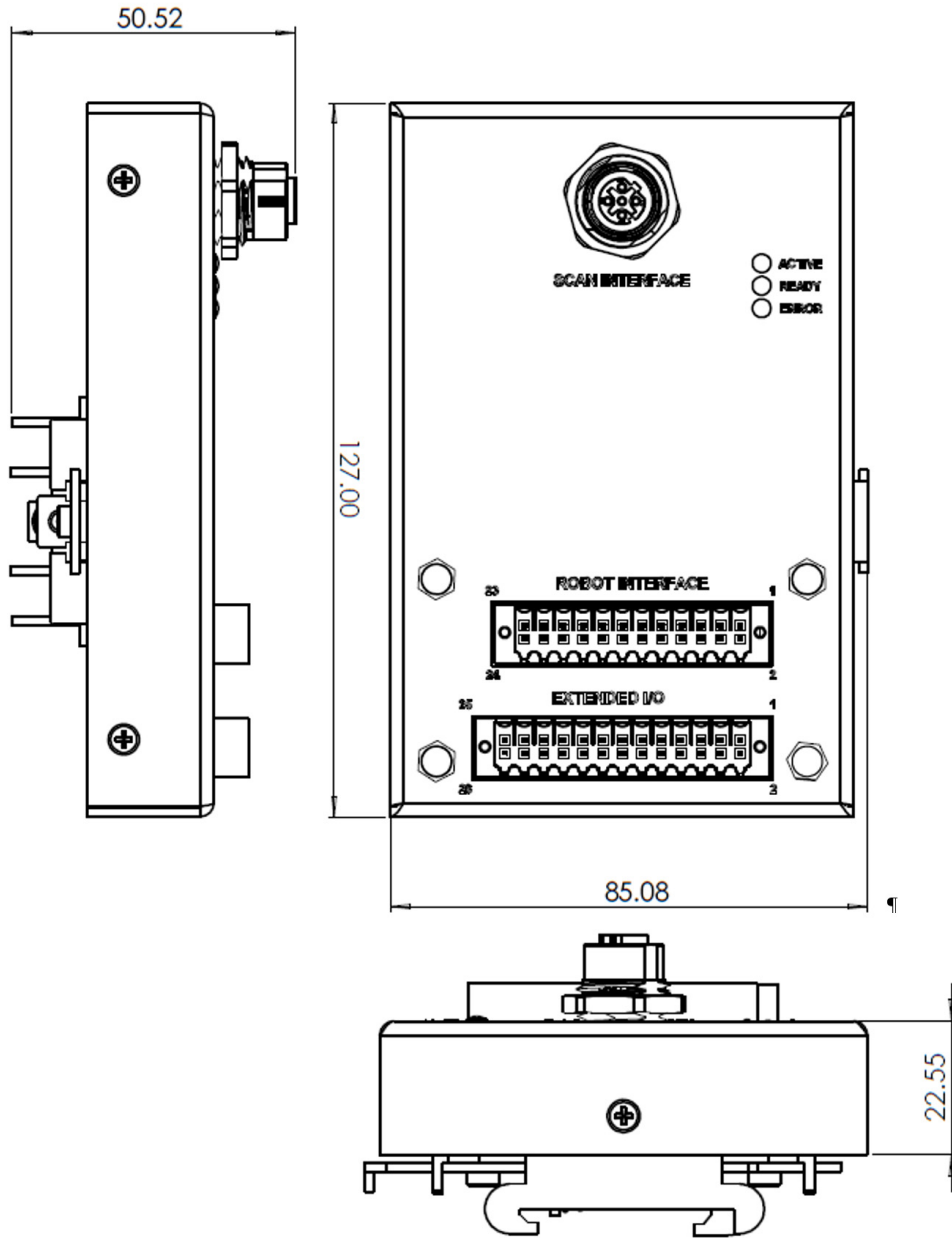
The following illustrates the layout and dimensions of the Motion Interface with Interlock.



(dimensions in millimeters)

4.1.2 EXTENDED I/O INTERFACE

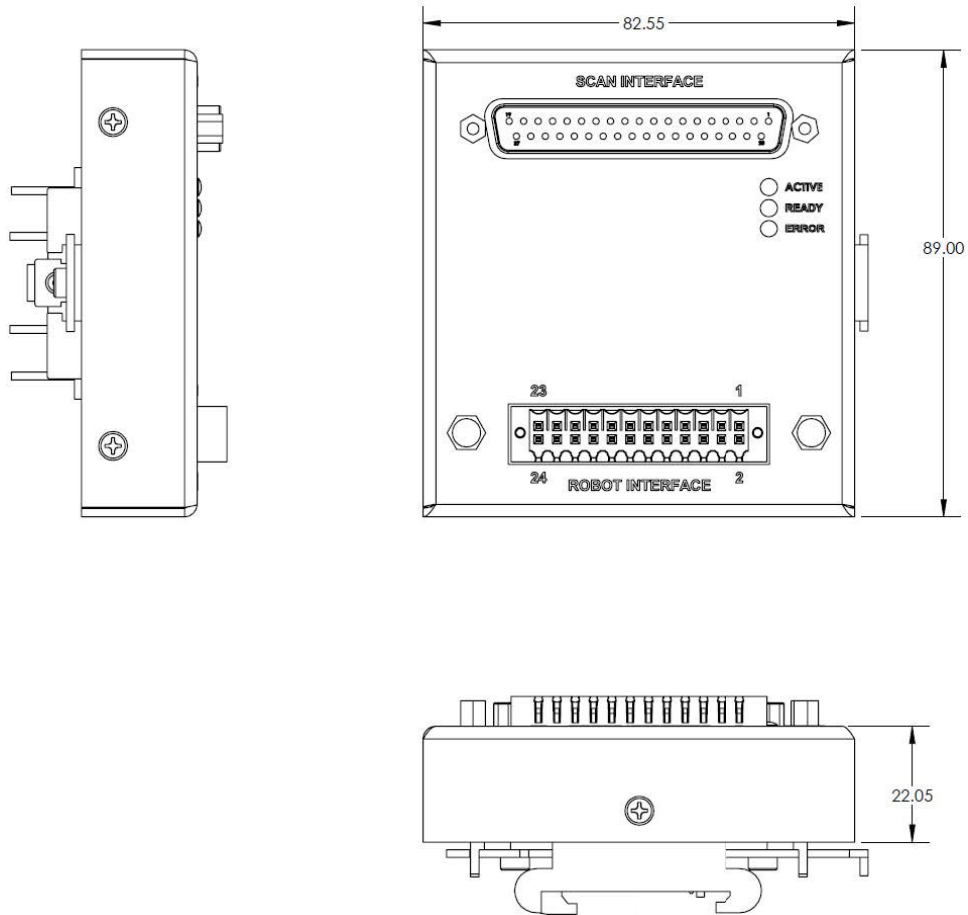
The following illustrates the layout and dimensions of the Extended I/O Interface.



(dimensions in millimeters)

4.1.3 24V INTERFACE

The following illustrates the layout and dimensions of the 24V Interface.



(dimensions in millimeters)

4.2 CONNECTORS AND PIN ASSIGNMENTS

Each device features a scan interface connector designed for use with the IPG Scan Controller.

► **STEP 1.** Connect the **SCAN INTERFACE** connector to the IPG Scan Controller:

- See section 4.2.1 for the 37-pin female connector or section 4.2.2 for the M12 serial female connector.

