

Rapid-Air

Operating Instructions

200T & 200TX Series Servo Feed Control Ver. 'C'

200T, s/n 133533 & Later
200TX, s/n 133969 & Later



4601 Kishwaukee Street, Rockford, IL 61109
815.397.2578
www.rapidair.com

Thank you for purchasing a Rapid-Air 200 series servo feed.

Our roots are in stamping and our engineering expertise is extensive. Many of our earliest products remain in use today, in small shops and large factories worldwide. Some of these products are still manufactured, with only slight modifications to the original design allowing for modern manufacturing technologies to be used in their production.

We designed and built our first servo driven roll feed in 1994. The current models combine the best of our proven mechanical design with a state of the art control system. As with the whole Rapid-Air product line there has been an ongoing program of product improvement.

All Rapid-Air products are built right here in our own U.S. factory. No inconsistent design, differing parts or sourcing problems. Just the same reliable quality, renowned support and lasting value you can always expect from Rapid-Air.

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SPECIFICATIONS

Mechanical

200T

Max Material Width:

208T	8" (203mm)
212T	12" (305mm)
218T	18" (457mm)
224T	24" (610mm)

Max Thickness Capacity at Full Width:

208T	0.105" (2.66mm)*
212T	0.095" (2.41mm)*
218T	0.085" (2.15mm)*
224T	0.075" (1.91mm)*

* based on low carbon steel, commercial grade

200TX

Max Material Width:

208TX	8" (203mm)
212TX	12" (305mm)
218TX	18" (457mm)
224TX	24" (610mm)

Max Thickness Capacity at Full Width:

208TX	0.125" (3.18mm)*
212TX	0.125" (3.18mm)*
218TX	0.100" (2.54mm)*
224TX	0.100" (2.54mm)*

* based on low carbon steel, commercial grade

Common

Max Feed Roll Opening:

208(x)	0.180" (3.81mm)
212(x)	0.180" (2.54mm)
218(x)	0.180" (3.81mm)
224(x)	0.180" (3.81mm)

Roll Position Repeatability: $\pm 0.0025"$

Roll Type: 8620 C.R.S. Hardened & Ground

Stock Entrance: Cascade Rollers w/ Edge Guides Standard

Options: Mechanical Operated Pilot Release Rollers
Special Rolls – Contact Factory
Self-Centering Edge Guides

SPECIFICATIONS cont'd

Electrical

Line Voltage: 200(x)	240 VAC, 3Ø, 50/60 Hz
Rated Input Current: 200T 200TX	4.6 Amps @ 240 VAC, 3Ø, 50/60 Hz 4.6 Amps @ 240 VAC, 3Ø, 50/60 Hz
Max Inrush Current:	10.0 Amps
Max Operating Temperature:	30° C Ambient
Controller:	Trio Motion Coordinator MC302X
AC Servo Drive:	Kollmorgen AKD-B01206
Display:	Beijer H-T60b-S
Enclosure Rating: Dimensions:	IP65 24" x 18" x 10" (610mm x 457mm x 254mm)
Inputs:	Use PNP sensor or isolated contact Min 3.5 VDC / Max 30 VDC Min 2 mA / Max 15 mA
Outputs:	Sourcing: 24VDC @ 250 mA max.
Options:	460 VAC, 3Ø, 50/60 Hz AC Cooled Enclosure Adjustable Mounting Bracket Serial Feed Interface
Pneumatic Shop Air (required for Pilot Release rolls)	Filtered and lightly lubricated Working Pressure 80-120 PSI Maximum Pressure 150 PSI

Mechanical Setup

Installation

It is very important that the servo feed or a feed & bracket combination be securely mounted and not allowed to float. When mounting the servo feed it should be positioned with the centerline of the drive rollers in line with the centerline of the die entrance and at the proper pass line height. Alignment of the feed to the die (parallelism) is very important to the accuracy of the feed. Drag due to misalignment can cause short feeds and servo faults. The servo feed has 4 holes, threaded for 3/8-16 bolt for mounting purposes.

If the feed is positioned a distance far enough away from the die so that the material sags then it is possible to get short feeds or buckling from the feed motion. To help prevent this a guide or 'bridge' should be built between the servo feed and the die.

An adjustable mounting bracket is available from Rapid-Air as an optional mounting method (see page 28). The bracket is mounted directly to the top of the bolster plate via two bolts. Recommended bolt diameter is 1/2-13. The vertical plate of the bracket has two adjusting screws to provide additional support, stability and perpendicularity alignment.

Once the bracket has been aligned and secured to the bolster plate the servo feed can then be mounted to the bracket. The slotted holes in the bracket allow for accurate alignment of the servo feed on the x-axis. Loosen the elevator locking screws (item #7) and rotate the elevating screw (item #3) to position the servo feed at the proper pass line height. When correctly positioned retighten the elevator locking screws to prevent the unit from moving.

Gear Train

The gear train is located on the same side as the roll release handle. It is a non-lubricated gear train so it is essentially maintenance free.

Pilot Release Stop

(Item #49 on sheet 3 or 4 of appropriate assembly drawing)

Our 200(x) series servo feeds are equipped with a pilot release stop as standard. In a press feeding application higher speed applications may benefit from adjusting the pilot release stop. By limiting the amount the rolls can open, time is not wasted by the rolls traveling full open and close. The pilot release stop adjustment is mounted next to the roll pressure knob and should be set to let the rolls open about 0.005/0.010" to free the material during piloting.

Roll Release Handle

The roll release handle is located on the side of the servo feed. If the PILOT RELEASE STOP has not been set then the handle can travel 'full stroke' and lock in the fully open position. This is the max feed roll opening of 0.180". If the pilot release stop has been set then the handle will only travel enough to open the rolls to the amount set by the pilot release stop. The handle will not lock in this position, do not force beyond this point.

Roll Pressure

(Item #50 on sheet 2 of appropriate assembly drawing)

The roll pressure knob is located on the top of the servo feed and is a knurled knob with a locking nut. It is positioned perpendicular to the inlet face and uses a compression spring for adjusting roll pressure. Adjust so there is only enough pressure applied to properly feed the stock. Exerting too much pressure can result in 'fluting' of the edges or cause camber.

When equipped with the optional **AIR REGULATED UPPER FEED ROLL:**

When using air pressure to grip the material, the spring regulated grip should be backed out or removed. Do not use both grip regulating methods together.

When adjusting the roll pressure with the air regulated option increase the pressure in approximately 5 PSI increments until the proper feed is established. Take care not to induce camber in the material by applying excessive force. Record gage pressure when proper feed is achieved.

208(x) & 212(x)

10 PSI Gage = 60 LBS. force at the feed rolls.

20 PSI Gage = 120 LBS. force at the feed rolls.

30 PSI Gage = 180 LBS. force at the feed rolls.

218(x) & 224(x)

10 PSI Gage = 120 LBS. force at the feed rolls.

20 PSI Gage = 240 LBS. force at the feed rolls.

30 PSI Gage = 360 LBS. force at the feed rolls.

Entrance Guide

The entrance guide's adjustable rollers should be adjusted to maintain the incoming stock centered on the feed rolls. Similar guides are available as an option for the exit side of the feed rolls. By having a set of guides on each side of the servo feed the setup time for aligning the material in the feed is decreased considerably as you will know that the material is straight through the feed before entering the die.

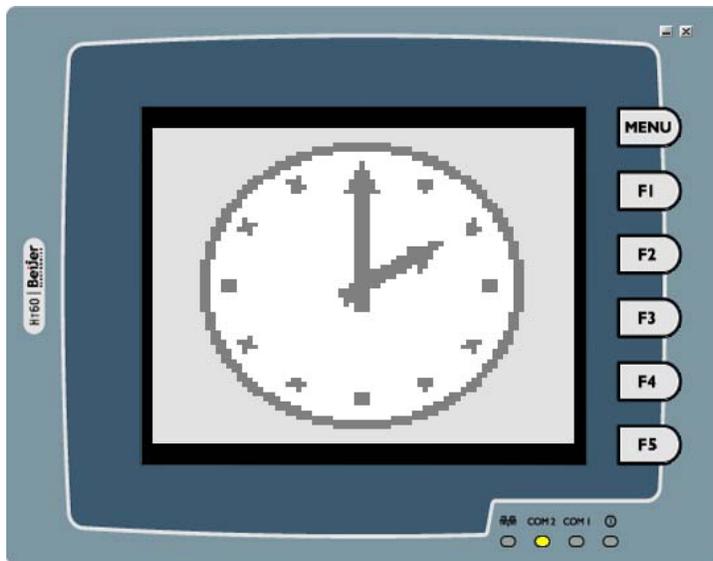
SERVO FEED OPERATION

When the control is turned on some of the components must boot-up, much like a computer. During this period the display will show a 'clock' so you can recognize the control is in the process of getting ready. If the control is turned on immediately after the incoming service is restored, you will notice a longer boot up time is required.

The display is a touch screen. Touch the screen in the general area of an object when it is necessary to enter numbers, 'push' pushbuttons or reset values. The screen has a built in screen saver function whereby it blanks after a predetermined time of inactivity. Touch the screen anywhere to bring back it to life.

