UNICON

Universal Controller Manual

Manual

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1.0 Limited Warranty

Duration:

One year from date of delivery to the original purchaser.

Who gives this warranty (warrantor):

PushCorp
Telephone: (972) 840-0208

Corporate Address:
P. O. Box 181915
Dallas, Texas 75218

Shipping Address:
3001 W. Kingsley Rd.
Garland, Texas 75041

Who receives this warranty (purchaser):

The original purchaser (other than for purposes of resale) of the *PushCorp* product

What products are covered by this warranty:

Any *PushCorp* Adjustable Force Device or Adjustable Force Device accessory supplied or manufactured by the Warrantor.

What is covered under this warranty:

Defects in material and/or workmanship which occur within the duration of the warranty period.

What is NOT covered in this warranty:

A. IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANT-ABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED TO ONE YEAR FROM THE DATE OF ORIGINAL PURCHASE. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

B. ANY INCIDENTAL, INDIRECT, OR CONSEQUENTIAL LOSS, DAMAGE or EXPENSE THAT MAY RESULT FROM ANY DEFECT, FAILURE, MALFUNCTION OF THE *PUSHCORP* PRODUCT. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you.

C. Any failure that results from an accident, purchaser's abuse, neglect, unauthorized repair or failure to operate the products in accordance with the instructions provided in the owner's manual(s) supplied with the product.

Responsibilities of the Warrantor under this warranty:

Repair or replace, at Warrantor's option, products or components which have failed within the duration of the warranty period.

Responsibilities of the purchaser under this warranty:

A. Deliver or ship the *PushCorp* product or component to PushCorp Service Center, Dallas, TX. Freight and insurance costs, if any, must be borne by the purchaser.

B. Use reasonable care in the operation and maintenance of the product as described in the owner's manual(s).

When warrantor will perform repair or replacement under this warranty:

Repair or replacement will be scheduled and serviced according to the normal work flow at the service center, and depending on the availability of replacement parts. Purchasers requiring quicker repair may receive such with payment of a *PushCorp* predetermined expediting fee.

This Limited Warranty gives you specific legal rights and you may also have other rights which vary from state to state.

2.0 General Overview

The PushCorp Universal Control Cabinet provides a highly integrated, easy to use solution for controlling any PushCorp servomotor device and compliance equipment. Installation is simply a matter of mounting the cabinet and connecting 3-phase, 480VAC power, the safety inputs/outputs, and a single ethernet connection. The Universal Control Cabinet allows the equipment to be controlled via a remote PLC or robot controller using an Ethernet IP fieldbus connection.

NOTE: There is an option for a ProfiNet eEnabled Universal Control Cabinet. Ask your PushCorp Sales Engineer for more information, or send an email to sales@pushcorp.com.

3.0 Installation

3.1 Control Cabinet Mounting

The cabinet is designed to be wall mounted outside the robot work area in a relatively clean environment.

The enclosure measures 20”x24”x30”. The dimensions of the mounting tabs are shown in Figure 1.

