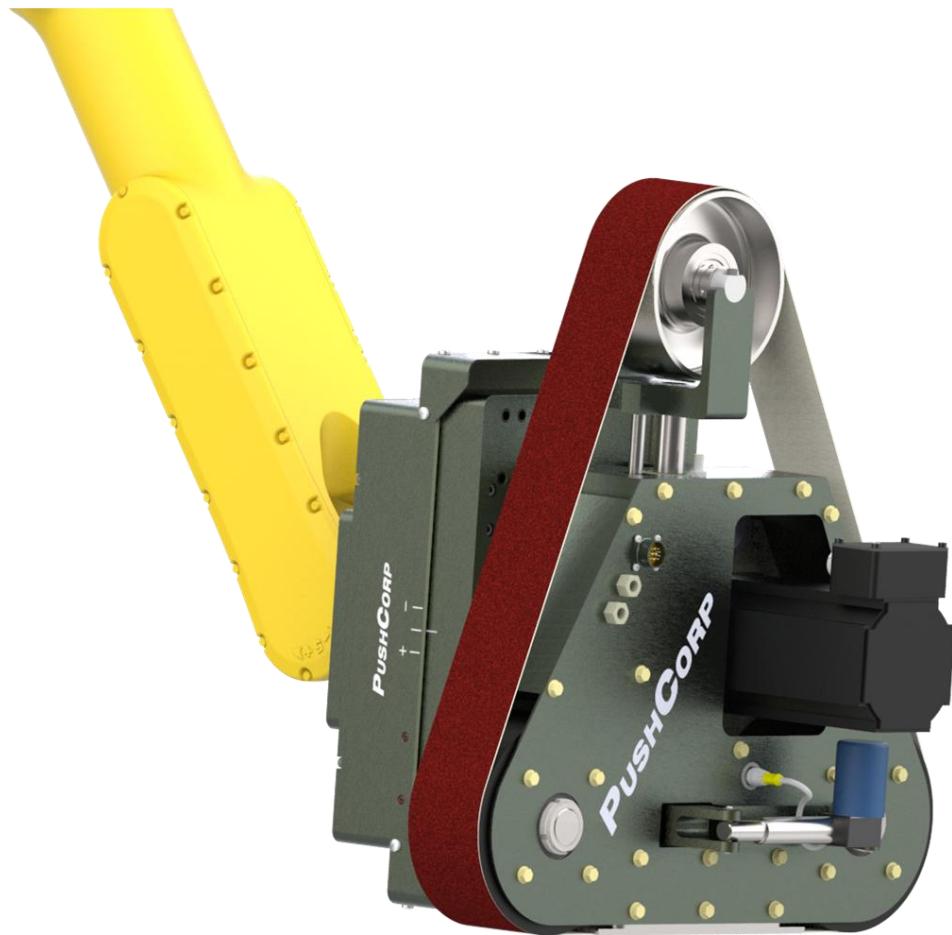


# **RBS372 Series**

*Robotic Belt Sander*



**Manual**

***PUSHCORP***

**NEVER OPERATE THE RBS372  
MANUALLY**

**NEVER OPERATE THE RBS372 WITH  
PERSONNEL IN THE WORKCELL**

**DO NOT USE LUBRICATED AIR.**

**This device requires a dry, non-lubricated  
80 psi (5.5 bar) maximum air supply  
filtered to 5  $\mu\text{m}$  and a 0.3 micron oil mist  
separator.**

**Non-compliance with these requirements  
will void the manufacturer's warranty.  
(See Section 3.4)**

**All fasteners, mounting holes, and pipe  
threads on this tool are METRIC**

**All *PushCorp, Inc.* electrical cables are rated for high  
twist and flex robotic applications with a minimum  
cable bending radius specification of 125mm (5 in).  
Cable damage resulting from failure to abide by this  
specification will not be covered under warranty.**

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## **1.0 LIMITED WARRANTY**

### **Duration:**

One year from date of delivery to the original purchaser.

### **Who gives this warranty:**

*PushCorp*

Telephone: (972) 840-0208

### **Corporate Address:**

P. O. Box 181915  
Dallas, Texas 75218

### **Shipping Address:**

3001 W. Kingsley Rd.  
Garland, Texas 75041

### **Who gives 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* industrial equipment or 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, INC.* 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, Inc.* product or component to PushCorp, Inc. 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, Inc.* 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 RBS372 Series Robotic Belt Sander is a lightweight and compact, material removal and surface finishing tool. It has been designed from the ground up as a robotic belt-sanding unit with many new and unique features. The RBS372 uses standard 3" wide by 72" long belt media. Closed-loop servo motor speed control technology combined with this long lasting belt media makes short work of most sanding operations.

Three different sanding configurations are available: a flat platten area, a 7-inch (178-mm) contact wheel, and the slack area of the belt media. The PushCorp supplied mounting plate allows attachment of the RBS372 to an AFD carriage in three different orientations. Having these mounting options allow either the platten or contact wheel to be aligned with the AFD carriage axis of compliance. Working on the slack of the belt media generally does not require compliance.

In most any finishing process, consistency is of paramount importance. For this reason the RBS372 is powered by a high torque servo motor with adjustable speed control that can be varied at any time during the finishing process. The unit has a 4.8 horsepower (3.58 kW) motor that supplies 8.8 lb-ft (12 N-m) of torque at the drive wheel. A timing belt drive system provides a 1.2:1 torque advantage via high-strength, Poly-Chain belt, for long life and increased durability.