On the right hand side of the display there are 5 programmable function keys. These keys have different functions depending on the active screen. The 'F5' key is typically the EXIT or CANCEL key. The keys are always active. If you forget a key's function you can press the MENU button and the function key menu for the active screen will 'slide out'. The slide out menu is also a touch key so you can either touch the appropriate menu choice or press the 'F' key itself. Once a choice is made the slide out menu will close. You can also close the slide out menu by pressing the MENU button a second time. As you become accustomed to the operation of the servo feed you will probably find yourself calling for the slide out menu less and less.

The servo feed will power up with the last job used as the active job. This means there is no need to load the same job number day after day.



SERVO FEED OPERATION cont'd

SPLASH SCREEN:



Once the control is booted up and ready to go the Rapid-Air logo will be displayed. This is called the SPLASH screen. The SPLASH screen is the main menu.

- | | |
|-----------------|---|
| F1 – JOB SELECT | Go to this screen to set up the desired job. |
| F2 – AUTOMATIC | Go to this screen to start making parts. |
| F3 – MANUAL | Go to this screen to manually control individual functions. |
| F4 – JOB REVIEW | Go to this screen to quickly see what the active job is and its parameters. |
| F5 – ABOUT | Go to this screen for information about the servo feed. |

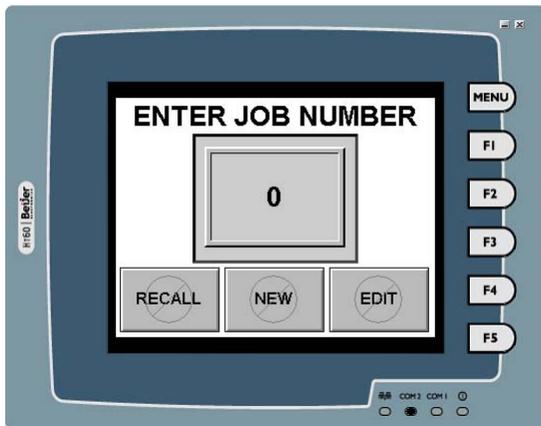
You can change to any screen listed, no particular order is required. For purposes of explaining the controls we will describe how to enter a new job number and the job parameters.

A typical sequence would be:

- **JOB SELECT** – Enter a job number
 - **SELECT NEW, EDIT or RECALL**
 - **NEW & EDIT** lead to a series of screens that allow you to configure the job recipe.
- **MANUAL** – Allows you to test settings and position the material for production.
- **AUTOMATIC** – Ready for production, waiting for the feed initiate signal.

SERVO FEED OPERATION cont'd

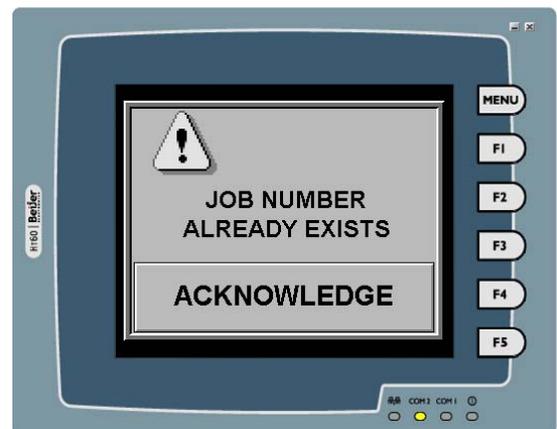
JOB SELECT:



This screen is used to define a new job, edit an existing job or recall an existing job. Up to 99 jobs can be created and stored. Until a valid job number is entered the 'RECALL', 'NEW' and 'EDIT' pushbuttons are not enabled. 'F5' is the only function key used on this screen. Use the 'F5' key to return to the SPLASH screen without changing any job information.

RECALL: This pushbutton recalls a previously set up job and makes it the active job. If an invalid job number is entered you will get a fault message. Simply acknowledge the message and try again. When the recall is successful you will be returned to the SPLASH screen.

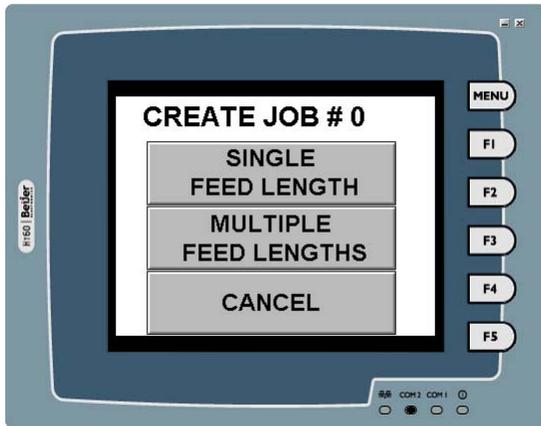
NEW & EDIT: Both of these pushbuttons will lead you through the same job definition screens. If you've forgotten what job numbers have previously been set up and you enter a used number and then push 'NEW' you will get a fault message. This action is intended to keep the operator from accidentally changing a stored job. Similarly, if you enter a job number that does not exist and try to 'EDIT' it you will get a fault message. Simply acknowledge the message and try again.



SERVO FEED OPERATION cont'd

NEW & EDIT:

When entering job parameters the first decision is whether the job is a single sequence (1 feed length) or a multi-sequence (2 or more different feed lengths) application. Jobs #1-25 may be defined either way, while jobs #26 and higher can only be a single job. For jobs 1-25 you are presented with a screen to select either SINGLE FEED LENGTH or MULTIPLE FEED LENGTHS. On jobs #26 and higher this screen is bypassed.



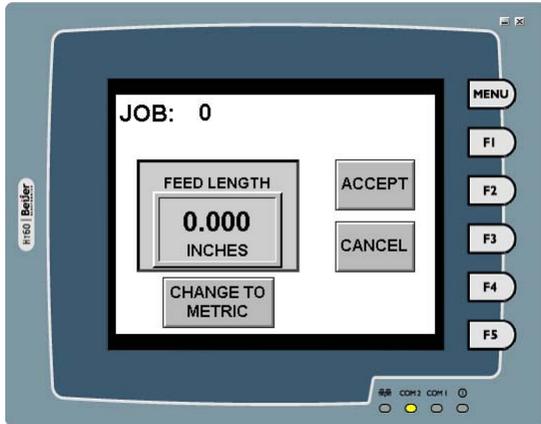
NEW – SINGLE SEQUENCE

For all single sequence jobs you are presented with 3 more screens to enter the required job information. Enter the PRESS SPEED in strokes per minute. Enter the FEED WINDOW in degrees and indicate if PILOT RELEASE of the rolls is required. Not all models of the Rapid-Air servo feeds are equipped with the pilot release capability as standard, so the PILOT RELEASE defaults to NO. If your model does not have pilot release capability or your application does not require pilot release you may skip the PILOT RELEASE prompt.

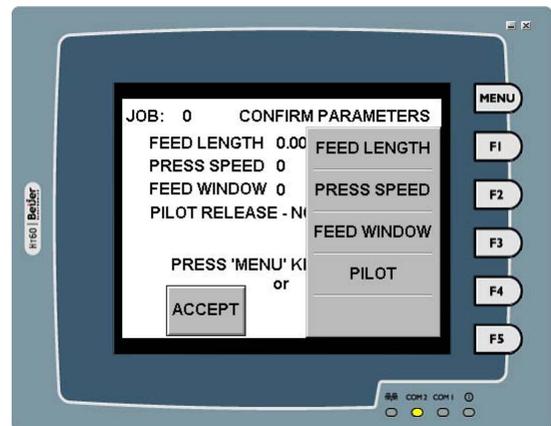
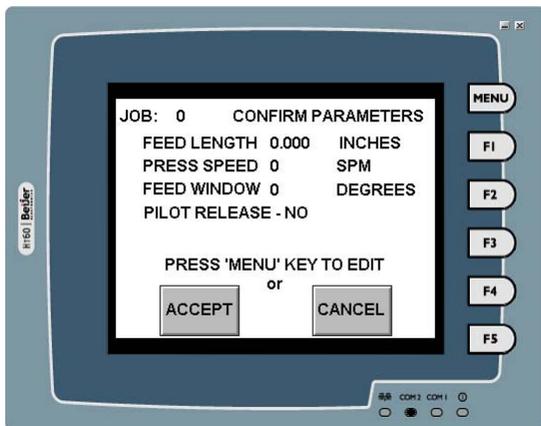


SERVO FEED OPERATION cont'd

Finally enter the FEED LENGTH. For the operator's convenience the units used for length can be toggled between inches and millimeters.



After all of the parameters are entered the job settings are displayed. The operator is asked to confirm the information is correct. If any entry needs to be corrected the 'F' keys or the slide out menu will allow a particular parameter to be changed. Once accepted the controller does the math to determine the needed move profile and confirm the requested move is within specs of the servo feed model. Upon successful entry of a job the operator is returned to the SPLASH screen.