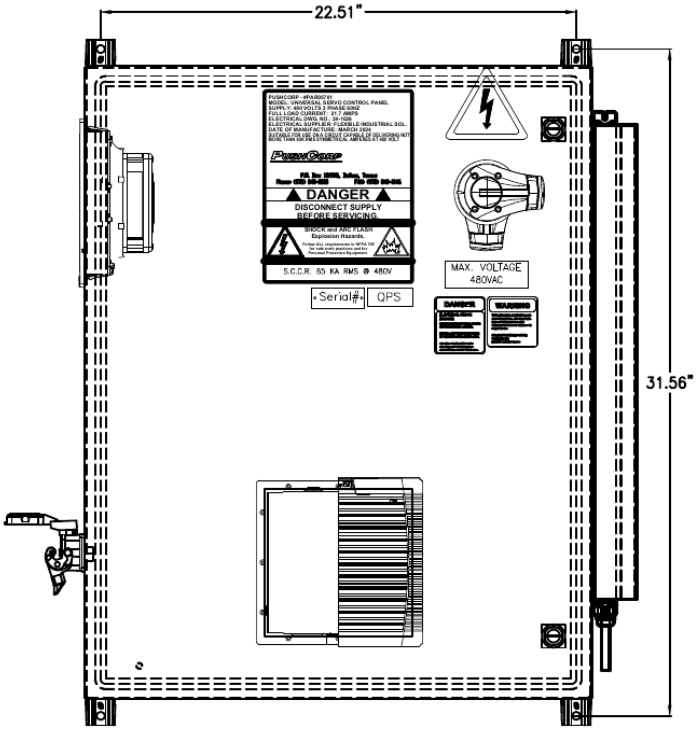


Figure 1: Panel Mounting Dimensions

3.2 Electrical Connections

The cabinet requires 480 VAC, 3-Phase, 50/-60 Hz power to operate. This should be supplied via a conduit connection to the resistor side of the cabinet. The control signal connections are made to the External Interface Blocks as shown in Figure 2.

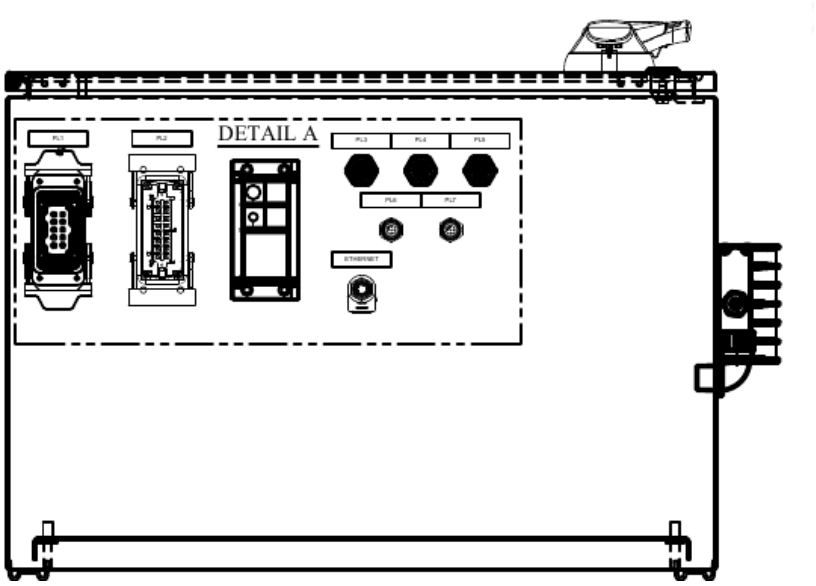


Figure 2: Panel Mounting Dimensions

3.3 Detailed Electrical Connections

As seen in Figure 3, the panel has several connectors to make connecting to both PushCorp devices and peripheral devices simple.