The RBS372 has two additional important features designed specifically for operating in a robotic workcell. First, the Belt Media may be remotely tracked from outside the workcell. This feature enables an operator to adjust the sanding belt tracking while the tool is safely isolated within the robot workcell. A linear actuator operated via a single 24 VDC signal provides a simple control solution to the remote tracking operation. Secondly, the belt media can be installed or removed by remotely extending or retracting the tracking wheel. Pneumatic pressure is supplied to the unit to provide proper belt media tension. Supplying pressure to the unit extends the tracking wheel actuator, and allows the customer to remotely adjust belt media tension. Removing the pressure releases the tension on the Belt Media, allowing it to be easily replaced.

## 3.0 INSTALLATION

### 3.1 Mounting the RBS372

#### 3.1.1 Mounting the RBS372 on an AFD90/1240

The RBS372 Robotic Belt Sander is designed to be mounted on an AFD90/1240 adjustable force device. To mount the RBS372 to an AFD: first detach the Mounting Plate by removing the eight (8) M6x1x20 Socket Head Cap Screws securing it to the RBS. The Mounting Plate has three (3) sets of four (4) holes for mounting directly to the AFD90/1240. Each of the four (4) hole sets allows the RBS to be oriented in three different positions relative to the Carriage travel. Position the Mounting Plate on the AFD Carriage and secure it using four (4) M8x1.25x22 Socket Head Cap Screws. Finally reattach the RBS to the Mounting Plate using the eight (8) M6 fasteners previously removed (See Figure 1). Tighten all the fasteners to the torque specified in Section 5.0. If the PushCorp supplied Mounting Plate is not used, the customer is responsible for providing a Drive Belt guard. **Do not operate the RBS without a Drive Belt guard.**

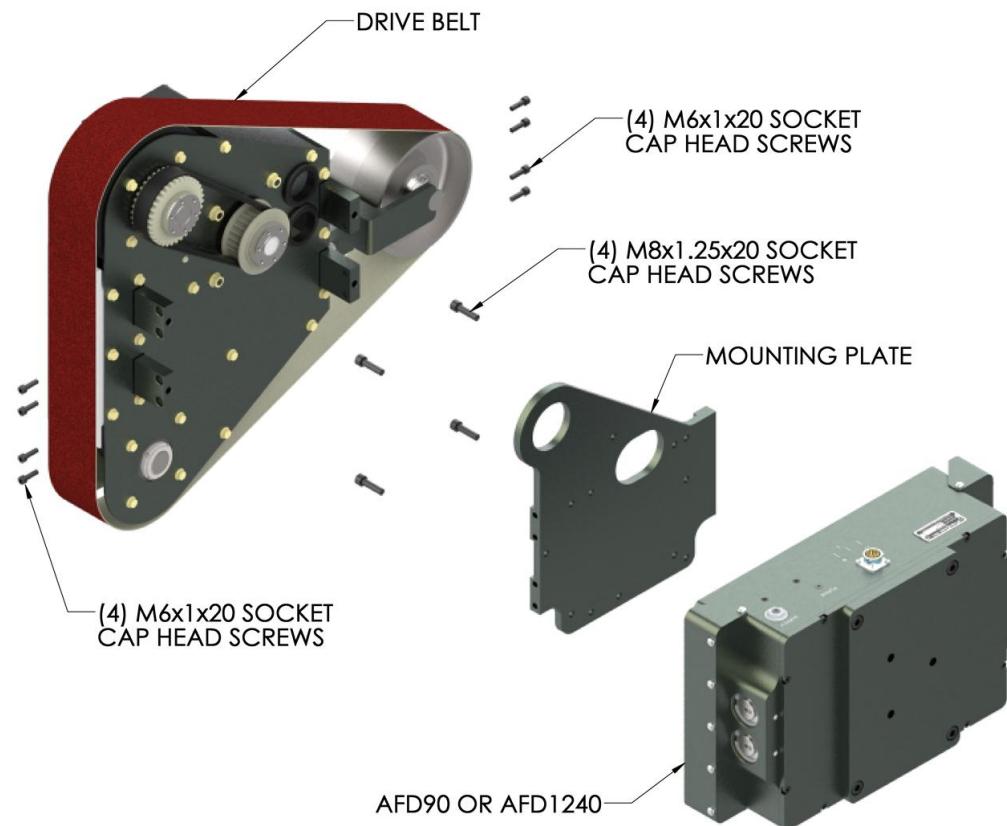
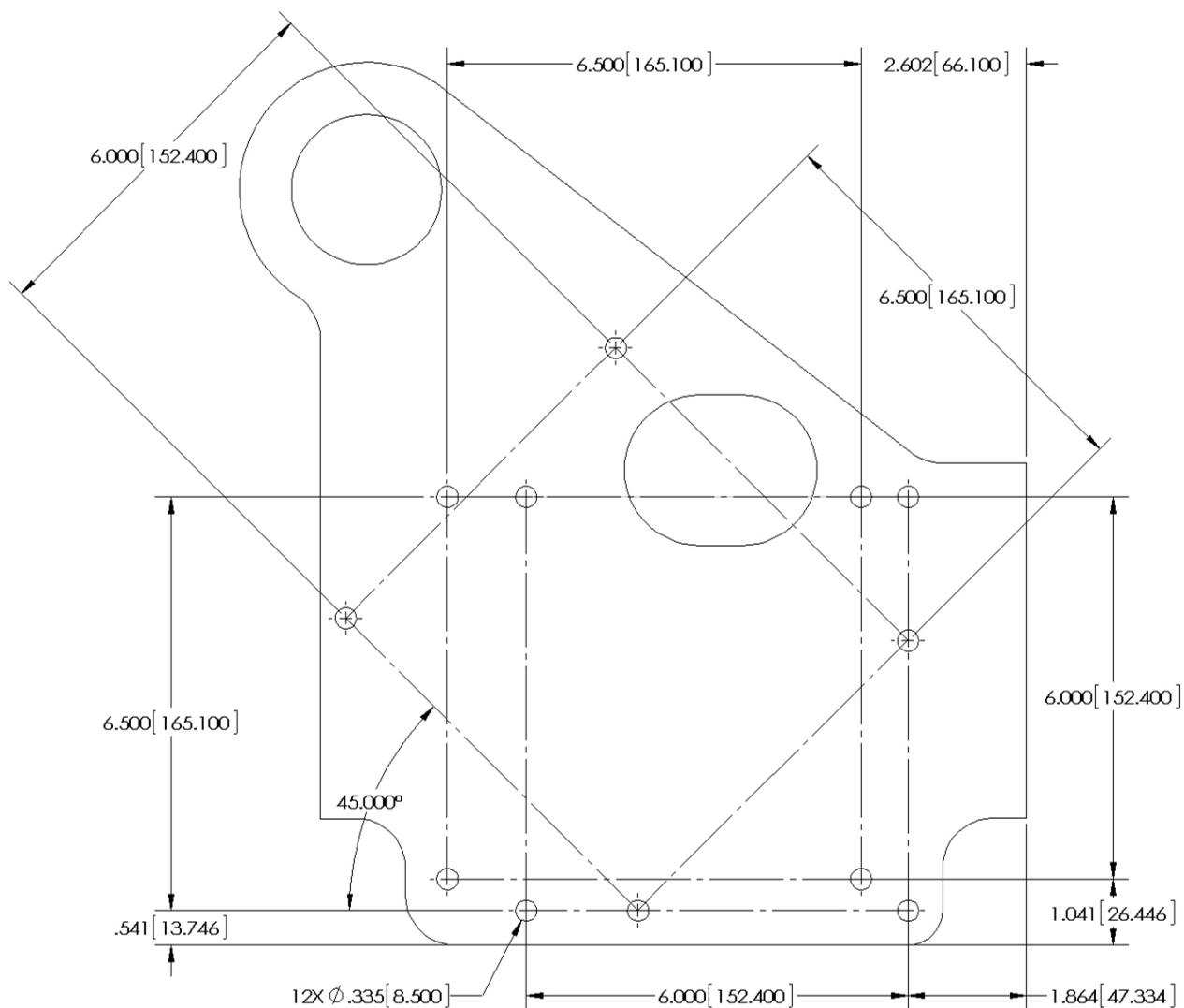