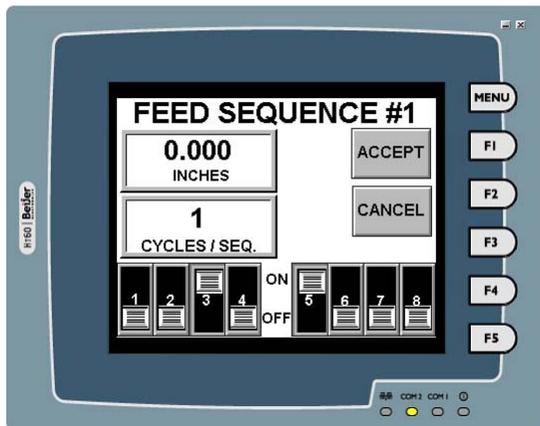
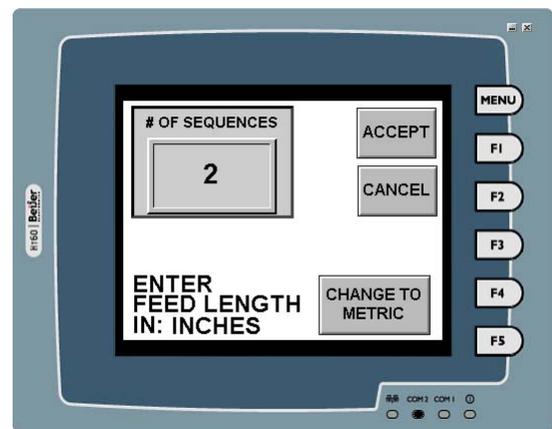
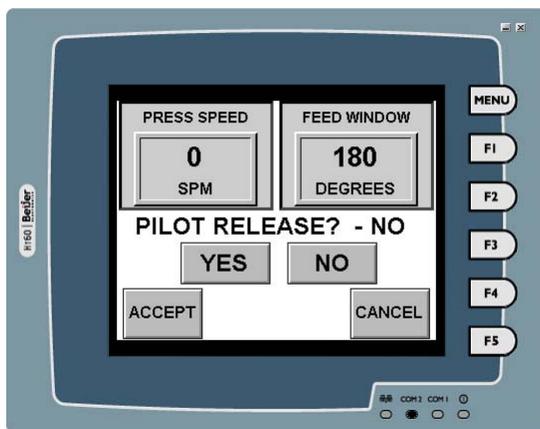
If the move is beyond the capabilities of the servo feed a warning is displayed. Acknowledging the fault will return the operator to the CONFIRM PARAMETERS screen where the job can be canceled or corrected and re-accepted.



SERVO FEED OPERATION cont'd

NEW – MULTIPLE SEQUENCE

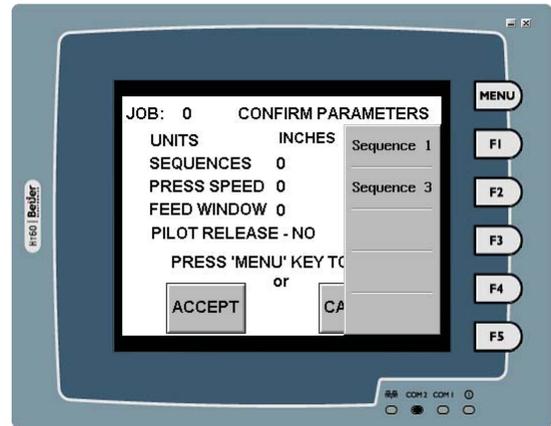
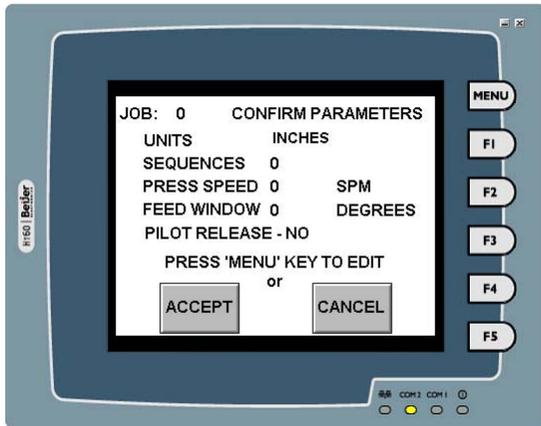
MULTI-SEQUENCE jobs require similar information and the screens are designed to step you through the process. Required information still includes the PRESS SPEED and FEED WINDOW but this is only entered one time, not for each sequence. Each feed length is a sequence and the number of sequences is needed. Up to 10 sequences are allowed per job. The operator is only required to enter information for however many sequences were indicated as being required. In addition each sequence may be cycled up to 10 times. The default number of cycles per sequence is 1 and if this is correct it does not need to be changed. For example a job may require 5 feeds of 3 different feed lengths, 1.0", 0.53", 0.53" & 2.5". This job would be a MULTI-SEQUENCE job of 3 sequences. The 2nd sequence would require 3 cycles.



GAG programming is included in the standard servo feed control, but the associated outputs are a purchased option. If the option is not included GAG outputs may be programmed on/off all day long with no effect. The outputs are programmed via the slide switches at the bottom of each feed sequence screen. When the GAG option is included the outputs are updated at the beginning of each sequence.

SERVO FEED OPERATION cont'd

Once all of the required information is entered a brief summary of the job is displayed. Individual sequences can be reviewed by way of the 'F' keys or slide out menu. At this point a job can be accepted, canceled or edited.



As with the single sequence job definition, once a job is accepted the move profiles are calculated and checked for compatibility with the servo feed model. If a sequence is determined to be out of spec an error message is displayed, indicating which sequence is bad. As soon as an out of spec move is encountered the controller stops processing the job. This means if more than one move is out of spec you are notified of only one at a time and it must be corrected before others will be found.



SERVO FEED OPERATION cont'd

MANUAL:

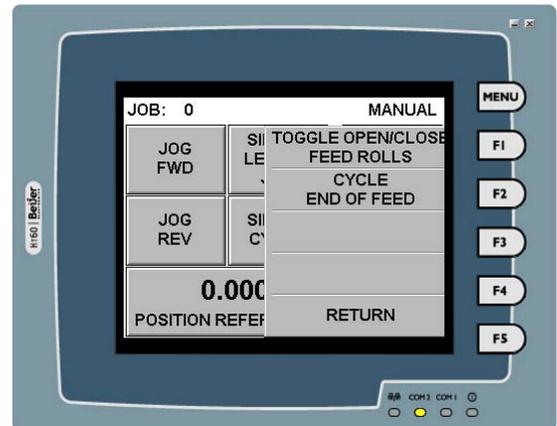
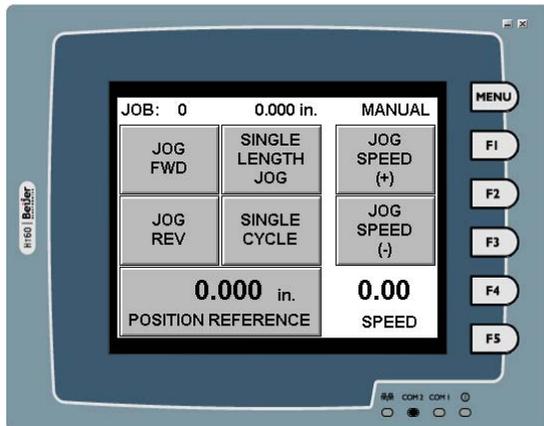
The manual mode is to aid in job setup and for maintenance. You can jog forward (JOG FWD) and you can jog reverse (JOG REV). The jog speed can be changed via the JOG SPEED (+) and JOG SPEED (-) pushbuttons. The speed can vary from 1 to 20. These numbers do not relate to anything like inches/sec, they are just a reference so you can return to a particular speed during future setups. When either jog speed change button is pushed the speed changes a small amount initially. The longer the button is held the more coarse the change becomes.

The SINGLE CYCLE pushbutton will cause 1 feed length to be fed at the normal production speed and accel/decel rates. The JOG LENGTH pushbutton will jog forward just like the JOG FWD button except it will only feed up to the programmed feed length and then the POSITION REFERENCE indicator needs to be reset to 0.000 before it will jog again. Touch the POSITION REFERENCE 'box' to reset it.

It is possible to jog the servo feed via hardwired pushbuttons. If the servo feed was not ordered with a remote jog pendant it is possible to field install JOG FWD and JOG REV pushbuttons. See page 2 of 2 of the included electrical schematic. Like the HMI jog buttons, the hardwired pushbuttons will only be active when the display is on the manual function screen.

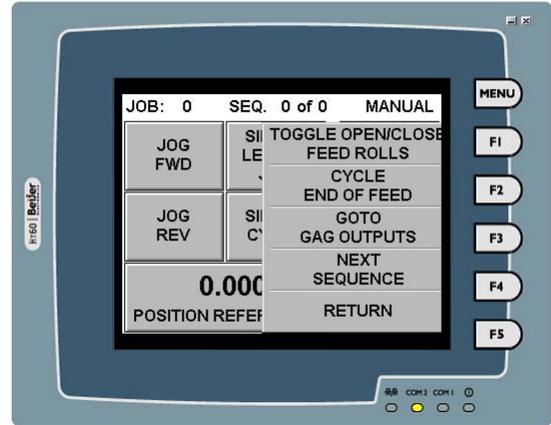
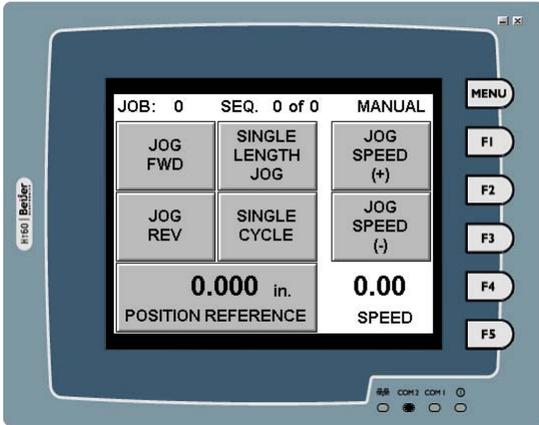
'F1' will toggle the rollers open and closed if the servo feed is equipped with air operated rollers.