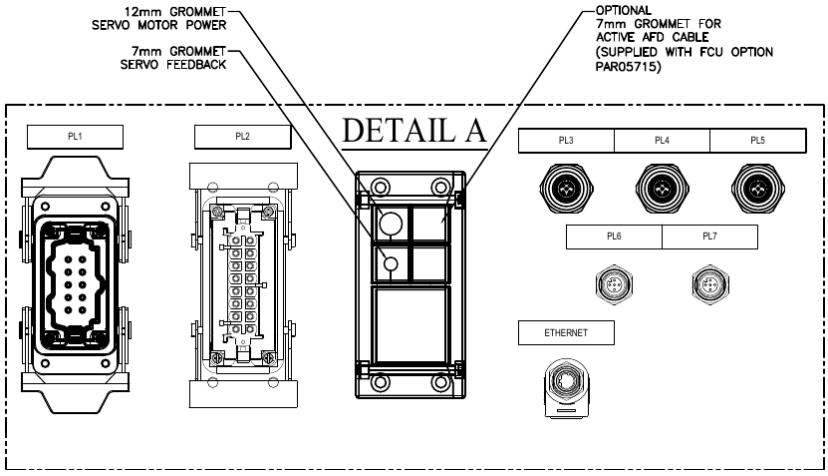


Figure 3: Panel Mounting Dimensions

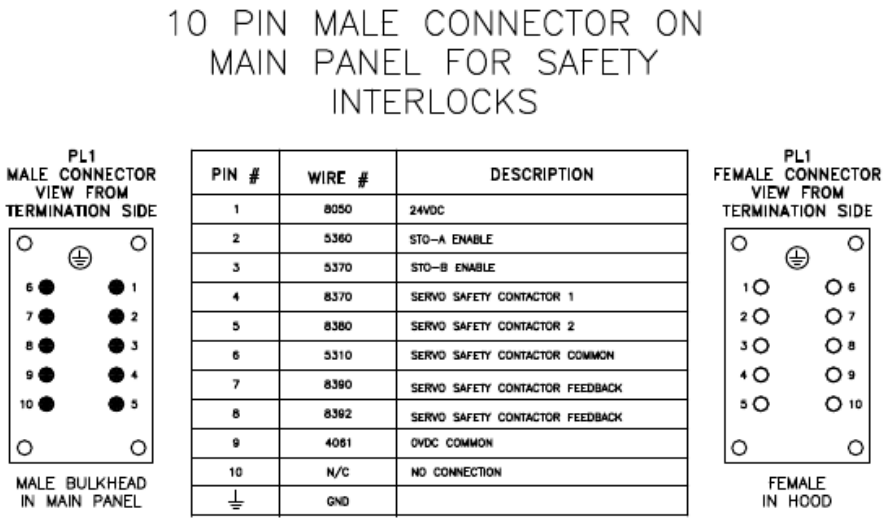
3.4 Safety Connections - PL1

The Universal Control Panel is outfitted with a standard “Harting Style”, 10-pin, male bulkhead connector, Weidmuller PN 248858000.

The mating cable-side connector is Weidmuller PN 1204100000 with a matching size 4 hood, PN 1654220000.

This is denoted as PL1 in all references to this connector.

The diagram in Figure 4 shows the pin numbers and descriptions for the safety connections of the control panel.



PIN #	WIRE #	DESCRIPTION
1	8050	24VDC
2	5360	STO-A ENABLE
3	5370	STO-B ENABLE
4	8370	SERVO SAFETY CONTACTOR 1
5	8380	SERVO SAFETY CONTACTOR 2
6	5310	SERVO SAFETY CONTACTOR COMMON
7	8390	SERVO SAFETY CONTACTOR FEEDBACK
8	8392	SERVO SAFETY CONTACTOR FEEDBACK
9	4061	0VDC COMMON
10	N/C	NO CONNECTION
⏚	GND	

Figure 4: Safety Connections

Pin 1 is internally supplied 24VDC from the controller's power supply.
Pin 10 is internally supplied 0VDC from the controller's power supply.

STO1-ENABLE and STO2-ENABLE are configured to be either connected through a pair of dry contacts with 24VDC from Pin 1. Or the STO1-ENABLE and STO2-ENABLE can be energized through an external 24V digital signal. These two connections shall satisfy the dual channel required in most robotic applications.

SERVO SAFETY CONTACTOR 1 AND SERVO SAFETY CONTACTOR 2 will need to be connected to a 24V signal, preferably from a safety rated I/O point. This will in turn actuate the contactors and supply 480V to the servo amplifier on the panel.

SERVO SAFETY CONTACTOR COMMON will need to be connected to an external 0V.

Both SERVO SAFETY CONTACTOR FEEDBACK connections are connected to a normally closed contact. These contacts will open when the contactors are actuated, the STOs are enabled, and the RTO signal from the drive is on.

The RTO signal indicates that the drive has power and there are no faults. The feedback signal is also connected to the internal IO module in the panel. If you choose to monitor these through the fieldbus connection, the signal designation can be found in section 5.2.1.