Figure 1: Mounting the RBS372 to an AFD

#### 3.1.2 Rigid Mounting of the RBS372

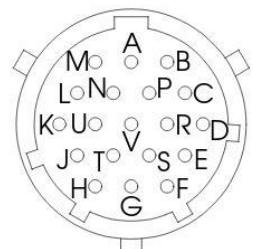
For some applications the RBS372 may be used without a compliant device. The unit can be rigidly mounted to the robot arm, or to a fixed mounting plate. Figure 2 shows the available mounting holes.



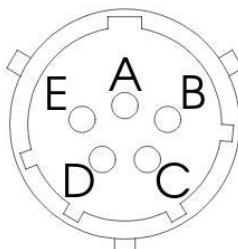
**Figure 2: Mounting Plate Hole Locations**

### 3.2 Electrical Connections

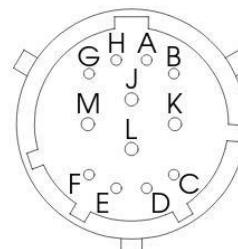
The RBS372 requires three electrical cables, Motor Power, Motor Feedback, and Belt Tracking Control (See Figure 6). If PushCorp supplies the electrical cables and servo motor amplifier the tool should be easily connected. The Motor Power, Motor Feedback, and Belt Tracking Control connectors are shown below in Figure 3.