'F2' will cycle the END OF FEED output.

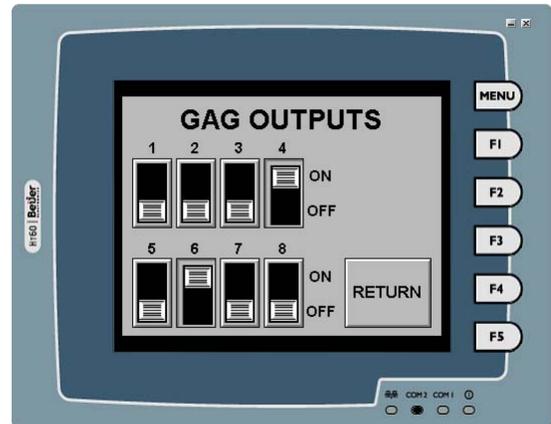


SERVO FEED OPERATION cont'd

MANUAL mode for a MULTI_SEQUENCE job is similar with a couple of additional functions. The manual screen indicates which sequence is active. This is important if you are jogging SINGLE CYCLE or a SINGLE LENGTH JOG. The 'F4' key will allow you to step thru the defined sequences.



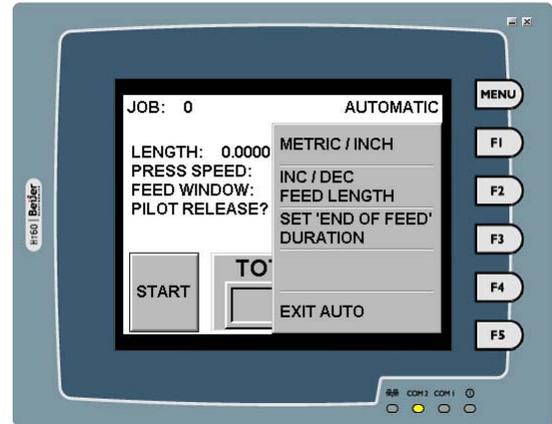
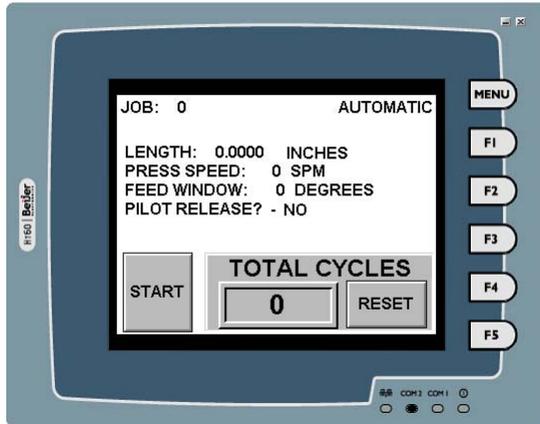
'F3' will display a screen that allows you to turn on/off the GAG outputs. In the manual mode the GAG outputs are *not* automatically turned off/on based on the current sequence.



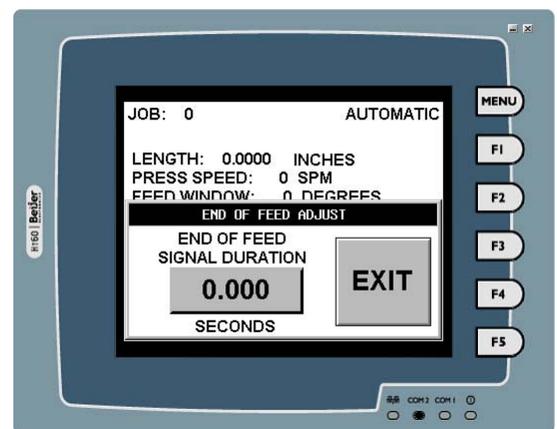
SERVO FEED OPERATION cont'd

AUTOMATIC:

Changing to the AUTOMATIC screen does not cause the servo feed to respond to the feed initiate input. The pushbutton labeled START must be pushed to enable the feed cycling. Once enabled the feed will cycle when the feed initiate input is activated and the pushbutton label will change to STOP.



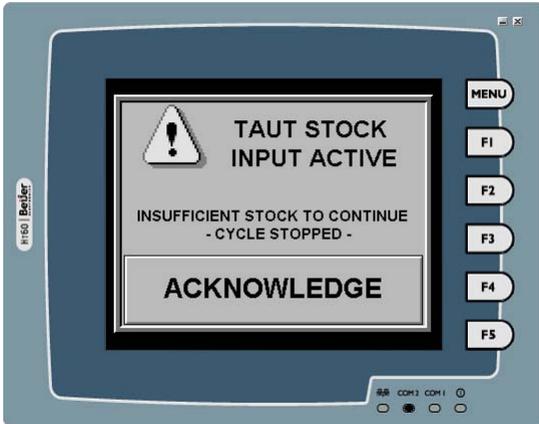
The start/stop toggling action of this pushbutton will allow the operator to stop and re-start the servo feed as needed without going through several different screen changes. The TOTAL COUNT indicator may be reset at any time. To completely exit the automatic mode press the 'F5' key. The 'F' keys offer access to 3 additional features of the automatic mode. 'F1' will toggle the displayed feed length between inches and millimeters. 'F2' will allow you to adjust the feed length (while cycling) in 0.001" increments. The adjusted feed length will then be saved as the job's programmed length. The servo feed control has an output dedicated to the 'END of FEED' signal. This signal will turn on at the end of the feed motion and will remain on for the time period set via 'F3'. After the time period has lapsed the output will turn off. On a SINGLE SEQUENCE job the END of FEED signal will turn on at the end of every feed motion. For a MULTI-SEQUENCE job it will only turn on after the last cycle of the last sequence.



SERVO FEED OPERATION cont'd

AUTOMATIC cont'd:

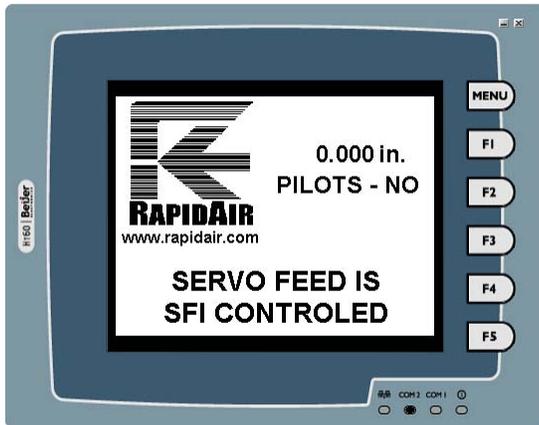
The servo feed control has an input dedicated for a TAUT stock sensor. A user supplied sensor wired to this input will cause the servo feed to stop cycling if the input is triggered. The feed will continue to feed the length in progress when the input is triggered so it must be adjusted to allow enough stock in the loop to allow the completion of that feed length. The TAUT stock input is only active in the AUTOMATIC mode.



SERVO FEED OPERATION cont'd

SERIAL FEED INTERFACE (optional)

The servo feed control has the capability of being interfaced to various press automation controls via a RS-232 serial communication link. When enabled, all control of the servo feed is done by the mothership. When ready to operate the screen shown below is displayed. In addition to the SFI control reminder the current mode, feed length and pilot requirement is displayed. The SFI can be field added. To enable the SFI interface a special cable is required (available from Rapid-Air Corp.) and a configuration jumper must be installed. Contact Rapid-Air for more information.



When the servo feed is equipped for a SFI a RS-232 breakout board is mounted on the control subpanel. A communication cable from the press automation controller with flying leads can be connected to the servo feed via the terminal strip on the breakout board. Optionally the servo feed's cable connected to the breakout board can be removed from the board and mating DB9 connectors can be coupled together eliminating the need for the breakout board.

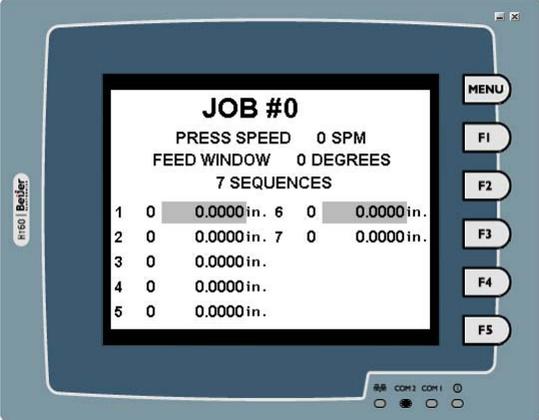
The servo feed RS-232 pinout is:

- 5 - GND
- 3 - RX
- 2 - TX
- SH - SHIELD

SERVO FEED OPERATION cont'd

JOB REVIEW

When the feed is powered up the last job used, edited or recalled is the active job by default. If you do not remember what that job is you can review it by pressing 'F4- JOB REVIEW' on the SPLASH screen.



SERVO FEED OPERATION cont'd

ABOUT

If you contact Rapid-Air Corp. to request parts or seek other assistance with your servo feed you may be requested to provide the Rapid-Air serial number or other programming information. You can find this information on the 'ABOUT' screen. Because the display or other parts may not be working when you need to contact us please record the information in the space provided below.