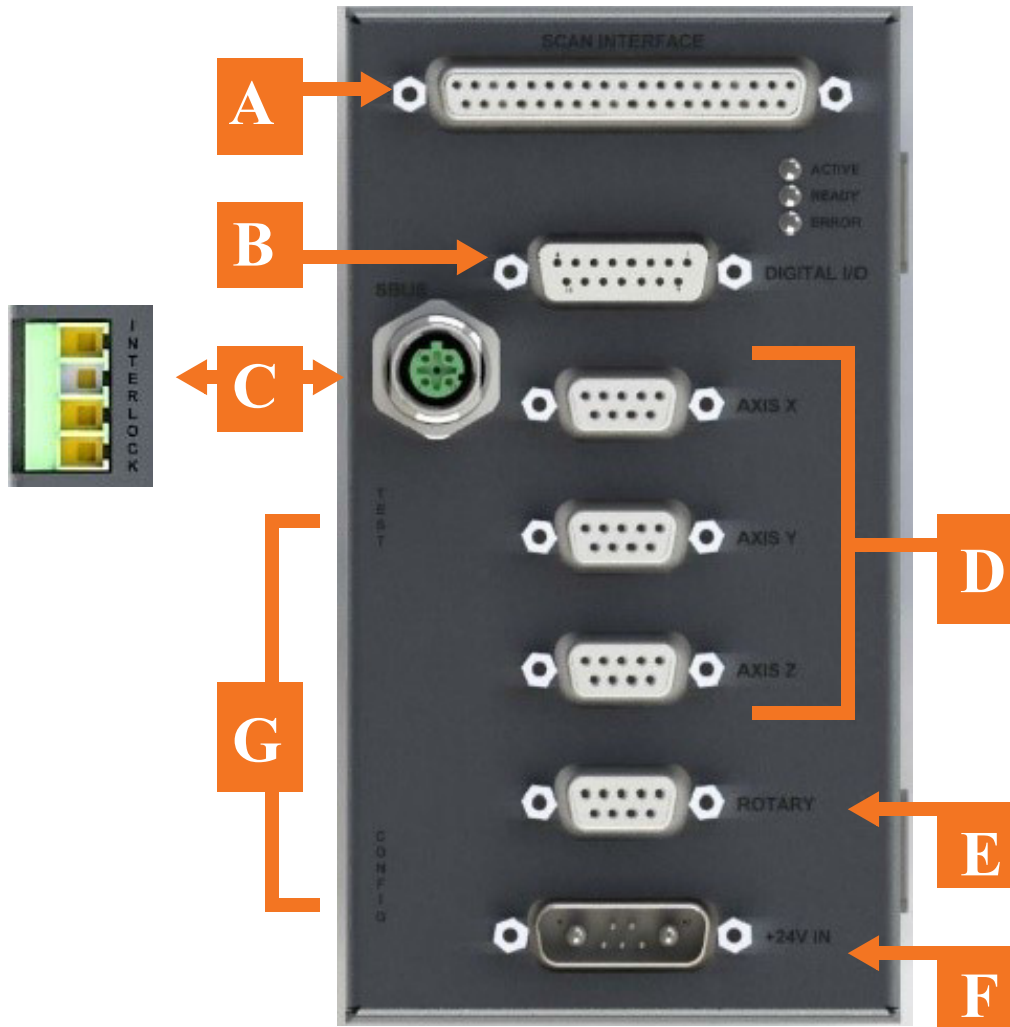


► **STEP 2.** Identify and make the appropriate connections for your device:

- See section 4.2.1 for **Motion Interface** connectors: Scan Interface, Digital I/O, Axis XYZ, Rotary, +24V IN, and SBUS or Interlock (depends on model).
- See section 4.2.2 for **Extended I/O Interface** connectors: Scan Interface, Robot Interface, and Extended I/O.
- See section 4.2.3 for **24V Interface** connectors: Scan Interface and Robot Interface.

4.2.1 MOTION INTERFACE

The device is designed with the following features and functions:



PART NAMES AND CONVENTIONS

- 4.2.1-A. **SCAN INTERFACE** connects the device to the IPG Scan Controller.
- 4.2.1-B. **DIGITAL I/O** connects the device to additional I/Os (up to 2) provided by the IPG Scanner for communication/setup and is a 5V isolated interface.
- 4.2.1-C. **SBUS** or **INTERLOCK** (depends on model):
 - **SBUS** is a pass-through connector for the optional Extended I/O Interface via serial bus (SBUS).
 - **INTERLOCK** is a screw terminal connector.
- 4.2.1-D. **AXIS XYZ** connects the device to a motion device driver.
- 4.2.1-E. **ROTARY** connects the device to a motion device driver.
- 4.2.1-F. **+24V IN** connects the device to a power supply input.
- 4.2.1-G. **TEST** and **CONFIGURATION**.

ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE:** 24 volts.
- INPUT CURRENT:** 1 ampere.
- SIGNAL LEVEL INPUTS:** 5 volts.
 - 1kΩ input resistance (pulled up).
- SIGNAL OUTPUTS:** 5 volts.
 - 10 milliampere maximum current for ACTIVE/READY/ERROR outputs.
 - 100 milliampere maximum current (differential); 50 milliampere maximum current (single-ended) for axis outputs; 100 Ohms output impedance.
 - 1kΩ (pulled up) resistance for Axis Home inputs.
- COMMUNICATION:** Full duplex transformer coupled serial indicators lights - ACTIVE, READY, and ERROR.
- MOUNTING:** Spring loaded DIN rail.
- SCAN CONTROLLER INTERFACE:** 37-pin D-cable.

MOTION INTERFACE

| SECTION | NAME/DESCRIPTION | CONNECTOR PIN ASSIGNMENTS |
|---------|------------------|---------------------------|
|---------|------------------|---------------------------|

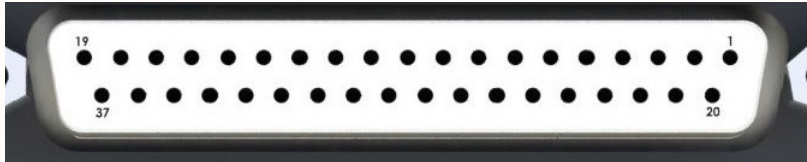
Connection to Scan Controller:

4.2.1-A

SCAN INTERFACE
(37-pin female connector)



The SCAN INTERFACE connector is a 1-to-1 connection to the IPG Scan Controller.



The following is recommended:

- Molded D-SUB, DB37 male/female cable (not included).
- All cables should be shielded.
- All shielded cables should not exceed 50 feet.

| PIN | NAME | I/O | DESCRIPTION |
|---------|-------------------------------------|-----------------------|--|
| 1 / 20 | Active / Return | IN / 3VTTL | Mark in progress. |
| 2 / 21 | Ready / Ground | IN / 3VTTL | Ready, waiting signal. |
| 3 / 22 | Error / Ground | IN / 3VTTL | Error condition. |
| 4 / 23 | Start / Ground | OUT / 3VTTL | Start signal input, pulled up to 3.3V. |
| 5 / 24 | Stop / Ground | OUT / 3VTTL | Stop signal input active low, pulled up to 3.3V. |
| 6 / 25 | GPIO[0] / Ground | IN or OUT / 3VTTL | General Purpose I/O (GPIO) for synchronization, pulled up to 3.3V. |
| 7 / 26 | GPIO[1] / Ground | IN or OUT / 3VTTL | General Purpose I/O (GPIO) for synchronization, pulled up to 3.3V. |
| 8 / 27 | A_Axis_A(+) / A_Axis_A(-) | IN or OUT RS422 | Axis A, Phase A. |
| 9 / 28 | A_Axis_B(+) / A_Axis_B(-) | IN or OUT RS422 | Axis A, Phase B. |
| 10 / 29 | A_Axis_Z(+) / A_Axis_Z(-) | IN or OUT RS422 | Axis A, Home (or zero) differential or single-ended on Z(+), pulled up to 3.3V. |
| 11 / 30 | B_Axis_A(+) / B_Axis_A(-) | IN or OUT RS422 | Axis B, Phase A. |
| 12 / 31 | B_Axis_B(+) / B_Axis_B(-) | IN or OUT RS422 | Axis B, Phase B. |
| 13 / 32 | B_Axis_Z(+) / B_Axis_Z(-) | IN RS422 or 3VTTL | Axis B, Home (or zero) differential or single-ended on Z(+), pulled up to 3.3V. |
| 14 / 33 | C_Axis_A(+) / C_Axis_A(-) | IN or OUT RS422 | Axis C, Phase A. |
| 15 / 34 | C_Axis_B(+) / C_Axis_B(-) | IN or OUT RS422 | Axis C, Phase B. |
| 16 / 35 | C_Axis_Z(+) / C_Axis_Z(-) | IN/OUT RS422 or 3VTTL | Axis C, Home (or zero) differential or single-ended on Z(+), pulled up to 3.3V, or ClkIn/ClkOut differential for synchronization to laser. |
| 17 / 36 | Fiber InterlockA0/Fiber InterlockA1 | OUT Relay | SBUS_A(+) and SBUS_A(-). |
| 18 / 37 | Fiber InterlockB0/Fiber InterlockB1 | OUT Relay | SBUS_B(+) and SBUS_B(-). |
| 19 | Return | OUT | Logic ground. |