One cable-side hood insert set is included with the panel from the factory. The cable to connect to an external safety interface is not included and must be provided by

the purchaser of the systems. A cable gland is provided with the hood, Weidmuller PN1569100000, and will accept a cable diameter between 10 and 14 mm.

Cross references for the hood and insert are:

TE

Insert - T2040102201-000 (HE-010-F)
Hood - T1220100116-000 (H10B-TG-PG16)

Phoenix Contact

Insert - 1648186
Hood - 1412622

NOTE: It is the responsibility of the System Integrator and/or End-user to follow all applicable electrical codes and OSHA safety standards when wiring the control cabinet. This includes the proper and judicious use of ground termination, fuses, contactors, cut-off switches, lock-out switches, and Emergency Stop circuits. PushCorp assumes no responsibility or liability for the electrical system design and implementation of the control cabinet in the End-user application. Refer to OSHA rules and regulations and the CE Machinery Regulations (IEC 204-1) when designing systems that include motors and drives to ensure the users are protected.

PushCorp will provide answers to any questions regarding the servo drive system and will be responsible for any warranty issues.

NOTE: Please contact PushCorp (Tel 1.972.840.0208) directly for any technical support.

3.5 Digital Inputs

There are three A-Coded 4-pin M12 bulkheads on the bottom of the panel which provide access to the digital inputs and outputs of the panel.

PL3 and PL4 are both 24VDC digital inputs. These are female 4-pin A-Code M12 with the input being taken on Pin 4. The rest of the wiring is standard for an M12 input.

3.6 Digital Outputs

PL5 is a female 4-pin A-Code M12 wired to be able to be used with single ended cord or a "Y" splitter. It has a 24VDC output on both Pin 4 and Pin 2. When the Y cord is used, the output will be on Pin 4 of each split M12s.

On PL5 the 24VDC to the connector is through Pin 1 and 0VDC to the connector is on Pin 3.

3.7 Analog Input

PL6 is an analog input (0-10VDC) female 4-pin A-Code M12, configured to work with PushCorp's Passive AFDs for carriage position feedback.

3.8 Analog Output

PL7 is an analog output (0-10VDC) female 4-pin A-Code M12. The output is on Pin 2 and the 0VDC reference is on Pin 3. Commonly used for electronic regulator control.

3.9 Ethernet Connection

The Ethernet connection is a female 4-pin D-Code M12.

3.10 PL2 – Optional Equipment Control

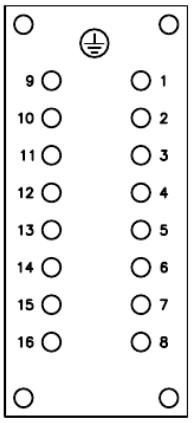
The PL2 connector is also a "Harting Style" connection which brings additional control capability out of the panel and into the process. The primary purpose of this connector is to control the tracking wheel of PushCorp's belt sander products: such as the SBS82, SBS92 or the RBS372. It can, however, be used to expand the IO capability of the system so that other components may be controlled by the Universal Controller. This allows for additional IO within the panel to be available to external devices through the 16-pin PL2 connector.

3.11 Belt Sander Control

When using the PL2 with the SBS82 or SBS92 floor standing belt sanders, there is an additional option box available to handle the belt tracking functions of these units. The pinout for the 16 pin connector is shown below in Figure 5.