Servo Feed Model Number _____

Serial Number (S/N) _____

Shop Order Number (S.O.) _____

Controller Prog. Number _____

If your servo feed is equipped with a HMI capable of displaying multiple languages, the optional languages may be selected via the slide out menu on the ABOUT screen.



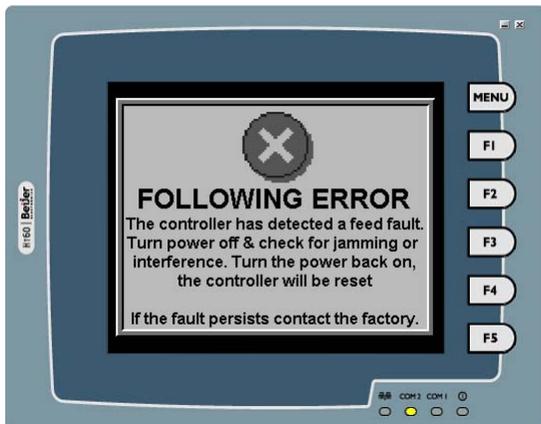
TROUBLESHOOTING

If the servo drive faults out it is reported back to the controller as a general fault condition and the controller is not able to annunciate the specific cause. The operator interface will display the following message.



There is a 2 character LED display on the front panel of the drive. The left character will be 'F' as in fault, and the right side displays the 3 digit fault number as follows: 1-9-1-[break] (for example). If the drive faults out you may get lucky and it is a onetime occurrence. Note the fault code and completely cycle power by turning the disconnect off and on. If this does not clear the fault or the fault quickly returns contact Rapid-Air Corp.

A fault you are more likely to be able to recover from will be sensed by the controller and the following message will be displayed.



TROUBLESHOOTING cont'd

Roll Parallelism

The servo feed has an eccentric shaft to allow adjustment of the upper roll to ensure it is parallel with the fixed position lower roll. It has an adjustment of 0.005" and the adjusting mechanism is located on the side of the feed by the Roll Release handle. The eccentric is locked in position by two ¼-20 button head screws. The shaft has 5/8" wrench flats which allow CW or CCW rotation to move the position of the upper roll end.

The parallel adjustment is factory set at assembly. If material tracking is a problem first inspect the alignment of the feed to the die as well as the payoff equipment setup. Also confirm the material itself is not the issue. Check the material camber by cutting a 3' to 5' length of stock from the payoff. Lay the material next to a straight edge and observe if there is camber. If there is not obvious camber turn the sample strip upside down from the way it is normally being fed and run it through the servo feed. If the material now tracks in the other direction it could be indicative of a material issue rather than a feed problem.

Only after confirming these items are not the cause should you attempt to adjust the roll parallelism.

Roll Parallelism Adjustment

- Remove both the entrance and exit roll covers.
- With the upper roll down, shine a light on the contact point between the upper and lower rollers. Observe from the opposite side. If the amount of light showing between the rollers is the same for the entire length of the rolls then the parallelism is good. If one end or the other has more light showing (i.e. more gap) then adjustment is indicated.
- To adjust:
 - Loosen the two ¼-20 button head eccentric lock screws.
 - Rotate the eccentric while viewing the amount of light showing between the rollers. Rotate until the rolls appear parallel.
 - Tighten the two ¼-20 button head eccentric lock screws. Check the opening with a feeler gage
- Replace both the entrance and exit roll covers.

WARRANTY

Warranty Terms & Conditions

ALL SALES BY THE COMPANY ARE MADE SUBJECT TO THE FOLLOWING TERMS AND CONDITIONS. PLEASE READ.

Warranty – The Company warrants for a period of one year from the date of shipment by the Company that the product shipped is free from defects in material and workmanship. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL IMPLIED WARRANTIES IN LAW, INCLUDING MERCHANTABILITY. The Company obligation under this warranty is limited to repairing or replacing, F.O.B. Rockford, IL, any part or parts proved to have been defective when shipped. In no event shall the Company be liable for special or consequential damages. Provisions set forth in specifications are descriptive and subject to change and are not intended as warranties.

Customer License Agreement

Rapid-Air reserves the rights in its software. The software program is licensed by Rapid-Air to the original purchaser of the equipment which contains the software for use only on the terms set forth in this license.

You may use the program only on the programmable servo controller furnished with the system and only in conjunction with the servo feed supplied with the system.

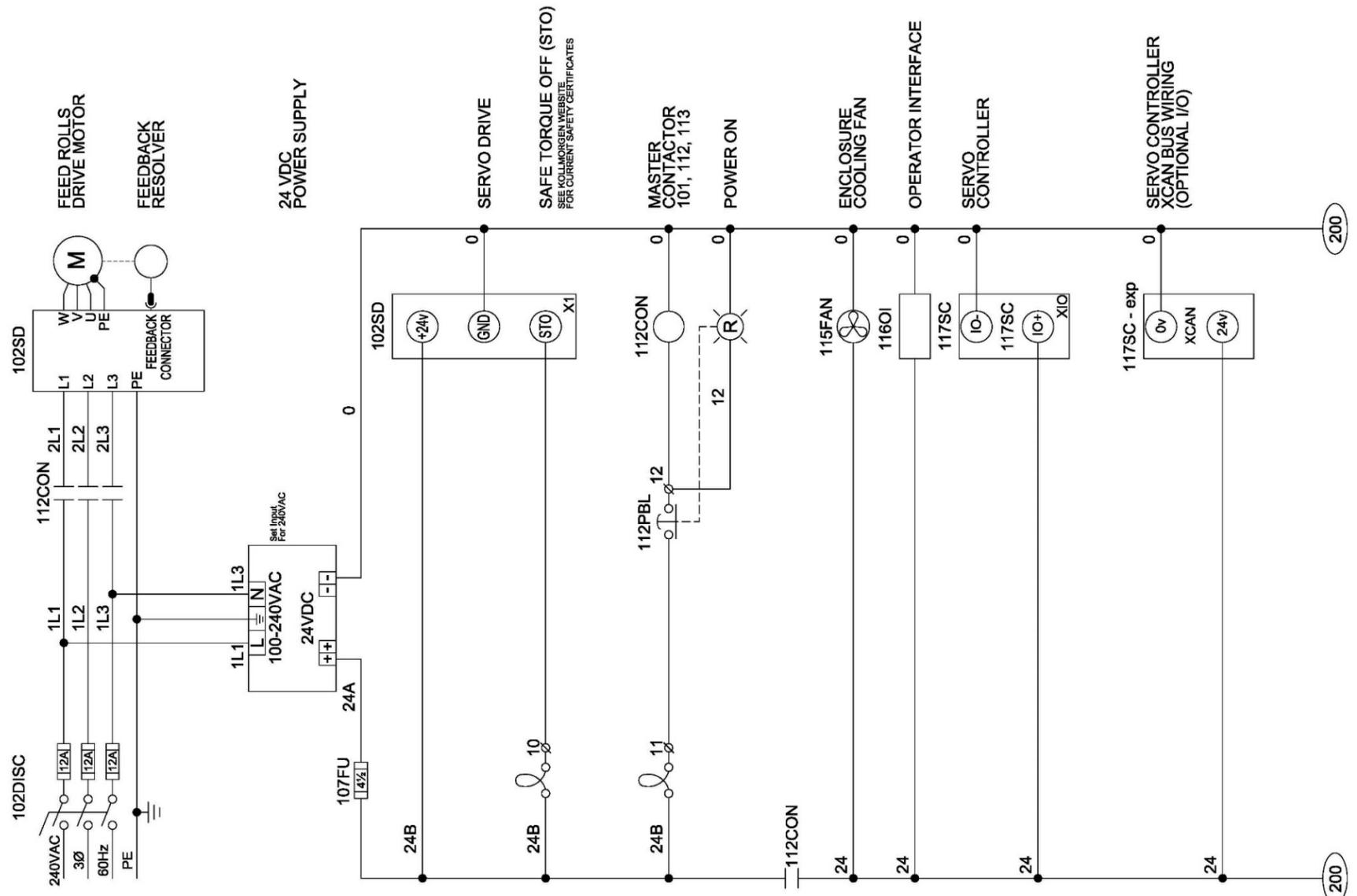
You may not without expressed permission from Rapid-Air:

- A. Copy, distribute, or document the program for others.
- B. Modify or merge any portion of the program for use on non-compatible hardware.
- C. Make alterations to the program.