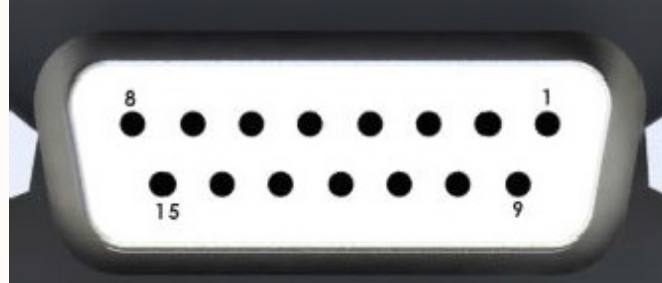
MOTION INTERFACE

| SECTION | NAME/DESCRIPTION | CONNECTOR PIN ASSIGNMENTS |
|---------|------------------|---------------------------|
|---------|------------------|---------------------------|

Connection to Additional I/Os (up to 2):

4.2.1-B

DIGITAL I/O
(15-pin female connector)



| PIN | NAME | I/O | DESCRIPTION |
|-----|--------------|-----|---|
| 1 | Return | --- | --- |
| 2 | Stop | IN | Stop signal input, active low. Pulled up to +5V. |
| 3 | Ready | OUT | Ready, waiting for start. |
| 4 | GPI[0] | IN | Use this pin if DB37 connector pin 6 is an input. Must configure SW3-1 for input. Pulled up to +5V. |
| 5 | Ground | --- | --- |
| 6 | GPO[0] | OUT | Use this pin if DB37 connector pin 6 is an output. Must configure SW3-1 for output. |
| 7 | Ground | --- | --- |
| 8 | Ground | --- | --- |
| 9 | Start | IN | Start signal input. Pulled up to +5V. |
| 10 | Active | OUT | Mark in progress. |
| 11 | Error | OUT | Error condition. |
| 12 | GPI[1] | IN | Use this pin if DB37 connector pin 7 is an input. Must configure SW3-2 for input. |
| 13 | GPO[1] | OUT | Use this pin if DB37 connector pin 7 is an output. Must configure SW3-2 for output. |
| 14 | ROTARY_SEL_L | IN | Pulled up to +5V. When this signal is high, Y axis is enabled. When this signal is low, Rotary axis is enabled. Can be driven by GPIO[0/1], if configured. |
| 15 | Ground | --- | --- |

Note: For GPIO signals, the software input/output direction must match with Configuration switch SW3. For details, please see the *IPGScan Software User Guide*.

MOTION INTERFACE

| SECTION | NAME/DESCRIPTION | CONNECTOR PIN ASSIGNMENTS |
|---------|------------------|---------------------------|
|---------|------------------|---------------------------|

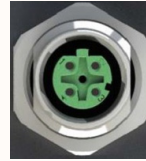
Connection to SBUS or Interlock (depends on model):

4.2.1-C

SBUS



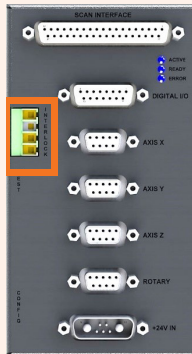
If equipped with an SBUS, DB37 connector pins 17/36 and pins 18/37 of the cable must be twisted pair and kept as short as possible.



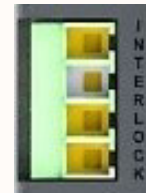
PIN SIGNAL

| | |
|---|-------|
| 1 | (+)Rx |
| 2 | (+)Tx |
| 3 | (-)Rx |
| 4 | (-)Tx |

INTERLOCK



If equipped with an INTERLOCK:



PIN NAME I/O DESCRIPTION

| | | | |
|-------|---------------------|-----|---|
| 1 / 2 | INTLK_A0 / INTLK_A1 | Out | Fiber interlock is safe when 1 is connected to 0. |
| 3 / 4 | INTLK_B0 / INTLK_B1 | Out | Fiber interlock is safe when 1 is connected to 0. |

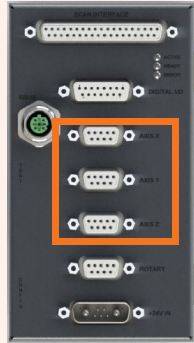
MOTION INTERFACE

| SECTION | NAME/DESCRIPTION | CONNECTOR PIN ASSIGNMENTS |
|---------|------------------|---------------------------|
|---------|------------------|---------------------------|

Connection to Motion Device:

4.2.1-D

AXIS XYZ
(9-pin female connector)



There are three (3) connectors with identical pin-outs intended for XYZ control. These connectors send control signals for motion drivers and receives encoder signals. Connector configuration can drive or receive signals at 5V logic, single-ended (SE) or differential.

| PIN | NAME | I/O | DESCRIPTION |
|-------|-------------------------------|-----------|--|
| 5 / 9 | Axis_IO[0](+)/Axis_IO[0](-) | IN or Out | Pin 5: Can be a 5V command (SE or differential) or encoder feedback, depending on SW4. Pin 9: Only used if differential signal is needed. |
| 4 | Return | --- | --- |
| 8 / 3 | Axis_IO[1](+)/Axis_IO[1](-) | IN or OUT | Pin 8: Can be a 5V command (SE or differential) or encoder feedback, depending on SW4. Pin 3: Only used if differential signal is needed. |
| 7 | Return | --- | --- |
| 2 / 6 | Home_Sensor(+)/Home_Sensor(-) | IN | Pin 2: Can be SE or differential depending on SW4. Pin 6: Only used if differential signal is needed. |
| 1 | Return | --- | --- |

Notes

- Pin 5: STEP or quadrature Channel A.
- Pin 8: DIRECTION or quadrature Channel B.
- Pins 5/9 and Pins 8/3: If differential signals not used, ground should be return signal.
- Pin 2: Home sensor input. If single-ended (SE) is used, Home_Sensor(+) is pulled up. A connection to ground will make it active.

4.2.1-E

ROTARY
(9-pin female connector)



This connector sends control signals for motion drivers and receives encoder signals.

| PIN | NAME | I/O | DESCRIPTION |
|-------|---------------------------------|-----------|---|
| 5 / 9 | Rotary_IN[0](+)/Rotary_IN[0](-) | IN or OUT | Pin 5: Can be a 5V command (SE or differential) depending on SW4. Pin 9: Only used if differential signal is needed. |
| 4 | Return | --- | --- |
| 8 / 3 | Rotary_IN[1](+)/Rotary_IN[1](-) | IN or OUT | Pin 8: Can be a 5V command (SE or differential) depending on SW4. Pin 3: Only used if differential signal is needed. |
| 7 | Return | --- | --- |
| 2 / 6 | Home_Sensor(+)/Home_Sensor(-) | IN | Pin 2: Can be SE or differential depending on SW4. Pin 6: Only used if differential signal is needed. |
| 1 | Return | --- | --- |

Notes

- Pin 5: STEP or quadrature Channel A.
- Pin 8: DIRECTION or quadrature Channel B.
- Pins 5/9 and Pins 8/3: If differential signals not used, ground should be return signal.
- Pin 2: Home sensor input. If single-ended (SE) is used, Home_Sensor(+) is pulled up. A connection to ground will make it active.