16 PIN FEMALE CONNECTOR ON MAIN PANEL FOR OPTIONAL EQUIPMENT

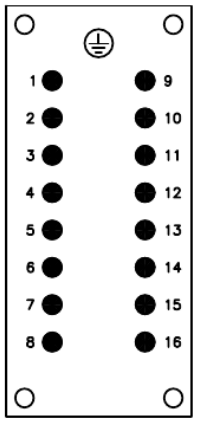
PL2
FEMALE CONNECTOR
VIEW FROM
TERMINATION SIDE



FEMALE BULKHEAD
IN MAIN PANEL

PIN #	WIRE #	DESCRIPTION
1	4061	0VDC COMMON
2	8110	24VDC COMMON (PLC)
3	8080	24VDC COMMON (BSRCon ACTUATOR CTRL PWR)
4	I:1.1/8	LEFT BELT EXTENDED (SBS81/91 ONLY)
5	I:1.1/9	RIGHT BELT EXTENDED
6	I:1.1/10	LEFT BELT RETRACTED (SBS81/91 ONLY)
7	I:1.1/11	RIGHT BELT RETRACTED
8	I:1.1/12	SPARE INPUT
9	I:1.1/13	SPARE INPUT
10	O:1.2/8	SPARE OUTPUT
11	O:1.2/9	SPARE OUTPUT
12	O:1.2/10	SPARE OUTPUT
13	O:1.2/11	SPARE OUTPUT
14	O:1.2/12	SPARE OUTPUT
15	O:1.2/13	SPARE OUTPUT
16	N/C	NO CONNECTION
⏚	GND	

PL2
MALE CONNECTOR
VIEW FROM
TERMINATION SIDE



MALE
IN HOOD

Figure 5: PL2 Wiring Inputs and Outputs

When the Tracking Control Box is required, ASM03827 should be ordered from PushCorp. This will connect to the Universal control panel through cable 3896G-5717M14-3895G. This cable is 14m standard, and can be custom ordered in 1m increments, up to 30m long. The 3896G-5717M14-3895G cable will connect from the PL2 connector to the PL2.1 connector on the Tracking Control Box. PL30 will then connect from the Tracking Control Box to the SBS82/92 using cable 949-3946M14-3894G. This cable is also provided in a 14m standard length, and is available in 1m increments up to 30m long. You can see the graphic representation of the Tracking Control Box in Figure 6.