MOTOR FEEDBACK



MOTOR POWER



BELT TRACKING ACTUATOR

FEEDBACK PIN-OUTS

PIN	SIGNAL
A	HALL + SUPPLY
B	HALL - SUPPLY
C	HALL C
D	HALL B
E	HALL A
F	THERMISTOR
T	THERMISTOR
V	SHIELD

POWER PIN-OUTS

PIN	SIGNAL
A	MOTOR A
B	MOTOR B
C	MOTOR C
D	GROUND
E	SHIELD

TRACKING PIN-OUTS

PIN	SIGNAL
A	TRACKING +
B	TRACKING -
C	+24V SENSOR POWER
D	OV SENSOR POWER
E	BELT BREAK OUT
F	TENSION RETRACT OUT

Figure 3: RBS372 Connector Pin-Outs

RBS372 INTERNALS

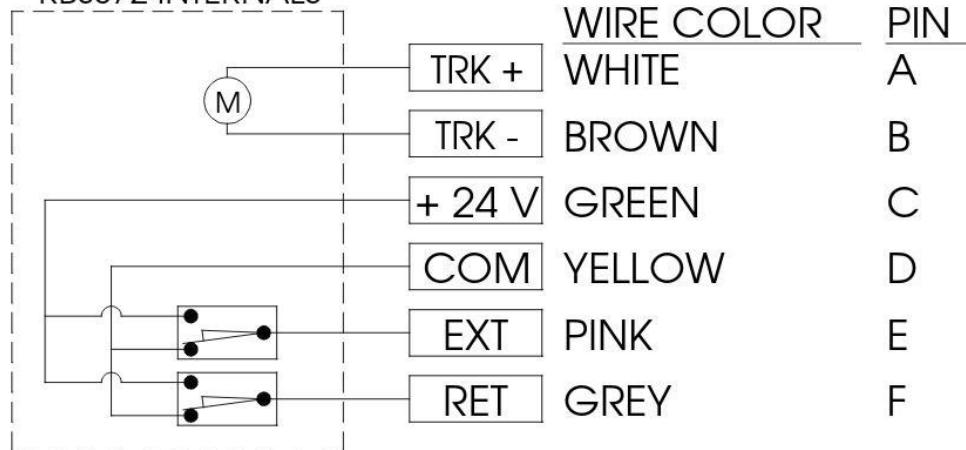


Figure 4: RBS372 Electrical Connections

### 3.2.1 AKD2G Servo Amplifier – Default Electrical Connections

#### Amplifier Default Configuration

This amplifier is already properly configured for a PushCorp spindle. No further configuration is required if the below settings will work for your application.

#### Analog Interface

Conne ctor	Pin	Function
X21	A1	Analog-In 1+ : +/-10VDC Command Velocity
X21	A2	Analog-In 1- : +/-10VDC Command Velocity
X21	B1	Analog-Out 1 : 0 - 10VDC Velocity Monitor
X21	B2	AGND : Analog GND
CASE		Shield

#### Digital Interface

Conne ctor	Pin	Function
X21	A3	Digital-In 1 : Fault Reset Input
X21	A4	Digital-In 2 : Run Input
X21	A5	Enable : Enable Drive Input
X21	B3	+24VDC : Digital Output Supply
X21	B4	DGND : Digital I/O Common
X21	B5	BTB/RTO : Ready To Operation (Dry Contact)
X21	B6	BTB/RTO : Ready To Operation (Dry Contact)
X21	B7	Digital-Out 1 : Motor Overload Warning
X21	A11	STO-A-A1 : Safety Torque Off A Input
X21	B11	STO-B-A1 : Safety Torque Off B Input

**For more information an instruction manual is available at:**

[http://www.pushcorp.com/Manuals/Kollmorgen\\_AKD2G\\_Instruction\\_Manual.pdf](http://www.pushcorp.com/Manuals/Kollmorgen_AKD2G_Instruction_Manual.pdf)

### 3.2.2 S724 Servo Amplifier – Default Electrical Connections

#### Kollmorgen Default Configuration

This amplifier is already properly configured for a PushCorp spindle. No further configuration is required if the below settings will work for your application.

#### Analog Velocity Mode

*+/-10VDC Analog Input for command velocity*

#### Analog Interface

Connector	Pin	Function
X3B	9	-Analog-In 1 – Command Velocity
X3B	10	+Analog-In 1 – Command Velocity
X3B	13	AGND - Shield

#### Digital Interface

Connector	Pin	Function
X3A	1	Enable – Enable Drive Output
X3A	2	Digital-In 1 – Fault Reset
X3A	6	Digital-Out 1 – Fault Present
X3A	7	Digital-Out 2 – At Zero Speed
X3B	14	BTB/RTO – Ready To Operation (Dry Contact)
X3B	15	BTB/RTO – Ready To Operation (Dry Contact)
X3B	16	DGND – Digital 0VDC Common

#### Optional Analog Output (MUST HAVE ANALOG CARD INSTALLED IN SLOT 3)

Connector	Pin	Function
X3C	17	Analog Out 1 - Velocity Feedback
X3C	18	AGND
X3X	19	Analog Out 2 - Motor Load Feedback
X3C	20	AGND

#### For all other questions please contact:

*PushCorp Tech Support: 1.972.840.0208, 8am – 5pm Central Time*

*Kollmorgen Tech Support: 1.540.633.3545, 8am – 5pm Eastern Time*



### 3.3 Pneumatic Connections

The Robotic Belt Sander requires a dry, non-lubricated, 5 micron filtered, 80 to 100 psi (5 to 7 Bar) air supply with a 0.3 micron oil mist separator. Failure to provide supply air to these specifications can degrade performance and will void any warranty repairs concerning pneumatic components. Additionally, a *minimum* 80 psi (5 Bar) air pressure must be maintained for the device to operate within published specifications. Low air pressure will not allow the Belt Media to be properly tensioned.

The pneumatic supply system should be configured as shown in Figure 5.