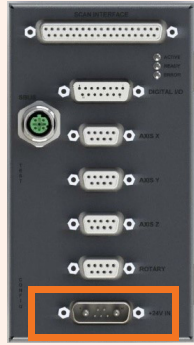
MOTION INTERFACE

| SECTION | NAME/DESCRIPTION | CONNECTOR PIN ASSIGNMENTS |
|---------|------------------|---------------------------|
|---------|------------------|---------------------------|

Connection to Power Supply:

4.2.1-F

+24V IN
(D-SUB 7W2 male connector)



This connector is for power supply input. One (1) power supply connector kit is included with shipment (pins and shell).



| PIN | NAME | I/O | DESCRIPTION |
|-----|------------|-------|------------------------------|
| A1 | +24V, 1A | Power | Isolated input power supply. |
| A2 | 24V Return | Power | Isolated input power supply. |
| 1-5 | NC | --- | Not connected. |

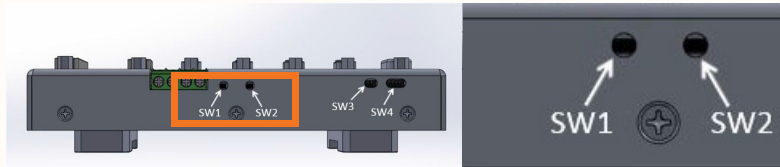
Test and Configuration:

4.2.1-G

TEST and CONFIG
(momentary test pushbuttons and configuration dip-switches)

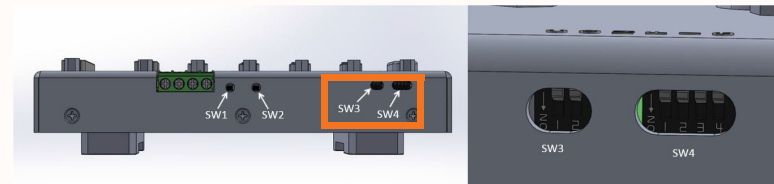


TEST pushbuttons are located on the left side of the device, as shown and described below:



| PIN | NAME | DESCRIPTION |
|-----|--------------|------------------------------------|
| SW1 | Pushbutton 1 | When pressed, Start signal is low. |
| SW2 | Pushbutton 2 | When pressed, Stop signal is low. |

CONFIG switches are located on the left side of the device, as shown and described below:



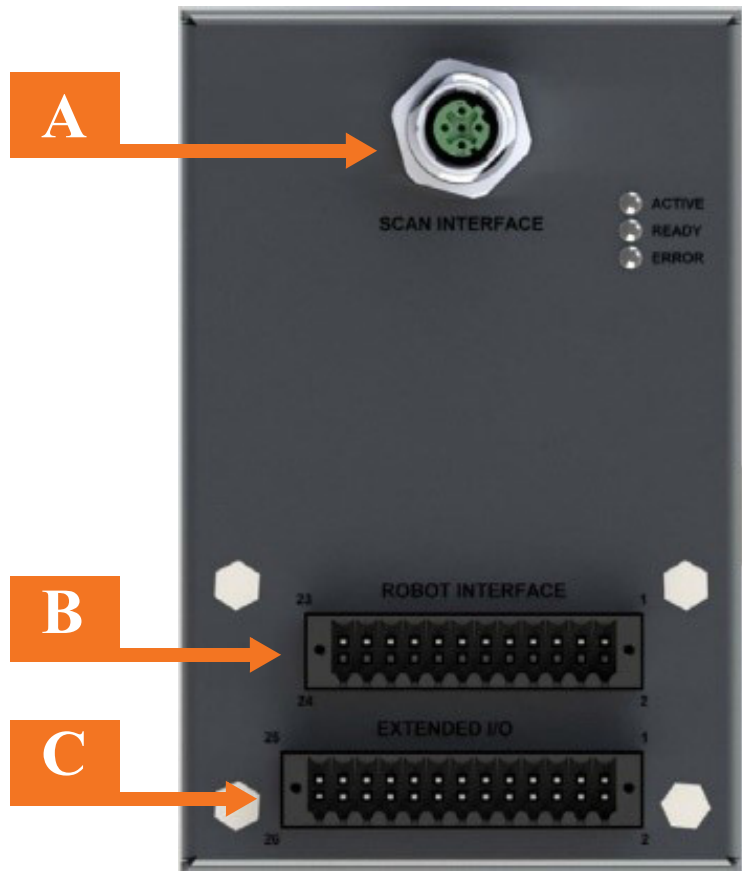
| PIN | NAME | POSITION | DESCRIPTION |
|-----|-------------------------|--------------|---|
| SW3 | GPIO Setup | 1 - ON / OFF | GPIO[0] = Input/GPIO[0] = Output. |
| | | 2 - ON / OFF | GPIO[1] = Input/GPIO[1] = Output. |
| SW4 | Encoder Interface Setup | 1 - ON / OFF | Home Sensor Signal = SE/Home Sensor Signal = Differential. |
| | | 2 - ON / OFF | Encoder Input Signal = SE/Encoder Input Signal = Differential. |
| | | 3 - ON / OFF | Drive signals are output from the interface board. Encoder signals are input to the interface board. |
| | | 4 - ON / OFF | Rotary axis cannot be used if SW4 is in the OFF position. Reserved. |

Notes:

- Each switch set is marked with an arrow to indicate ON (↓) or OFF (↑).
- SW4: Home sensor input. If single-ended is used, Home_Sensor(+) is pulled up. A connection to ground will make it active.

4.2.2 EXTENDED I/O INTERFACE

The device is designed with the following features and functions:



PART NAMES AND CONVENTIONS

4.2.2-A. SCAN INTERFACE connects the device to the IPG Scan Controller.

4.2.2-B. ROBOT INTERFACE connects the device to external discrete I/O devices such as a robot or PLC.

4.2.2-C. EXTENDED I/O connects the device to an extended I/O equipment.

ELECTRICAL SPECIFICATIONS

INPUT VOLTAGE: 5 to 24 volts.

INPUT CURRENT: 1.5 ampere maximum.

SIGNAL LEVEL INPUTS: 5 to 24 volts.

- 1kΩ input resistance.

SIGNAL OUTPUTS: 5 to 24 volts at 50 milliampere maximum.

- 25Ω output resistance.

COMMUNICATION: Full duplex transformer coupled serial.


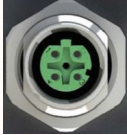
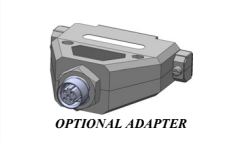
INDICATOR LIGHTS: ACTIVE, READY, and ERROR.

MOUNTING: Spring loaded DIN rail.


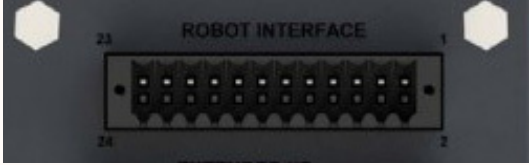
SCAN CONTROLLER INTERFACE: 4-pin D-coding connector.

EXTERNAL DEVICE INTERFACE: Connector terminal block.