ADDENDUMS

NO ADDENDUMS

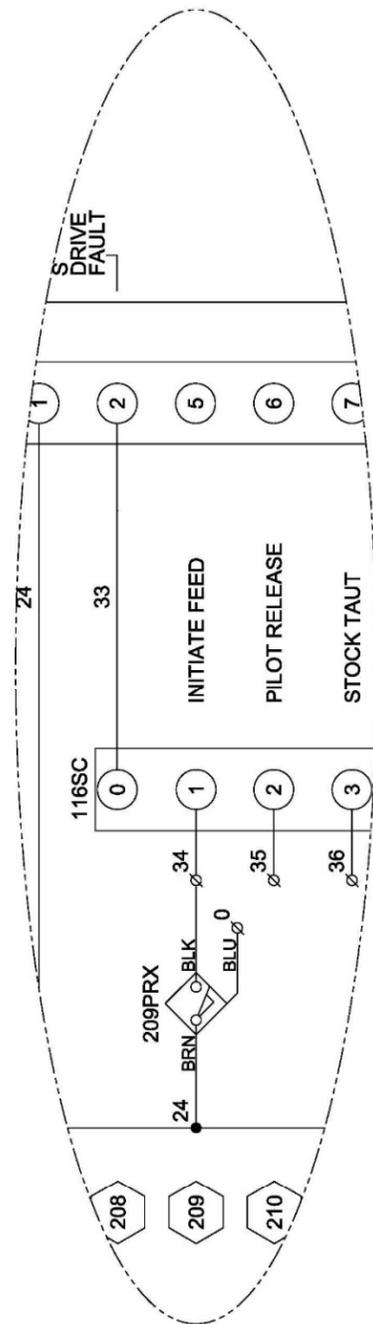
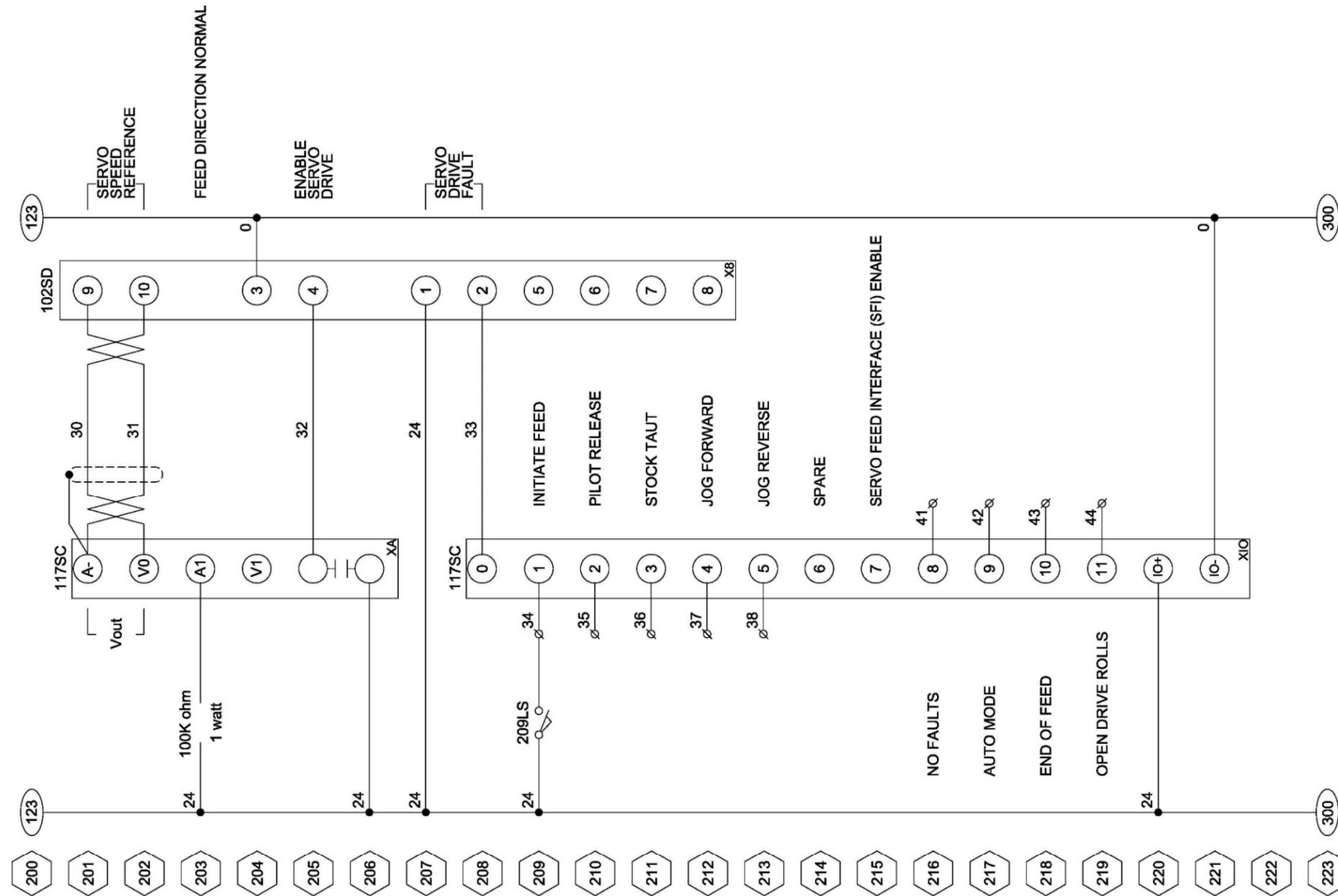
100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123



SHEET 1 OF 3
POWER CIRCUIT

REV.	CHANGE	DATE	SCALE	DRAWING NUMBER
			N/A	85500335-1

RAPID-AIR CORPORATION
ROCKFORD, IL
PART NAME 200(x) SERVO FEED - ver. 'C' cntrl
WIRING SCHEMATIC



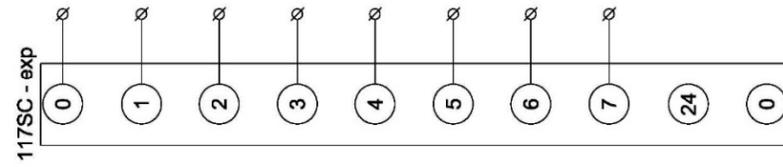
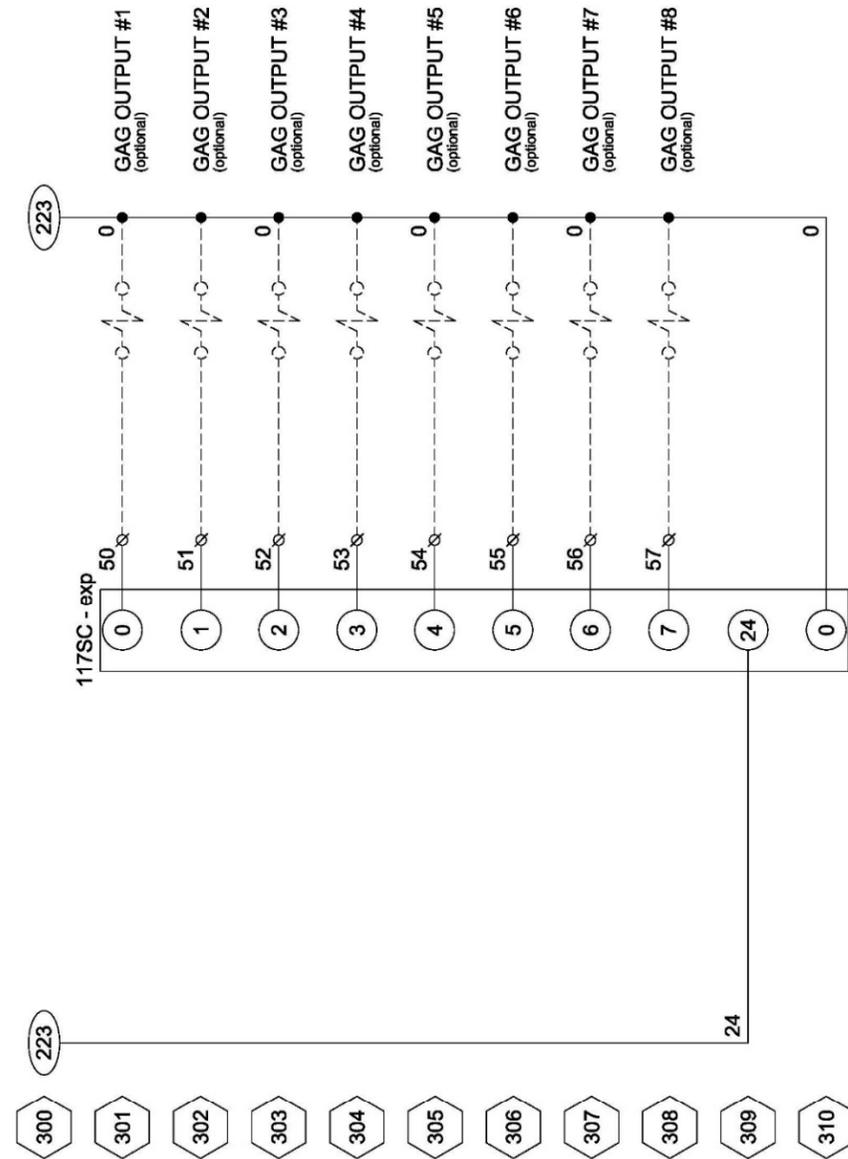
TYPICAL PNP PROX SWITCH WIRING EXAMPLE