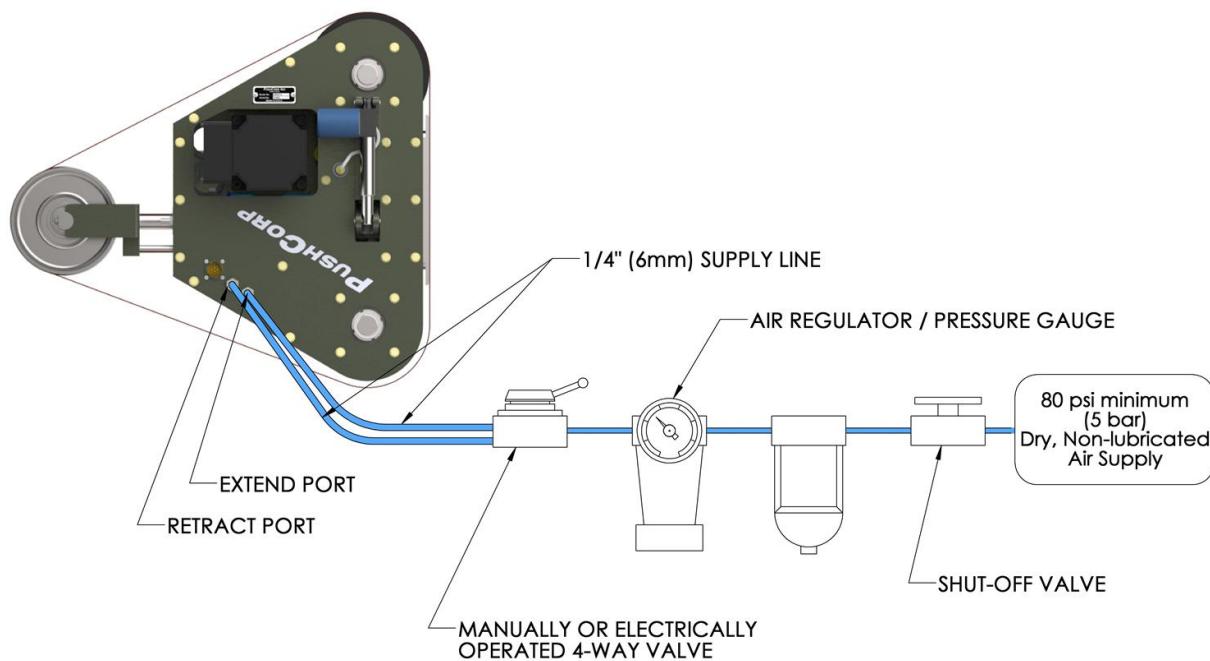


Figure 5: Pneumatic Configuration

**WARNING: If water condensation is a problem in your air supply system, an air dryer device is highly recommended. Moisture inside the device will cause premature failure that will not be covered under warranty.**

The RBS372 has two (2) pneumatic inputs; these are the two (2) female R 1/8 (Metric) ports shown in Figure 5. These ports supply the air pressure to extend and retract the Tracking Wheel. Before connecting the supply to the air fittings, open the supply valve to blow out any contaminants which may be in the line. Charge the supply line with compressed air and verify that there are no air leaks and that there is a minimum of 80 psi (5 Bar). If a minimum air pressure of 80 PSI cannot be achieved, then an auxiliary air compressor or booster pump must be installed.