EXTENDED I/O INTERFACE

| SECTION | NAME/DESCRIPTION | CONNECTOR PIN ASSIGNMENTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|--|--|--|------------------|--------|-------------|---|----|------------|--|---|----|------------|--|---|----|------------|--|---|----|------------|--|-----|------|-------------|---------|----------------------|---------------|---------|----------------------|----------------|
| <p>4.2.2-A</p> | <p>SCAN INTERFACE (M12 serial female connector)</p>  | <p>The serial bus (SBUS) connects to the 37-pin connector on the IPG Scan Controller. IPG recommends limiting the cable length to 30 meters.</p>  <table border="1" data-bbox="602 537 1422 636"> <thead> <tr> <th>PIN¹</th> <th>PIN²</th> <th>SIGNAL</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>37</td> <td>SBUS_B1(+)</td> <td>RS-485 Communication to Serial I/O Interface from IPG Scan Controller.</td> </tr> <tr> <td>4</td> <td>18</td> <td>SBUS_B0(-)</td> <td>Transformer Coupled 110 Ohm Termination.</td> </tr> <tr> <td>1</td> <td>36</td> <td>SBUS_A1(+)</td> <td>RS-485 Communication to IPG Scan Controller from Serial I/O Interface.</td> </tr> <tr> <td>3</td> <td>17</td> <td>SBUS_A0(-)</td> <td></td> </tr> </tbody> </table> <p>Notes: PIN¹ = Scan Interface PIN² = Scan Controller</p> <hr/> <p>The device interfaces with the IPG Scan Controller through a serial bus (SBUS). On the IPG Scan Controller, the SBUS is connected on DB37 connector pins 17/36 and 18/37.</p> <table border="1" data-bbox="602 816 1422 894"> <thead> <tr> <th>PIN</th> <th>NAME</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>17 / 36</td> <td>SBUS_A(+)/ SBUS_A(-)</td> <td>Serial input.</td> </tr> <tr> <td>18 / 37</td> <td>SBUS_B(+)/ SBUS_B(-)</td> <td>Serial output.</td> </tr> </tbody> </table> <p>► OPTIONAL ADAPTER (item #CEKBASY0000106PX is sold separately) IPG offers an optional adapter to assist with the wiring for this interface board. This adapter consists of a 37-pin D-SUB female connector wired to an M12 D-coded female connector.</p> <ul style="list-style-type: none"> The 37-pin connector is designed to connect directly to the IPG Scan Controller. The M12 connector is designed to connect to the Extended I/O Interface via the recommendations listed below.  <p>Recommendations for 37-pin connector cable:</p> <ul style="list-style-type: none"> Length (meters): 1m, 2m, 5m, 10m, 15m, or 20m. Manufacturers (subject to availability): Lumberg Automation, Phoenix Contact, TE Connectivity. <p>Recommendations for M12 connector cable:</p> <ul style="list-style-type: none"> Length (meters): 5m, 10m, or 30m. Manufacturer (subject to availability): Phoenix Contact. <p>► CABLES AND CONNECTIVITY The following cable suggestions have the correct M12 serial connector on one end and bare leads on the other end of the cable. The different part numbers correspond to different cable lengths. These specific cables are not required.</p> <p>Users will need to connect the M12 connector to a 37-pin D-SUB female connector. AMP connector 205209-2 is a suggested connector. Bare leads should be soldered onto the DB37 connector per electrical specifications. The cable must have a twisted pair for the input and output serial bus pairs.</p> <p>Notes:</p> <ul style="list-style-type: none"> Recommendations and/or references are subject to supplier availability and IPG reserves the right to revise this information (use for reference only). If using a Phoenix Contact cable, wire the SBUS as follows: <ul style="list-style-type: none"> Interface Pin 2/Controller Pin 37 = White/Green Interface Pin 4/Controller Pin 18 = Green Interface Pin 1/Controller Pin 36 = White/Orange Interface Pin 3/Controller Pin 17 = Orange <p>If additional support is required, please contact IPG Customer Service at 1-508-373-1157 or service@ipgphotonics.com.</p> | PIN ¹ | PIN ² | SIGNAL | DESCRIPTION | 2 | 37 | SBUS_B1(+) | RS-485 Communication to Serial I/O Interface from IPG Scan Controller. | 4 | 18 | SBUS_B0(-) | Transformer Coupled 110 Ohm Termination. | 1 | 36 | SBUS_A1(+) | RS-485 Communication to IPG Scan Controller from Serial I/O Interface. | 3 | 17 | SBUS_A0(-) | | PIN | NAME | DESCRIPTION | 17 / 36 | SBUS_A(+)/ SBUS_A(-) | Serial input. | 18 / 37 | SBUS_B(+)/ SBUS_B(-) | Serial output. |
| PIN ¹ | PIN ² | SIGNAL | DESCRIPTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 37 | SBUS_B1(+) | RS-485 Communication to Serial I/O Interface from IPG Scan Controller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 18 | SBUS_B0(-) | Transformer Coupled 110 Ohm Termination. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 36 | SBUS_A1(+) | RS-485 Communication to IPG Scan Controller from Serial I/O Interface. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 17 | SBUS_A0(-) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PIN | NAME | DESCRIPTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 / 36 | SBUS_A(+)/ SBUS_A(-) | Serial input. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 / 37 | SBUS_B(+)/ SBUS_B(-) | Serial output. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