SHEET 2 OF 3
I/O CIRCUIT

REV.	CHANGE	DATE	SCALE	DRAWING NUMBER
			N/A	85500335-2

RAPID-AIR CORPORATION
ROCKFORD, IL
PART NAME 200(x) SERVO FEED - ver. 'C' cntrl
WIRING SCHEMATIC

MATERIAL	WEIGHT
HEAT TREAT	HARDNESS
DRAWN BY TJH	CHECKED BY
DATE APRIL 2014	FINAL FINISH

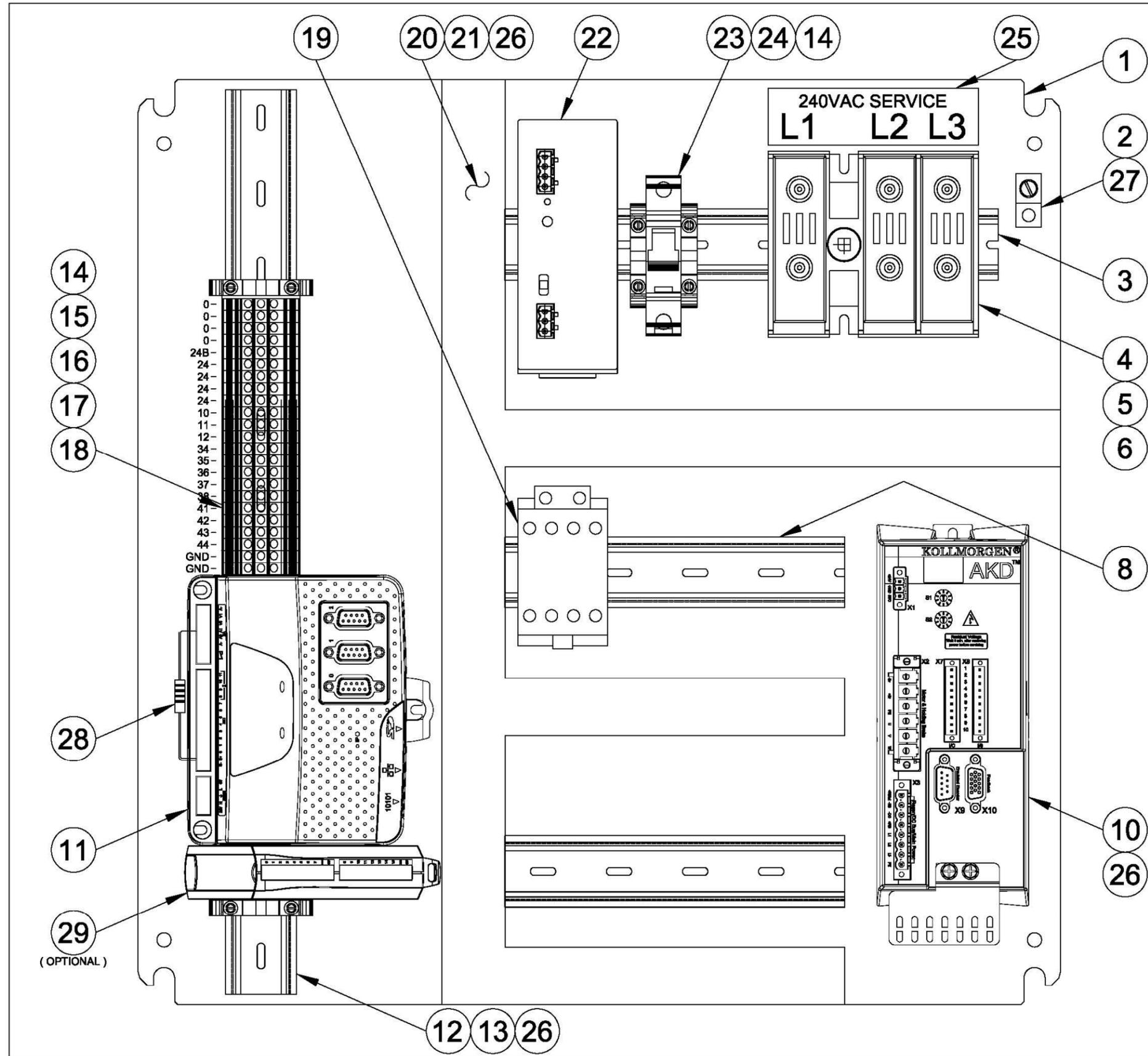


SHEET 3 OF 3
OPTIONAL I/O CIRCUIT

REV.	CHANGE	DATE	SCALE	DRAWING NUMBER
			N/A	85500335-3

RAPID-AIR CORPORATION
ROCKFORD, IL
PART NAME 200(x) SERVO FEED - ver. 'C' cntrl
WIRING SCHEMATIC

MATERIAL	WEIGHT
HEAT TREAT	HARDNESS
DRAWN BY TJH	CHECKED BY
DATE APRIL 2014	FINAL FINISH

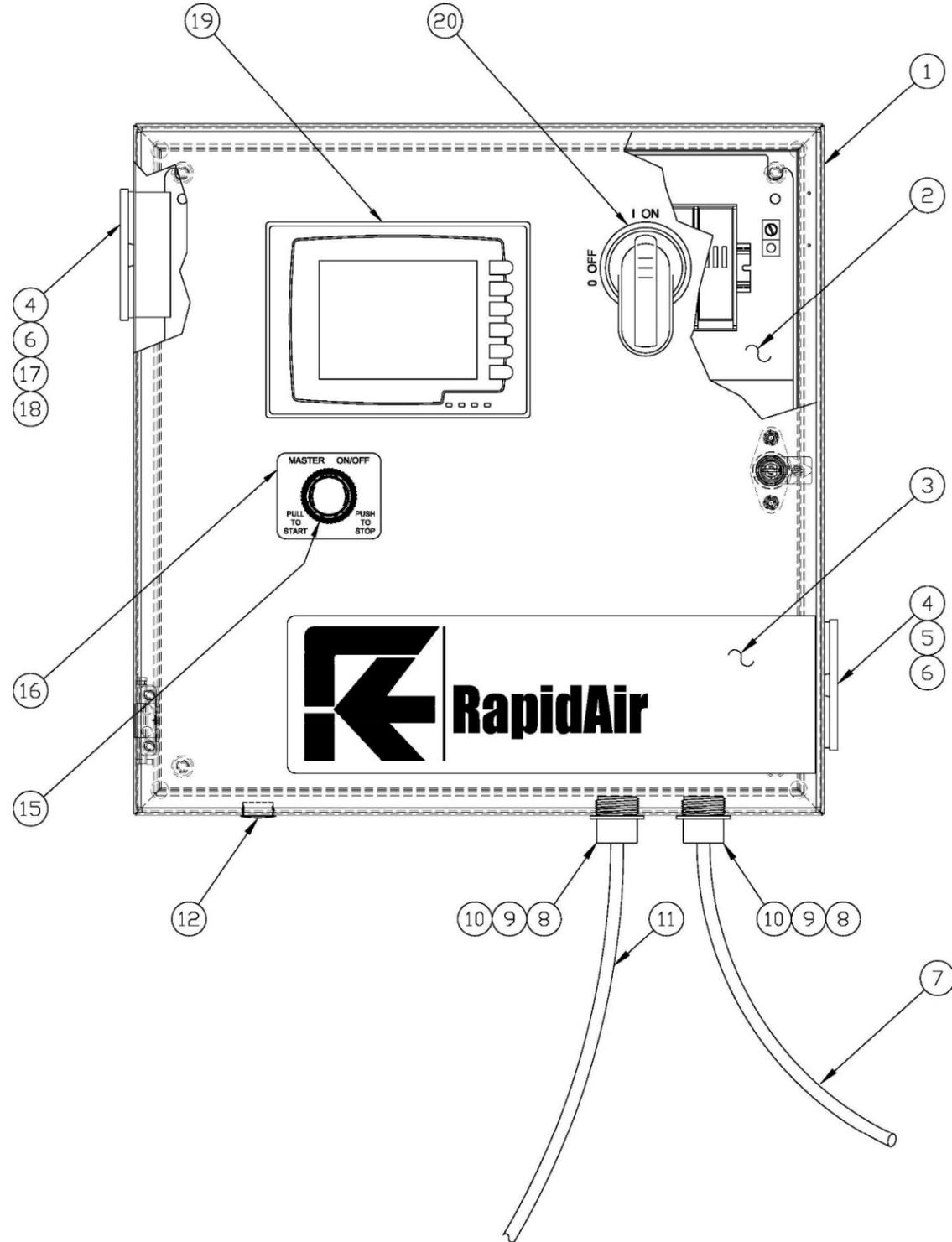


85500335 200(x) WIRING SCHEMATIC - version 'C' cntrl

ITEM	QTY.	PART NO.	DESCRIPTION	
N/S	2	69340036	26 GA. FERRULE	
N/S	4	69340037	20 GA. FERRULE	
N/S	5	69340039	16 GA. FERRULE	
N/S	3	69340040	14 GA. FERRULE	
N/S	1	69300048	CNTRLR / DISPLAY CABLE	
N/S	1	69300047	CNTRLR / DRIVE CABLE	
(OPTIONAL)	29	69100828	SERVO CONTROLLER EXPANSION I/O	
	28	69101008	RESISTOR	
	27	66020050	1/4-20 x 1/2" RHMS	
	26	66008037	8-32 x 3/8" RHMS	
	25	39900311	240VAC DISCONNECT WIRING LABEL	
	24	69101002	4 1/2A FUSE - CLASS CC	
	23	69100597	FUSE HOLDER	
	22	69100435	24VDC @ 5A POWERSUPPLY	
	21	69100748	1" WIRE DUCT COVER	
	20	69100749	1" x 2" WIRE DUCT	
	19	69100819	CONTACTOR	
	18	69100775	GROUND TERMINAL	
	17	69100773	TERMINAL JUMPERS	
	16	69100771	TERMINAL END BARRIER	
	15	69100770	TERMINAL	
	14	69100772	TERMINAL END ANCHORS	
	13	31900659	TERMINAL STANDOFF	
	12	69100769	DIN RAIL - 18"	
	11	69100827	SERVO CONTROLLER	
	10	69100830	SERVO DRIVE	
	9			
	8	2	69100769	DIN RAIL - 6.38"
	7			
	6	1	69100584	DISCONNECT SHAFT
	5	3	69101007	12A FUSE - CLASS J
	4	1	69100582	DISCONNECT - 30A/600VAC
	3	1	69100769	DIN RAIL - 9.5"
	2	1	69280249	GROUND LUG
	1	1	38900199	SUBPANEL