## 4.0 OPERATION

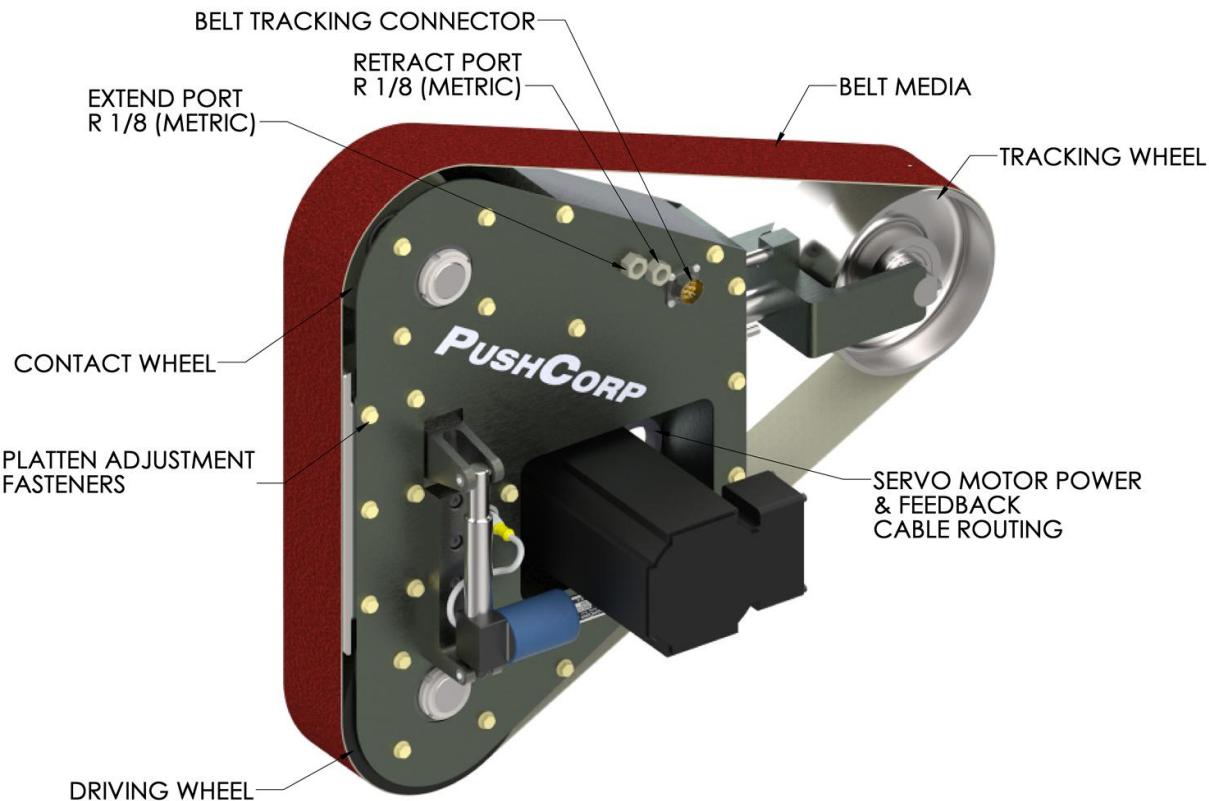


Figure 6: RBS372 Belt Stand

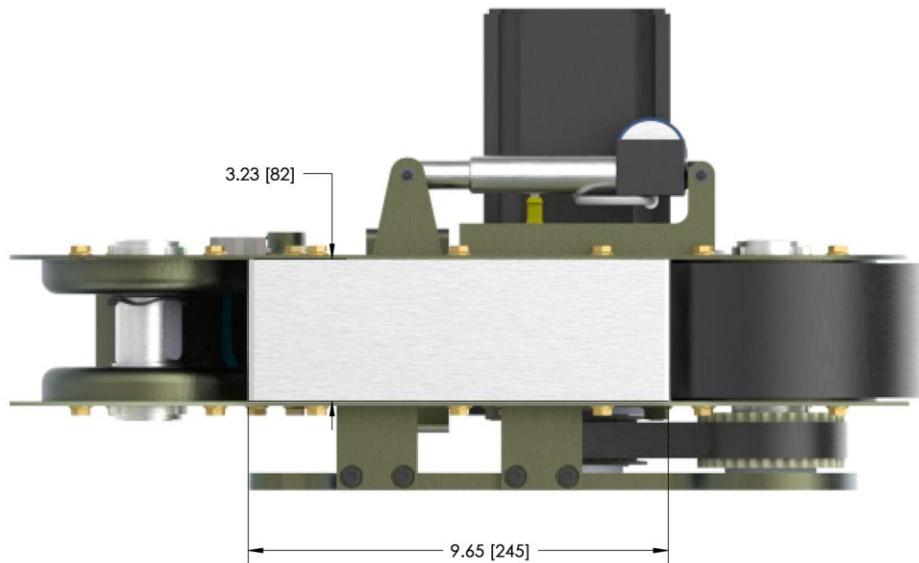


Figure 7: Platten Dimensions

#### 4.1 Belt Media Installation and Removal

The RBS372 uses 3" wide by 72" long Belt Media. To install new Belt Media, first supply pressure to the Retract Port to release the tension on the Belt Media. Install new Belt Media over the Contact Wheel, Drive Wheel, and the Tracking Wheel. Then tension the Belt Media by removing the pressure to the Retract Port, and applying pressure to the Extend Port. Reverse the previous steps to remove the Belt Media.

Proper tension is required for each Belt Media type and operation. The user is responsible for contacting the Belt Media manufacturer for the correct tension. The tension is adjusted by increasing or decreasing the pressure to the Extend Port. The conversion factor is listed below.

$$\begin{aligned}1 \text{ psi} &= 1.1 \text{ lbs. Belt Media Tension (English)} \\1 \text{ bar} &= 70 \text{ N Belt Media Tension (metric)}\end{aligned}$$

#### 4.2 Belt Media Tracking

The RBS372 uses an electromechanical linear actuator to adjust the tracking of the Belt Media. To track the Belt Media the user tilts the Tracking Wheel by energizing the Belt Tracking Actuator. Tilting the Tracking Wheel causes the Belt Media to move from side to side on the wheels. The Belt Tracking Actuator can not be back-driven and will hold its position after the signal has been removed. The Belt Media can only be tracked while the belt is in motion.

The Belt Tracking Actuator is a linear motion device driven by a DC motor. A 24 VDC supply applied to Pins A and B on the Belt Tracking Control connector energizes the motor and tilts the Tracking Wheel causing the Belt Media to move in one direction. Reversing the polarity of the applied 24 VDC signal tilts the Tracking Wheel to move the Belt Media in the opposite direction. Once the Belt Media has been successfully tracked, remove the signal, and the Belt Tracking Actuator will hold its position.

A double-pole, double-throw, center-off, momentary-contact, toggle switch will provide the simplest manual control implementation for the Belt Tracking Actuator.

**NOTE: Care must be taken to ensure that power to the Belt Tracking Actuator is not left on for an extended period of time after the actuator has reached the end of its travel or else overheating may occur.**

Over time, the tracking wheel that is controlled by the linear actuator will need to be replaced to maintain proper tracking accuracy. To properly replace the tracking wheel, use a 1/8" hex key to loosen the idler set screws, then remove the two M5 fasteners that mount the idler shaft to the tracking yoke. The tracking wheel can then be replaced, by sliding the new wheel onto the tracking shaft, remounting via the M5 fasteners, and tightening the idler set screws.