EXTENDED I/O INTERFACE

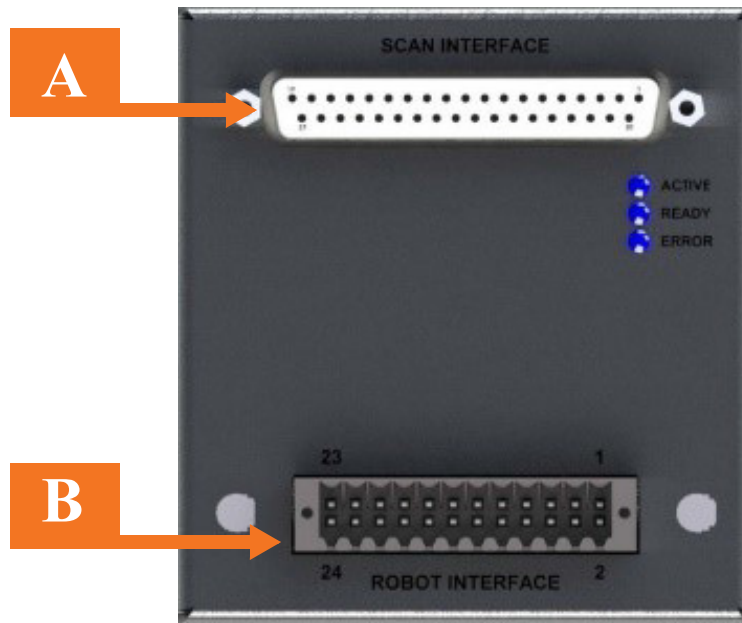
| SECTION | NAME/DESCRIPTION | CONNECTOR PIN ASSIGNMENTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---|--|---|--|--|-----|------|-----|-------------|-----|--------|-----|---|---|----------|----|---|---|----------|----|---|---|----------|----|---|---|----------|----|---|---|----------|----|---|---|----------|----|---|---|----------|----|---|----|----------|----|---|----|----------|----|---|----|--------|----|--|-------|--------|-----|---|----|-------|-----|--|----|--------|-----|---|----|-------|----|---|----|-------|-----|------------------------|----|--------|----|---|----|--------|-----|------------------------------------|-------|------|----|--|-------|--------|-----|---|
| <p>■ 4.2.2-B</p> | <p>ROBOT INTERFACE (24-pin male connector)</p>  | <p>IMPORTANT: SIGNALS ARE DESCRIBED IN TERMS OF THE SCAN CONTROLLER I/O.</p>  <table border="1" data-bbox="602 548 1422 1081"> <thead> <tr> <th>PIN</th> <th>NAME</th> <th>I/O</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1/2</td> <td>Ground</td> <td>---</td> <td>External device signal ground reference and power return.</td> </tr> <tr> <td>3</td> <td>Select 0</td> <td>IN</td> <td>Group selection bits from external device used to select a group or job to execute. <u>LEAST SIGNIFICANT BIT (PIN 3, SELECT 0).</u></td> </tr> <tr> <td>4</td> <td>Select 1</td> <td>IN</td> <td>Group selection bits from external device used to select a group or job to execute.</td> </tr> <tr> <td>5</td> <td>Select 2</td> <td>IN</td> <td>Group selection bits from external device used to select a group or job to execute.</td> </tr> <tr> <td>6</td> <td>Select 3</td> <td>IN</td> <td>Group selection bits from external device used to select a group or job to execute.</td> </tr> <tr> <td>7</td> <td>Select 4</td> <td>IN</td> <td>Group selection bits from external device used to select a group or job to execute.</td> </tr> <tr> <td>8</td> <td>Select 5</td> <td>IN</td> <td>Group selection bits from external device used to select a group or job to execute.</td> </tr> <tr> <td>9</td> <td>Select 6</td> <td>IN</td> <td>Group selection bits from external device used to select a group or job to execute.</td> </tr> <tr> <td>10</td> <td>Select 7</td> <td>IN</td> <td>Group selection bits from external device used to select a group or job to execute.</td> </tr> <tr> <td>11</td> <td>Select 8</td> <td>IN</td> <td>Group selection bits from external device used to select a group or job to execute. <u>MOST SIGNIFICANT BIT (PIN 11, SELECT 8).</u></td> </tr> <tr> <td>12</td> <td>Strobe</td> <td>IN</td> <td>Indication that the selection bits are ready to be read.</td> </tr> <tr> <td>13/14</td> <td>Ground</td> <td>---</td> <td>External device signal ground reference and power return.</td> </tr> <tr> <td>15</td> <td>Ready</td> <td>OUT</td> <td>Data is in the buffer and is waiting on an event to execute.</td> </tr> <tr> <td>16</td> <td>Active</td> <td>OUT</td> <td>When active, data is waiting to be processed or execution is in progress.</td> </tr> <tr> <td>17</td> <td>Start</td> <td>IN</td> <td>Signal from the external device to the Scan Controller to begin processing. Requires the correct commands in job.</td> </tr> <tr> <td>18</td> <td>Error</td> <td>OUT</td> <td>An error has occurred.</td> </tr> <tr> <td>19</td> <td>Enable</td> <td>IN</td> <td>Active to enable operation. Inactive will disable the laser, stop active operation, and prevent additional actions.</td> </tr> <tr> <td>20</td> <td>GPO[1]</td> <td>OUT</td> <td>Additional general purpose output.</td> </tr> <tr> <td>21/22</td> <td>+24V</td> <td>IN</td> <td>Power input for DC-DC converter. Referenced to ground.</td> </tr> <tr> <td>23/24</td> <td>Ground</td> <td>---</td> <td>External device signal ground reference and power return.</td> </tr> </tbody> </table> <p>Note: Select Inputs are referenced to IN_COMM from 26pin connector. If Ground is to be used for Select bits reference, it must be connected to IN_COMM.</p> | | | | PIN | NAME | I/O | DESCRIPTION | 1/2 | Ground | --- | External device signal ground reference and power return. | 3 | Select 0 | IN | Group selection bits from external device used to select a group or job to execute. <u>LEAST SIGNIFICANT BIT (PIN 3, SELECT 0).</u> | 4 | Select 1 | IN | Group selection bits from external device used to select a group or job to execute. | 5 | Select 2 | IN | Group selection bits from external device used to select a group or job to execute. | 6 | Select 3 | IN | Group selection bits from external device used to select a group or job to execute. | 7 | Select 4 | IN | Group selection bits from external device used to select a group or job to execute. | 8 | Select 5 | IN | Group selection bits from external device used to select a group or job to execute. | 9 | Select 6 | IN | Group selection bits from external device used to select a group or job to execute. | 10 | Select 7 | IN | Group selection bits from external device used to select a group or job to execute. | 11 | Select 8 | IN | Group selection bits from external device used to select a group or job to execute. <u>MOST SIGNIFICANT BIT (PIN 11, SELECT 8).</u> | 12 | Strobe | IN | Indication that the selection bits are ready to be read. | 13/14 | Ground | --- | External device signal ground reference and power return. | 15 | Ready | OUT | Data is in the buffer and is waiting on an event to execute. | 16 | Active | OUT | When active, data is waiting to be processed or execution is in progress. | 17 | Start | IN | Signal from the external device to the Scan Controller to begin processing. Requires the correct commands in job. | 18 | Error | OUT | An error has occurred. | 19 | Enable | IN | Active to enable operation. Inactive will disable the laser, stop active operation, and prevent additional actions. | 20 | GPO[1] | OUT | Additional general purpose output. | 21/22 | +24V | IN | Power input for DC-DC converter. Referenced to ground. | 23/24 | Ground | --- | External device signal ground reference and power return. |
| PIN | NAME | I/O | DESCRIPTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1/2 | Ground | --- | External device signal ground reference and power return. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Select 0 | IN | Group selection bits from external device used to select a group or job to execute. <u>LEAST SIGNIFICANT BIT (PIN 3, SELECT 0).</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Select 1 | IN | Group selection bits from external device used to select a group or job to execute. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Select 2 | IN | Group selection bits from external device used to select a group or job to execute. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Select 3 | IN | Group selection bits from external device used to select a group or job to execute. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Select 4 | IN | Group selection bits from external device used to select a group or job to execute. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Select 5 | IN | Group selection bits from external device used to select a group or job to execute. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Select 6 | IN | Group selection bits from external device used to select a group or job to execute. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | Select 7 | IN | Group selection bits from external device used to select a group or job to execute. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Select 8 | IN | Group selection bits from external device used to select a group or job to execute. <u>MOST SIGNIFICANT BIT (PIN 11, SELECT 8).</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Strobe | IN | Indication that the selection bits are ready to be read. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13/14 | Ground | --- | External device signal ground reference and power return. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | Ready | OUT | Data is in the buffer and is waiting on an event to execute. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | Active | OUT | When active, data is waiting to be processed or execution is in progress. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | Start | IN | Signal from the external device to the Scan Controller to begin processing. Requires the correct commands in job. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | Error | OUT | An error has occurred. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | Enable | IN | Active to enable operation. Inactive will disable the laser, stop active operation, and prevent additional actions. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | GPO[1] | OUT | Additional general purpose output. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21/22 | +24V | IN | Power input for DC-DC converter. Referenced to ground. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23/24 | Ground | --- | External device signal ground reference and power return. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