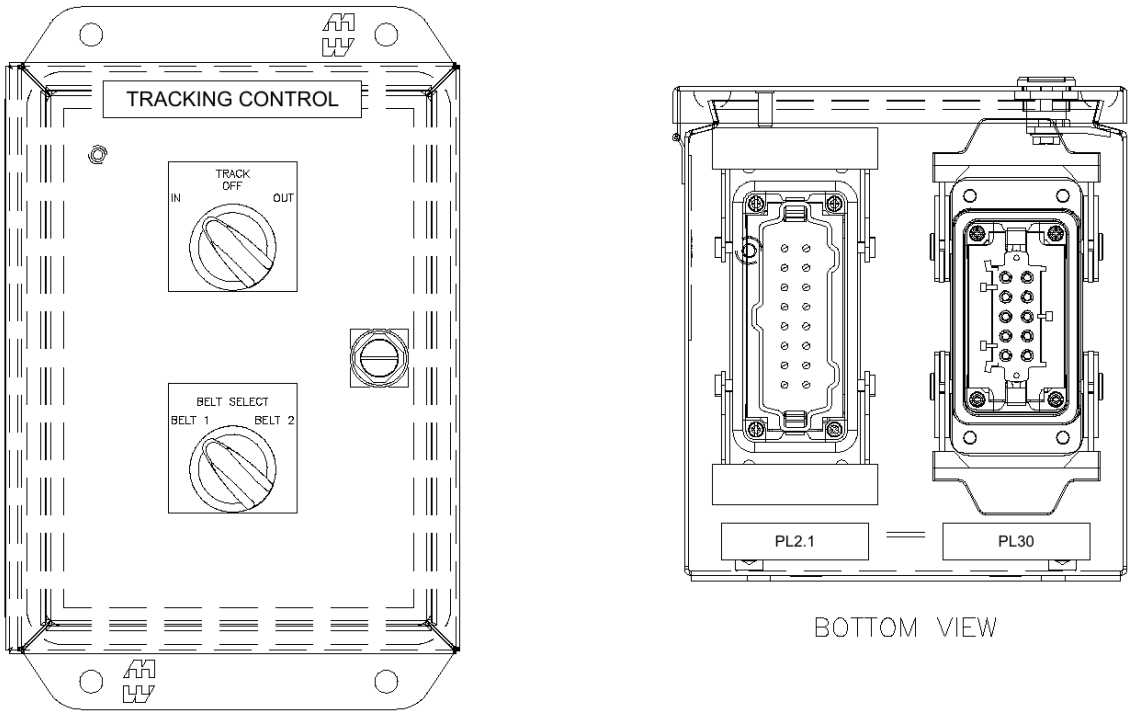


Figure 6: Tracking Control Box

4.0 Controls Architecture

4.1 IP Address Assignment

The PushCorp Universal Control Panel has three devices which will have three IP addresses assigned to it, the Kollmorgen AKD2G servo amplifier, Phoenix Contact Axio Coupler and the PushCorp FCUFLEX.

These devices leave the factory with the following IP addresses assigned.