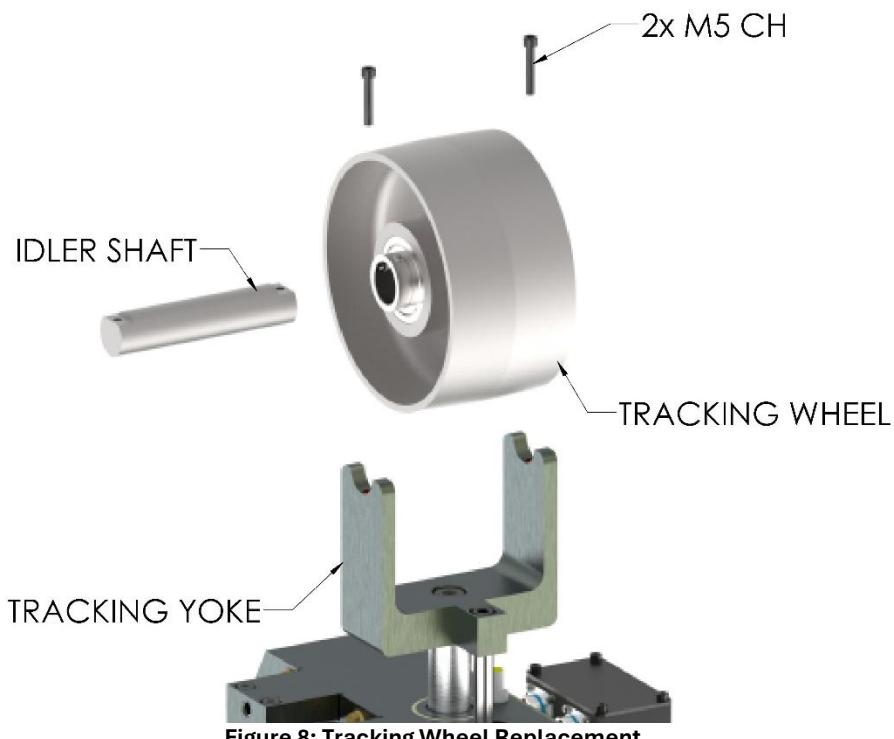


Figure 8: Tracking Wheel Replacement

#### 4.3 Achieving Desired Belt Media Speed

The user is responsible for determining the maximum speed for their Belt Media. The Servo Motor on the RBS372 can operate, in both directions, from 0 to 3460 rpm. Belt Media surface feet per minute (SFPM) can be calculated with the following conversion.

$$\begin{aligned}
 0 \text{ VDC Servo Amp Signal} &= 0 \text{ RPM Motor Speed} = 0 \text{ SFPM Belt Speed} \\
 10 \text{ VDC Servo Amp Signal} &= 3460 \text{ RPM Motor Speed} = 6338 \text{ SFPM Belt Speed}
 \end{aligned}$$

The belt speed varies linearly between these two operating points.

**WARNING! Do not exceed the Belt Media manufacturers maximum speed or injury could occur.**

#### 4.4 Platten Adjustment or Replacement

The steel Platten located between the Contact Wheel and Drive Wheel is used to provide a flat surface for the Belt Media to travel across. If the Platten is used it should be positioned to lightly touch the Belt Media using the six (6) Platten Adjustment Fasteners. When the Platten is not required it should be adjusted away (i.e., no contact) from the Belt Media to reduce the operating temperature.

#### 4.5 Drive Belt Replacement

The RBS372 uses a timing belt to transfer power from the Servo Motor to the Drive Wheel. This drive incorporates a high-strength Gates Poly Chain, PushCorp Part No. PAR02394-1. Should this Drive Belt ever require replacement, contact PushCorp for the proper procedure.

#### 4.6 Contact Wheel Replacement

For some applications the Contact Wheel will be used to press the Belt Media against the part. Because of this the Contact Wheel may need replacement, or a different style may be required than what is supplied. PushCorp can provide Contact Wheels with different rubber hardness or surface configurations. The following table shows the contact wheels available, **which should be specified at the time of purchase:**

Durometer	Contact Surface	Part #
70	Smooth	ASM01253
70	Serrated - 1/4" Land & Groove	ASM03659
30	Smooth	ASM03812
30	Serrated - 1/4" Land & Groove	ASM03661
30	Serrated - 1/2" Land & Groove	ASM03491
90	Serrated - 1/4" Land & Groove	ASM03807