EXTENDED I/O INTERFACE

| SECTION | NAME/DESCRIPTION | CONNECTOR PIN ASSIGNMENTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|--|--|--|------|-----|-------------|---|--------|----|---|---|--------|----|---|---|--------|----|---|---|--------|----|---|---|--------|----|---|---|--------|----|---|---|--------|----|---|---|---------|-----|---------------------------------------|---|--------|-----|--|----|--------|-----|--|----|--------|-----|--|----|---------|-----|--|----|---------|-----|--|----|---------|-----|--|----|---------|-----|--|----|---------|-----|--|----|---------|-----|--|----|---------|-----|--|----|---------|-----|--|----|---------|-----|--|----|-------|-----|--|----|-----|-----|---|----|---------|-----|--|----|-----|-----|---|----|---------|-----|--|----|-----|-----|---|
| <p>■ 4.2.2-C</p> | <p>EXTENDED I/O (26-pin male connector)</p>  |  <p>REQUIRED SIGNALS</p> <p>Pin 21 (V_OUT): The output signal level can be +5VDC to +24VDC inclusive. The desired signal level should be connected to pin 21 (V_OUT). The outputs are referenced to ground (GND). An internal switch sets the active level of outputs to either high or low (default is set to high).</p> <p>Pin 8 (IN_COMM): The input signal level is measured against the signal connected to pin 8 (IN_COMM).</p> <ul style="list-style-type: none"> • If the magnitude of the voltage between pin 8 (IN_COMM) and a given input is <u>at least 5V</u>, the input <u>will read ON</u>. • If the magnitude of the voltage between pin 8 (IN_COMM) and a given input is <u>less than 5V</u>, the input <u>will read OFF</u>. <p>Pins 23 and 25 (INT_PWR): These pins are connected to an internal power supply. This power supply will be either +5VDC or +24VDC (default is set to +5VDC) depending on the setting of the internal switch.</p> <p>I/O Settings: The input and output settings only change the EXTENDED I/O (26-pin connector); the ROBOT INTERFACE (24-pin connector) and the SCAN INTERFACE (serial bus connector) are not affected.</p> <table border="1"> <thead> <tr> <th>PIN</th> <th>NAME</th> <th>I/O</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td>1</td><td>GPI[1]</td><td>In</td><td>General purpose input signal. Can be used for interfacing requirements.</td></tr> <tr><td>2</td><td>GPI[2]</td><td>In</td><td>General purpose input signal. Can be used for interfacing requirements.</td></tr> <tr><td>3</td><td>GPI[3]</td><td>In</td><td>General purpose input signal. Can be used for interfacing requirements.</td></tr> <tr><td>4</td><td>GPI[4]</td><td>In</td><td>General purpose input signal. 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Can be used for interfacing requirements.</td></tr> <tr><td>13</td><td>GPO[17]</td><td>Out</td><td>General purpose output signal. Can be used for interfacing requirements.</td></tr> <tr><td>14</td><td>GPO[18]</td><td>Out</td><td>General purpose output signal. Can be used for interfacing requirements.</td></tr> <tr><td>15</td><td>GPO[19]</td><td>Out</td><td>General purpose output signal. Can be used for interfacing requirements.</td></tr> <tr><td>16</td><td>GPO[20]</td><td>Out</td><td>General purpose output signal. Can be used for interfacing requirements.</td></tr> <tr><td>17</td><td>GPO[21]</td><td>Out</td><td>General purpose output signal. Can be used for interfacing requirements.</td></tr> <tr><td>18</td><td>GPO[22]</td><td>Out</td><td>General purpose output signal. Can be used for interfacing requirements.</td></tr> <tr><td>19</td><td>GPO[23]</td><td>Out</td><td>General purpose output signal. 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Can be used to power pin 8 (IN_COMM) or pin 21 (V_OUT).</td></tr> <tr><td>26</td><td>GND</td><td>---</td><td>Signal ground reference and power return.</td></tr> </tbody> </table> | PIN | NAME | I/O | DESCRIPTION | 1 | GPI[1] | In | General purpose input signal. Can be used for interfacing requirements. | 2 | GPI[2] | In | General purpose input signal. Can be used for interfacing requirements. | 3 | GPI[3] | In | General purpose input signal. Can be used for interfacing requirements. | 4 | GPI[4] | In | General purpose input signal. Can be used for interfacing requirements. | 5 | GPI[5] | In | General purpose input signal. Can be used for interfacing requirements. | 6 | GPI[6] | In | General purpose input signal. Can be used for interfacing requirements. | 7 | GPI[7] | In | General purpose input signal. Can be used for interfacing requirements. | 8 | IN_COMM | --- | Common for the input digital signals. | 9 | GPO[0] | Out | General purpose output signal. Can be used for interfacing requirements. | 10 | GPO[2] | Out | General purpose output signal. Can be used for interfacing requirements. | 11 | GPO[3] | Out | General purpose output signal. Can be used for interfacing requirements. | 12 | GPO[16] | Out | General purpose output signal. Can be used for interfacing requirements. | 13 | GPO[17] | Out | General purpose output signal. Can be used for interfacing requirements. | 14 | GPO[18] | Out | General purpose output signal. Can be used for interfacing requirements. | 15 | GPO[19] | Out | General purpose output signal. Can be used for interfacing requirements. | 16 | GPO[20] | Out | General purpose output signal. Can be used for interfacing requirements. | 17 | GPO[21] | Out | General purpose output signal. Can be used for interfacing requirements. | 18 | GPO[22] | Out | General purpose output signal. Can be used for interfacing requirements. | 19 | GPO[23] | Out | General purpose output signal. Can be used for interfacing requirements. | 20 | GPO[24] | Out | General purpose output signal. Can be used for interfacing requirements. | 21 | V_OUT | --- | Power input for output signals referenced to ground. | 22 | GND | --- | Signal ground reference and power return. | 23 | INT_PWR | --- | Power output. Switch selectable: either +5V (0.2A max) or +24V (1.5A max). Can be used to power pin 8 (IN_COMM) or pin 21 (V_OUT). | 24 | GND | --- | Signal ground reference and power return. | 25 | INT_PWR | --- | Power output. Switch selectable: either +5V (0.2A max) or +24V (1.5A max). Can be used to power pin 8 (IN_COMM) or pin 21 (V_OUT). | 26 | GND | --- | Signal ground reference and power return. |
| PIN | NAME | I/O | DESCRIPTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | GPI[1] | In | General purpose input signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | GPI[2] | In | General purpose input signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | GPI[3] | In | General purpose input signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | GPI[4] | In | General purpose input signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | GPI[5] | In | General purpose input signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | GPI[6] | In | General purpose input signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | GPI[7] | In | General purpose input signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | IN_COMM | --- | Common for the input digital signals. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | GPO[0] | Out | General purpose output signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | GPO[2] | Out | General purpose output signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | GPO[3] | Out | General purpose output signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | GPO[16] | Out | General purpose output signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | GPO[17] | Out | General purpose output signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | GPO[18] | Out | General purpose output signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | GPO[19] | Out | General purpose output signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | GPO[20] | Out | General purpose output signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | GPO[21] | Out | General purpose output signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | GPO[22] | Out | General purpose output signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | GPO[23] | Out | General purpose output signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | GPO[24] | Out | General purpose output signal. Can be used for interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | V_OUT | --- | Power input for output signals referenced to ground. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | GND | --- | Signal ground reference and power return. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | INT_PWR | --- | Power output. Switch selectable: either +5V (0.2A max) or +24V (1.5A max). Can be used to power pin 8 (IN_COMM) or pin 21 (V_OUT). | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | GND | --- | Signal ground reference and power return. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | INT_PWR | --- | Power output. Switch selectable: either +5V (0.2A max) or +24V (1.5A max). Can be used to power pin 8 (IN_COMM) or pin 21 (V_OUT). | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | GND | --- | Signal ground reference and power return. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

4.2.3 24V INTERFACE

The device is designed with the following features and functions:




PART NAMES AND CONVENTIONS



4.2.3-A. SCAN INTERFACE connects the device to the IPG Scan Controller.
4.2.3-B. ROBOT INTERFACE connects the device to a robot or PLC for communication. Can be used as handshaking for robotic on-the-fly processing.

ELECTRICAL SPECIFICATIONS

INPUT VOLTAGE: 24 volts.
INPUT CURRENT: 0.1 ampere.
SIGNAL LEVEL INPUTS: 24 volts.
 · 10k Ω input resistance.
SIGNAL OUTPUTS: 24 volts tote pole at 50 milliampere maximum.
 · 25 Ω output resistance.
INDICATORS LIGHTS: ACTIVE, READY, and ERROR.
ISOLATION: 1,000 volts input to IPG Scan Controller.
MOUNTING: Spring loaded DIN rail.
SCAN CONTROLLER INTERFACE: 37-pin D-cable connector.

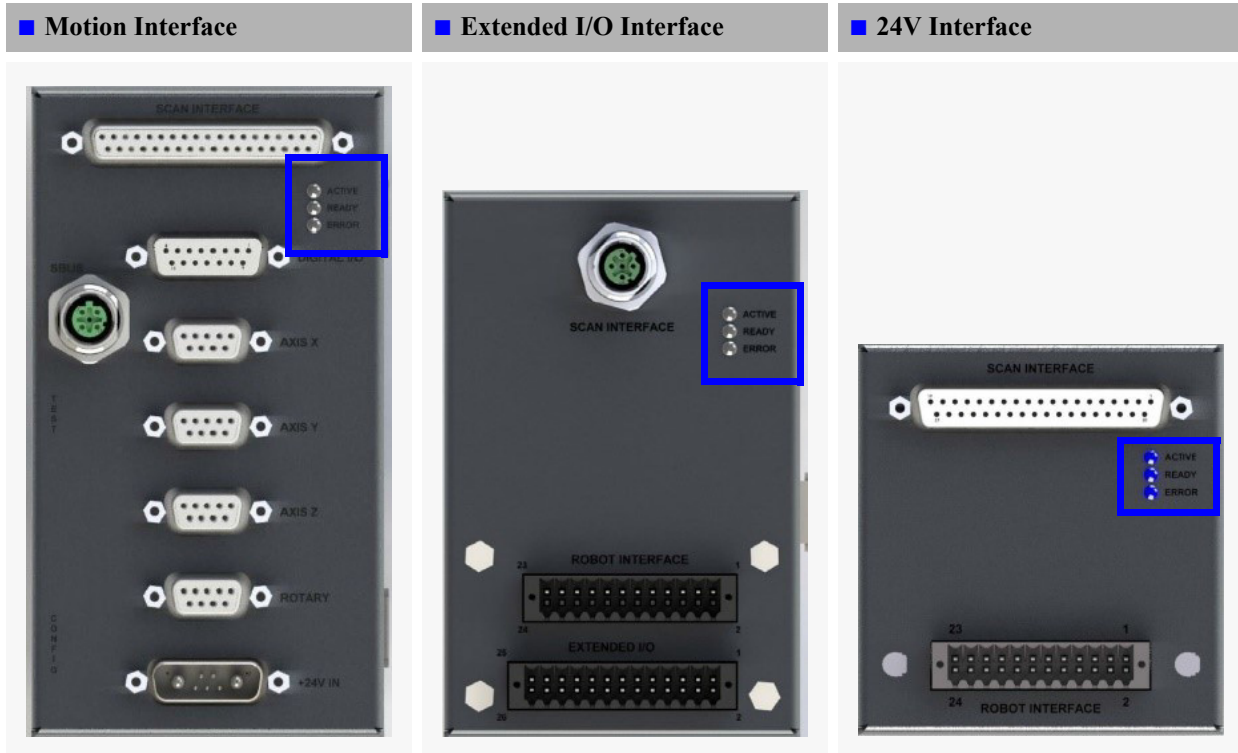
24V INTERFACE

| SECTION | NAME/DESCRIPTION | CONNECTOR PIN ASSIGNMENTS |
|------------------|--|--|
| <p>■ 4.2.3-A</p> | <p>SCAN INTERFACE (37-pin female connector)</p>  | <p>See section 4.2.1-A (same 37-pin female connector and pin assignments).</p> |