Phoenix Contact – Axio Coupler – 192.168.1.10

FCUFLEX – Anybus I/O module – 192.168.1.11

FCUFLEX – Programming Port – 192.168.1.12

AKD2G – EIP – 192.168.1.13

AKD2G – Programming Port – 192.168.1.14

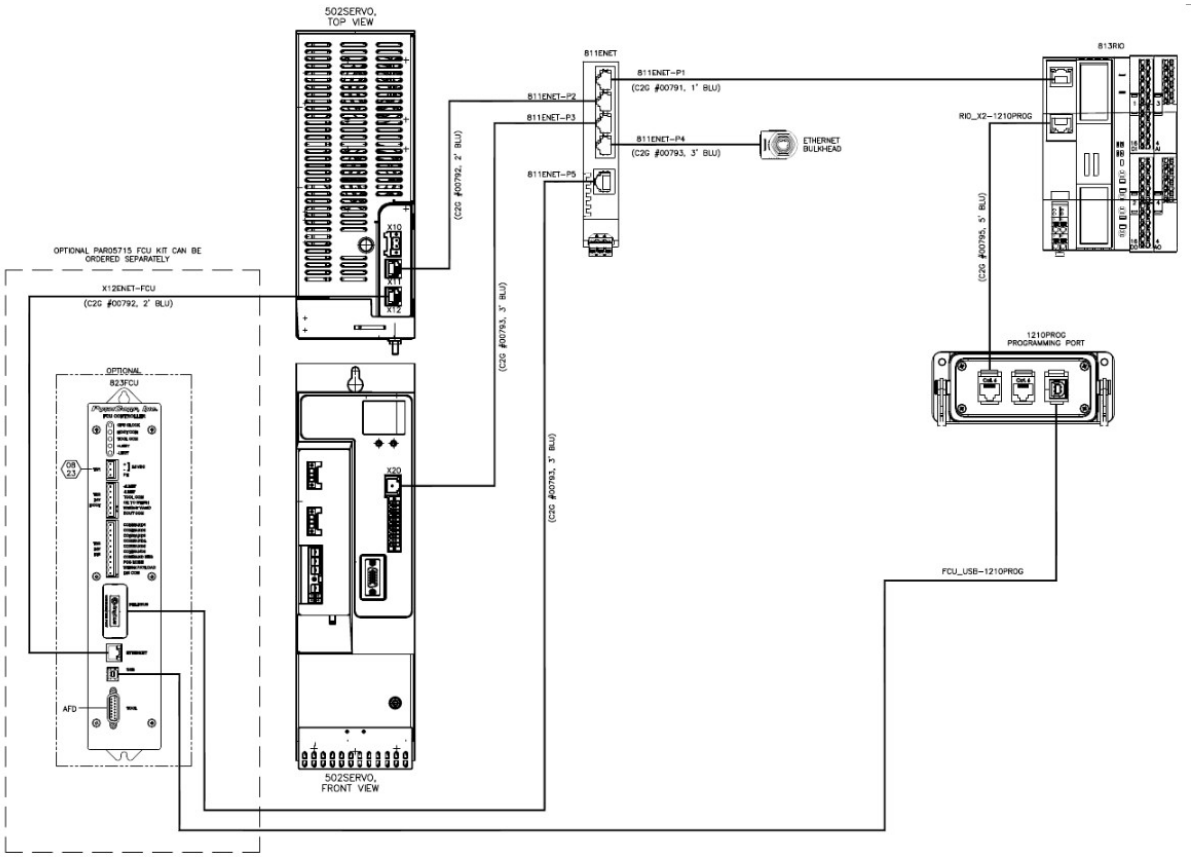


Figure 7: Hardware Layout

4.2 Software-based Configuration

FCUFLEX – Fieldbus IO module -
https://cloud.pushcorp.com/webdata/software/hms-IPConfigTool.zip

FCUFLEX – Programming Port - AFD Dashboard -
http://www.pushcorp.com/pages/software/afddashboard.msi

Kollmorgen AKD2G – Programming Port and Fieldbus
Kollmorgen Workbench

4.3 Web-based Configuration

The Phoenix Contact Axio Coupler and the FCUFLEX Anybus Module can be configured through a web browser by inputting the device's IP address in the address bar. This will open an interface where you can change the device IP address and save the configuration.

For the Phoenix Contact, you will need to enter the password "private" into the three password fields before the changes will take effect.

To change the IP Address of the Kollmorgen AKD2G, the Kollorgen Workbench Utility will need to be used.

5.0 Ethernet IP EDS File Information

5.1.1 Axio Coupler Configuration

VendCode = 562;

ProdType = 12;

ProdCode = 8169;

MajRev = 1**

MinRev = 2**

Connection Instance: 0

Producing Connection: 110

Consuming Connection: 100

Input Scanner Size: 10

Words Output Scanner Size: 10 Words

**NOTE: If your connection requires the major and minor revision be input to the configuration and the above configuration did not work, use the last digit for each HW/FW on the side of the Phoenix Contact AXIO module. Example: HW/FW 00/111 Major Rev – 0 Min Rev – 1.

5.1.2 Axio Coupler Configuration

VendCode = 1444;

ProdType = 43;

ProdCode = 55;

MajRev = 1;

MinRev = 1;

Connection Instance: 1

Producing Connection: 100

Consuming Connection: 150

Input Scanner Size: 10 Words

Output Scanner Size: 5 Words

5.1.3 Kollmorgen AKD2G Configuration

VendCode = 452

VendName = "Kollmorgen"

ProdType = 43

ProdTypeStr = "Generic Device”

ProdCode = 20

MajRev = 1

MinRev = 3

ProdName = "AKD2G-SPI"

Connection Instance: 2

Producing Connection: 104

Consuming Connection: 103

Input Scanner Size: 7 Words

Output Scanner Size: 3 Words

5.2 Component I/O Mapping

5.2.1 Axio Coupler I/O Map

Control Outputs to AXIO					Control Inputs from AXIO				
Words	Bytes	Bits	DESCRIPTION		Words	Bytes	Bits	DESCRIPTION	
0	0-1	0-15	Reserved		0	0	0	Contactor 1 On	
							1	Contactor 2 On	
							2	User Defined	
1	2	16	PL5 Pin 4 User Defined				3	User Defined	
		17	PL5 Pin 2 User Defined				4	PL3 User Defined	
		18	Servo Enable				5	PL4 User Defined	
		19	User Defined				6	User Defined	
		20	User Defined				7	User Defined	
		21	User Defined			1	8	User Defined	
		22	User Defined				9	User Defined	
		23	User Defined				10	User Defined	
	3	24	User Defined				11	User Defined	
		25	User Defined				12	User Defined	
		26	User Defined				13	User Defined	
		27	User Defined				14	User Defined	
		28	User Defined				15	User Defined	
		29	User Defined		1	2-3	16-31	Reserved	
		30	User Defined						
		31	User Defined						
2	4-5	32-47	Analog Output	Reserved	2	4-5	32-47	Analog Input	PL6-Passive AFD Feedback
3	6-7	48-63	Analog Output	Reserved	3	6-7	48-63	Analog Input	User Defined
4	8-9	64-79	Analog Output	Reserved	4	8-9	64-79	Analog Input	User Defined
5	10-11	80-95	Analog Output	Reserved	5	10-11	80-95	Analog Input	User Defined
6	12-13	96-111	Analog Output	PL7 Pin 2 – User Defined	6	12-13	96-111	Analog Input	Reserved
7	14-15	112-127	Analog Output	PL7 Pin 3 – User Defined	7	14-15	112-127	Analog Input	Reserved
8	16-17	128-143	Analog Output	User Defined	8	16-17	128-143	Analog Input	Reserved
9	18-19	144-159	Analog Output	User Defined	9	18-19	144-159	Analog Input	Reserved