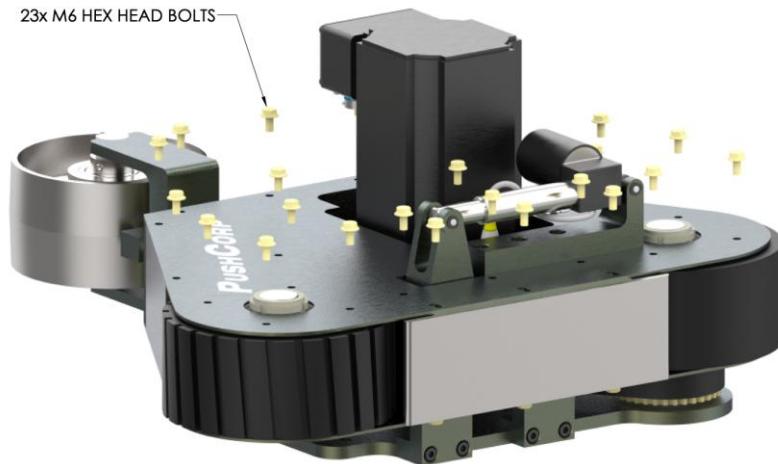
Step 1: Remove 23 M6 Hex Head Bolts

Figure 9: Remove Hex Head Fasteners

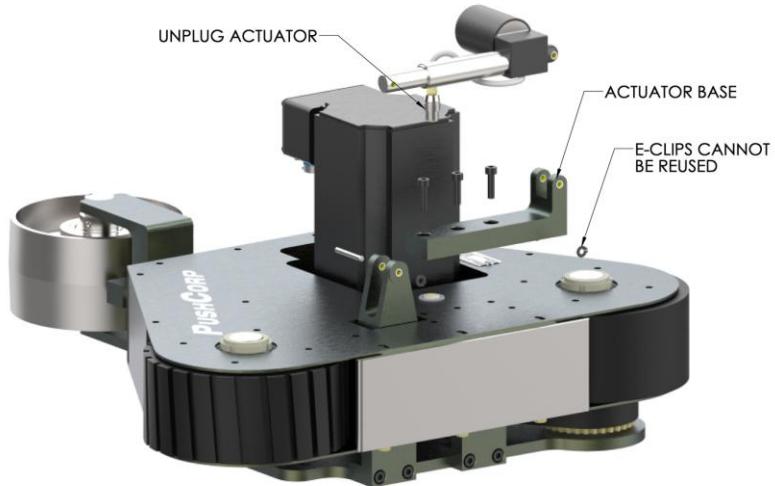
Step 2: Remove E-Clips/Pins/Actuator & Cap Head Fasteners/Actuator Base

Figure 10: Remove Actuator Components

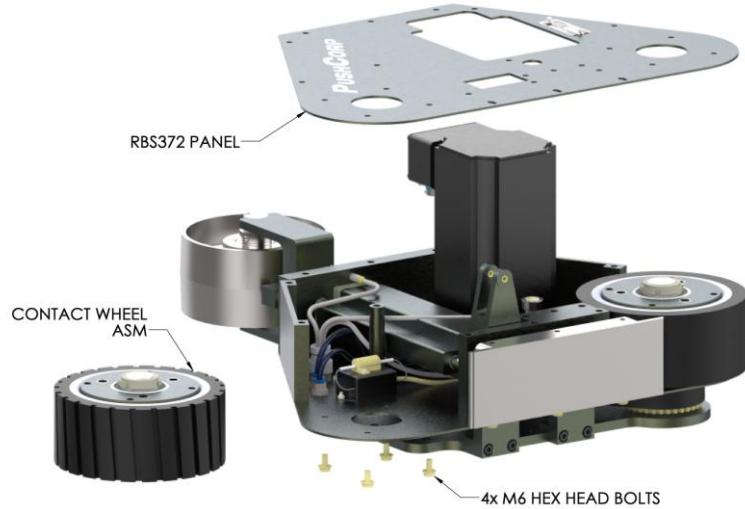
Step 3: Remove RBS372 Panel & Contact Wheel Assembly

Figure 11: Remove Panel & Contact Wheel Assembly

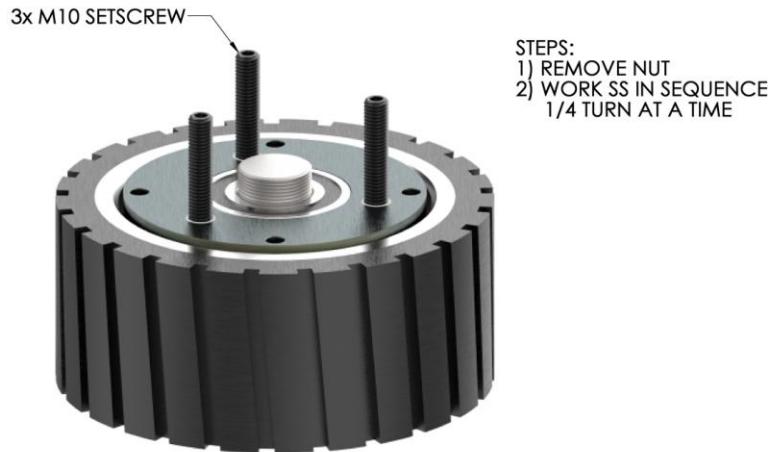
Step 4: Thread M10 Set Screws into Contact Wheel

Figure 12: Thread M10 Set Screws into Bearing Block

Step 5: Remove Clip & Wave Washers, Torque Set Screws to remove Bearing/Bearing Block & Contact Wheel from Shaft



**Figure 13: Torque Set Screws to Remove Bearing/Nearing Block from Contact Shaft**

Once the old contact wheel is removed, perform the steps in reverse order to properly replace the RBS372 contact wheel. It is important to clean the shaft, as well as the inside of the contact wheel to ensure a proper mate. Fasten the nut back on to the shaft with 45 ft-lbf of torque, and replace all new e-clips upon reassembly.

## 5.0 TECHNICAL SPECIFICATIONS

Category	Specification
<b>Contact Wheel</b>	3" Width, 7" Diameter
<b>Abrasive Belt Media</b>	3" Width, 72" Length
<b>Continuous Stall Torque</b>	8.9 ft.-lbs. (12 N-m) @ Drive Wheel
<b>Maximum Belt Speed</b>	6338 SFPM
<b>Weight</b>	83 lbs. (38 kg)
<b>Supply Air</b>	Non-lubricated, Dry, 5µm Filtered, 80 psi (5 Bar) Min.
<b>Supply Voltage</b>	240-480 VAC, 3-Phase +/-10%

*Please contact [techsupport@pushcorp.com](mailto:techsupport@pushcorp.com) for supply voltages less than 480V*

*Specifications subject to change without notice.*

Fastener Tightening Torque Specs					
Fastener Size	Torque			Minimum Depth	
	In.-lbs.	ft.-lbs.	N·m	in.	mm
M4 x .7	50	4.2	5.6	0.17	4.3
M5 x .8	85	7.1	9.6	0.21	5.3
M6 x 1	140	11.7	15.8	0.25	6.3
M8 x 1.25	348	29.0	39.3	0.33	8.4
M10 x 1.5	600	50.0	67.8	0.41	10.5