| <p>■ 4.2.3-B</p> | <p>ROBOT INTERFACE (24-pin male connector)</p>  | <p>IMPORTANT: SIGNALS ARE DESCRIBED IN TERMS OF THE IPG SCAN CONTROLLER I/O.</p>  <table border="1" data-bbox="602 999 1422 1451"> <thead> <tr> <th>PIN</th> <th>NAME</th> <th>I/O</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1/2</td> <td>Ground</td> <td>---</td> <td>Robot/PLC signal ground reference and power return.</td> </tr> <tr> <td>3</td> <td>Select 0</td> <td>IN</td> <td>Selection bits used to choose the upcoming IPGScan group.</td> </tr> <tr> <td>4</td> <td>Select 1</td> <td>IN</td> <td>Selection bits used to choose the upcoming IPGScan group.</td> </tr> <tr> <td>5</td> <td>Select 2</td> <td>IN</td> <td>Selection bits used to choose the upcoming IPGScan group.</td> </tr> <tr> <td>6</td> <td>Select 3</td> <td>IN</td> <td>Selection bits used to choose the upcoming IPGScan group.</td> </tr> <tr> <td>7</td> <td>Select 4</td> <td>IN</td> <td>Selection bits used to choose the upcoming IPGScan group.</td> </tr> <tr> <td>8</td> <td>Select 5</td> <td>IN</td> <td>Selection bits used to choose the upcoming IPGScan group.</td> </tr> <tr> <td>9</td> <td>Select 6</td> <td>IN</td> <td>Selection bits used to choose the upcoming IPGScan group.</td> </tr> <tr> <td>10</td> <td>Select 7</td> <td>IN</td> <td>Selection bits used to choose the upcoming IPGScan group.</td> </tr> <tr> <td>11</td> <td>Select 8</td> <td>IN</td> <td>Selection bits used to choose the upcoming IPGScan group.</td> </tr> <tr> <td>12</td> <td>Strobe</td> <td>IN</td> <td>Indication that the selection bits are ready to be read.</td> </tr> <tr> <td>13/14</td> <td>Ground</td> <td>---</td> <td>Robot/PLC signal ground reference and power return.</td> </tr> <tr> <td>15</td> <td>Ready</td> <td>OUT</td> <td>Data is ready. OK to start processing.</td> </tr> <tr> <td>16</td> <td>Active</td> <td>OUT</td> <td>Job is in process. Inactive when there is no job ready or running.</td> </tr> <tr> <td>17</td> <td>Start</td> <td>IN</td> <td>Signal to start running current IPGScan job.</td> </tr> <tr> <td>18</td> <td>Error</td> <td>OUT</td> <td>An error has occurred.</td> </tr> <tr> <td>19</td> <td>Enable</td> <td>IN</td> <td>Enable operation of the IPG Scanner.</td> </tr> <tr> <td>20</td> <td>GPO[1]</td> <td>OUT</td> <td>General Purpose Output. Can be used for additional interfacing requirements.</td> </tr> <tr> <td>21/22</td> <td>+24V</td> <td>IN</td> <td>Power input.</td> </tr> <tr> <td>23/24</td> <td>Ground</td> <td>---</td> <td>Robot/PLC signal ground reference and power return.</td> </tr> </tbody> </table> <p>Notes:</p> <ul style="list-style-type: none"> Pin 19, Enable: Must be set to high when previewing with the guide laser and during processing. Pin 20, GPO[1]: The signal is an OUTPUT from the IPG Scan Controller and an INPUT to the Robot/PLC. | PIN | NAME | I/O | DESCRIPTION | 1/2 | Ground | --- | Robot/PLC signal ground reference and power return. | 3 | Select 0 | IN | Selection bits used to choose the upcoming IPGScan group. | 4 | Select 1 | IN | Selection bits used to choose the upcoming IPGScan group. | 5 | Select 2 | IN | Selection bits used to choose the upcoming IPGScan group. | 6 | Select 3 | IN | Selection bits used to choose the upcoming IPGScan group. | 7 | Select 4 | IN | Selection bits used to choose the upcoming IPGScan group. | 8 | Select 5 | IN | Selection bits used to choose the upcoming IPGScan group. | 9 | Select 6 | IN | Selection bits used to choose the upcoming IPGScan group. | 10 | Select 7 | IN | Selection bits used to choose the upcoming IPGScan group. | 11 | Select 8 | IN | Selection bits used to choose the upcoming IPGScan group. | 12 | Strobe | IN | Indication that the selection bits are ready to be read. | 13/14 | Ground | --- | Robot/PLC signal ground reference and power return. | 15 | Ready | OUT | Data is ready. OK to start processing. | 16 | Active | OUT | Job is in process. Inactive when there is no job ready or running. | 17 | Start | IN | Signal to start running current IPGScan job. | 18 | Error | OUT | An error has occurred. | 19 | Enable | IN | Enable operation of the IPG Scanner. | 20 | GPO[1] | OUT | General Purpose Output. Can be used for additional interfacing requirements. | 21/22 | +24V | IN | Power input. | 23/24 | Ground | --- | Robot/PLC signal ground reference and power return. |
|------------------|---|---|--|------|-----|-------------|-----|--------|-----|---|---|----------|----|---|---|----------|----|---|---|----------|----|---|---|----------|----|---|---|----------|----|---|---|----------|----|---|---|----------|----|---|----|----------|----|---|----|----------|----|---|----|--------|----|--|-------|--------|-----|---|----|-------|-----|--|----|--------|-----|--|----|-------|----|--|----|-------|-----|------------------------|----|--------|----|--------------------------------------|----|--------|-----|--|-------|------|----|--------------|-------|--------|-----|---|
| PIN | NAME | I/O | DESCRIPTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1/2 | Ground | --- | Robot/PLC signal ground reference and power return. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Select 0 | IN | Selection bits used to choose the upcoming IPGScan group. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Select 1 | IN | Selection bits used to choose the upcoming IPGScan group. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Select 2 | IN | Selection bits used to choose the upcoming IPGScan group. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Select 3 | IN | Selection bits used to choose the upcoming IPGScan group. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Select 4 | IN | Selection bits used to choose the upcoming IPGScan group. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Select 5 | IN | Selection bits used to choose the upcoming IPGScan group. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Select 6 | IN | Selection bits used to choose the upcoming IPGScan group. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | Select 7 | IN | Selection bits used to choose the upcoming IPGScan group. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Select 8 | IN | Selection bits used to choose the upcoming IPGScan group. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Strobe | IN | Indication that the selection bits are ready to be read. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13/14 | Ground | --- | Robot/PLC signal ground reference and power return. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | Ready | OUT | Data is ready. OK to start processing. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | Active | OUT | Job is in process. Inactive when there is no job ready or running. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | Start | IN | Signal to start running current IPGScan job. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | Error | OUT | An error has occurred. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | Enable | IN | Enable operation of the IPG Scanner. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | GPO[1] | OUT | General Purpose Output. Can be used for additional interfacing requirements. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21/22 | +24V | IN | Power input. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23/24 | Ground | --- | Robot/PLC signal ground reference and power return. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

4.3 LED STATUS INDICATORS

Each device features 3 LED status indicators to signal when the device is active, ready, or when an error occurs.



4.3.1 ACTIVE

When active, the **ACTIVE** light will turn on.

4.3.2 READY

When ready, the **READY** light will turn on.

4.3.3 ERROR

When an error occurs, the **ERROR** light will turn on.

For a list of error conditions and troubleshooting instructions, please refer to the *IPG Scanner Series User Guide* and the *IPGScan Software User Guide*.

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