5.2.2 FCU I/O Map

Control Outputs to FCUFlex					
Word	Byte	Bits	Description		Scaling
1	1-2	0-15	Set Command Force		X10
2	3-4	16-31	Set Command Position		X100
3	5-6	32-47	Set Payload Weight		X10
4	7	48	OFF-Position Mode	Control Mode	None
			ON-Force Mode		None
		49	SoftTouchEnable		None
		50	Reserved		None
		51-55	SoftTouchPosition		x31
	8	56-60	SoftTouchForce		x31
		61-63	Reserved		None
5	9	64	Weight Payload		None
		65-71	Reserved		
	10	72-79	Reserved		

Control Inputs from FCUFlex					
Word	Byte	Bits	Description		Scaling
1	1	0	CPU Heartbeat		None
		1	Host Communication		None
		2	Tool Communication		None
		3	Metric Unit		None
		4	Pos Limit		None
		5	Neg Limit		None
		6	At Weight Position		None
		7	Weighing in Progress		None
	2	8	Weight Valid		None
		9-15	Reserved		None
2	3-4	16-31	Actual Force		X10
3	5-6	32-47	Actual Position		X100
4	7-8	48-63	Accel Gravity		X1000
5	9-10	64-79	Command Force		X10
6	11-12	80-95	Command Position		X100
7	13-14	96-111	Payload Weight		X10
8	15	112	OFF-Position Mode	Control Mode	None
			ON-Force Mode		None
		113	SoftTouch Enable		None
		114	SoftTouch Active		None
		115-119	SoftTouch Position		x31
	16	120-124	SoftTouch Force		x31
		125-127	Reserved		None
9	17-18	128-143	Max Force		X10
10	19-20	144-159	Max Position		X100

5.2.3 AKD2G I/O Map

Control Outputs to AKD2G				Control Inputs from AKD2G			
Word	Byte	Bit	Description	Word	Byte	Bit	Description
0	0	0	Clear Fault	0	0	0	Fault
		1	Velocity Enable			1	User Configurable
		2	Go Tool Change*			2	At Tool Change*
		3	User Configurable			3	User Configurable
		4	User Configurable			4	User Configurable
		5	User Configurable			5	User Configurable
		6	User Configurable			6	User Configurable
		7	User Configurable			7	User Configurable
	1	8	User Configurable		1	8	User Configurable
		9	User Configurable			9	User Configurable
		10	User Configurable			10	User Configurable
		11	User Configurable			11	User Configurable
		12	User Configurable			12	User Configurable
		13	User Configurable			13	User Configurable
		14	User Configurable			14	User Configurable
		15	User Configurable			15	User Configurable
1	2-3	N/A	Velocity Command	1	2-3	N/A	Actual Velocity
2	4-5	N/A		2	4-5	N/A	
				3	6-7	N/A	Actual Amperage
				4	8-9	N/A	
				5	10-11	N/A	Motor Temperature
				6	12-13	N/A	

*Only used with STC1015 & STC1515

7.0 Technical Specifications and Schematics

Supply Voltage: 480 VAC, 3-Phase
Max. Cont. Current: 30 Amps
Max. Peak Current: 60 Amps (2 Seconds)
Dimensions: 16” x 24” x 30” (DxWxH)
Weight: 250 lbs

Specifications subject to change without notice.