RAPID-AIR CORPORATION
 ROCKFORD, IL
 PART NAME: 200(x) SERVO CONTROL SUBPANEL ASSEMBLY

REV.	CHANGE	DATE	SCALE	DRAWING NUMBER	WEIGHT
		APRIL 2014	N/A	28900445	D

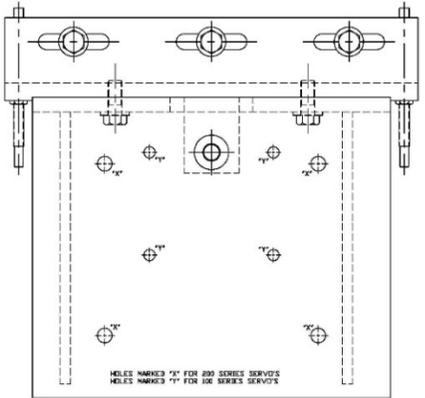


ITEM	QTY.	PART NO.	DESCRIPTION
N/S	1	10900601	100 & 200 SERVO CNTRL STAND
N/S	1	69280216	INSULATED SLEEVE CLAMP
N/S	1	60940015	RETAINER
20	1	69100583	DISCONNECT HANDLE
19	1	69100829	OPERATOR INTERFACE
18	4	66006175	RHMS 6-32
17	1	69100657	24VDC ENC. COOLING FAN
16	1	39900188	PUSHBUTTON NAMEPLATE
15	1	69100902	EXT'D HEAD PUSHBUTTON
14			
13			
12	1	69320005	HOLE PLUG
11	1	69300041	MOTOR POWER CABLE
10	2	69280248	METRIC LOCKNUT - M32
9	2	69280247	SPLIT CORDGRIP GROMMET
8	2	69280246	SPLIT CORDGRIP SHELL
7	1	69300042	MOTOR FEEDBACK CABLE
6	8	65100632	HEX NUT 6-32
5	4	66506062	FHSCS 6-32
4	2	69100643	VENT COVER & FILTER
3	1	39900243	LOGO LABEL
2	1	28900445	SUBPANEL ASSEMBLY
1	1	38900200	ENCLOSURE

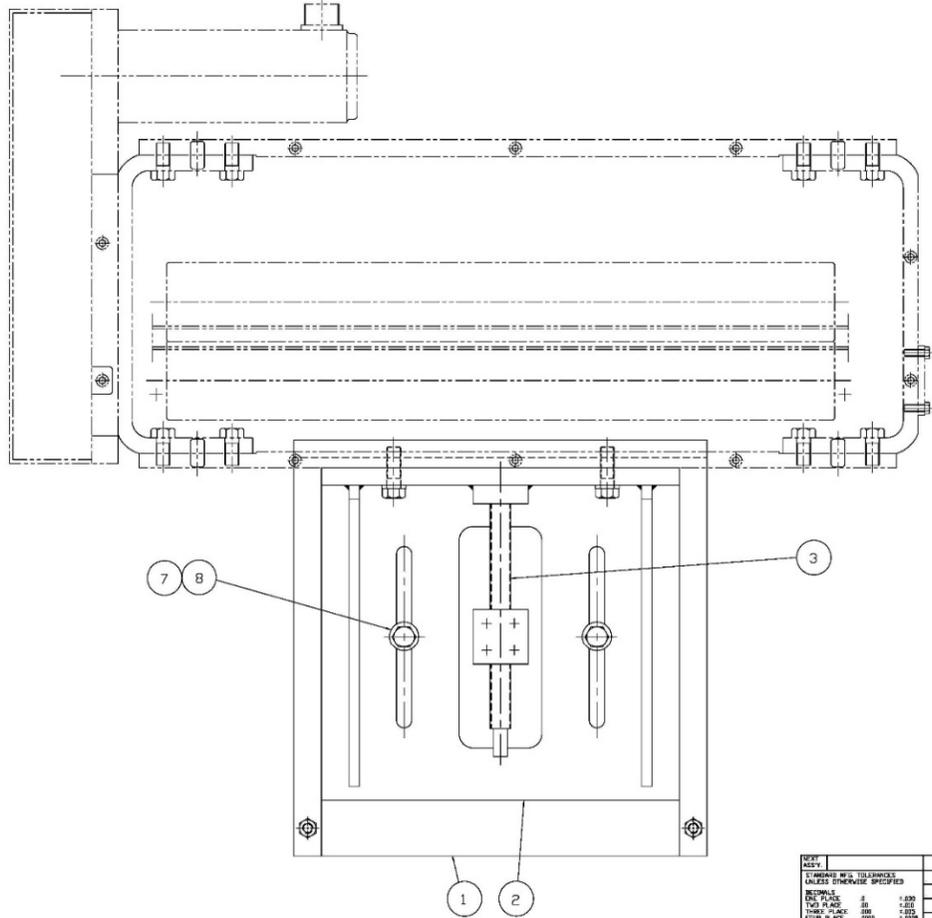
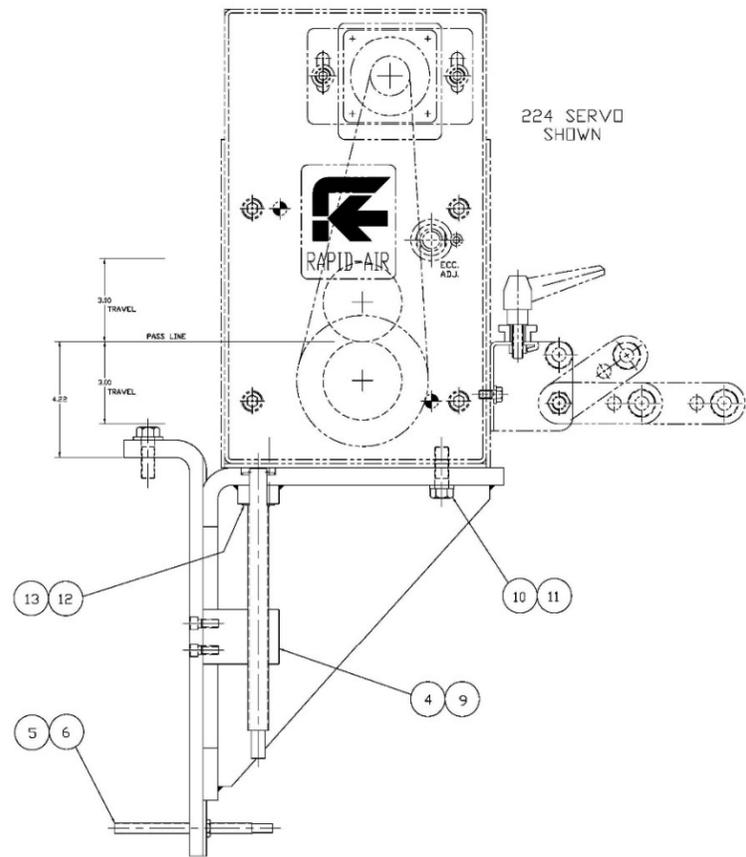
RAPID-AIR CORPORATION
 ROCKFORD, IL
 PART NAME: 200(x) SERVO CONTROL ASSEMBLY

NEXT ASSEMBLY	
STANDARD MFG. TOLERANCES UNLESS OTHERWISE SPECIFIED	
DECIMALS	
ONE PLACE	±.030
TWO PLACE	±.010
THREE PLACE	±.005
FOUR PLACE	±.0025
FRACTIONS	±1/64
FINISH	63/✓

MATERIAL	WEIGHT
HEAT TREAT	HARDNESS
DRAWN BY: TJH	CHECKED BY:
DATE: APRIL 2014	FINAL FINISH
SCALE: N/A	DRAWING NUMBER: 28900446
REV.	CHANGE
DATE	



15		
14		
13	1	60910062 RETAINING RING
12	2	64520006 THRUST WASHER
11	4	61300050 LOCKWASHER 1/2
10	4	65853150 HEX BOLT 1/2-13 X 1 1/2
9	4	65931075 SHCS 5/16-18 X 3/4
8	2	61200034 FLAT WASHER 1/2
7	2	65853125 HEX BOLT 1/2-13 X 1 1/4
6	2	65113716 JAM NUT 3/8-16
5	2	36100087 ADJUSTING SCREW
4	1	31702276 ADJUSTING SCREW PLATE
3	1	32900748 ADJUSTING SCREW
2	1	31900657 FEED SUPPORT BRACKET
1	1	31900656 MOUNTING BRACKET
ITEM	QTY.	PART NO. DESCRIPTION



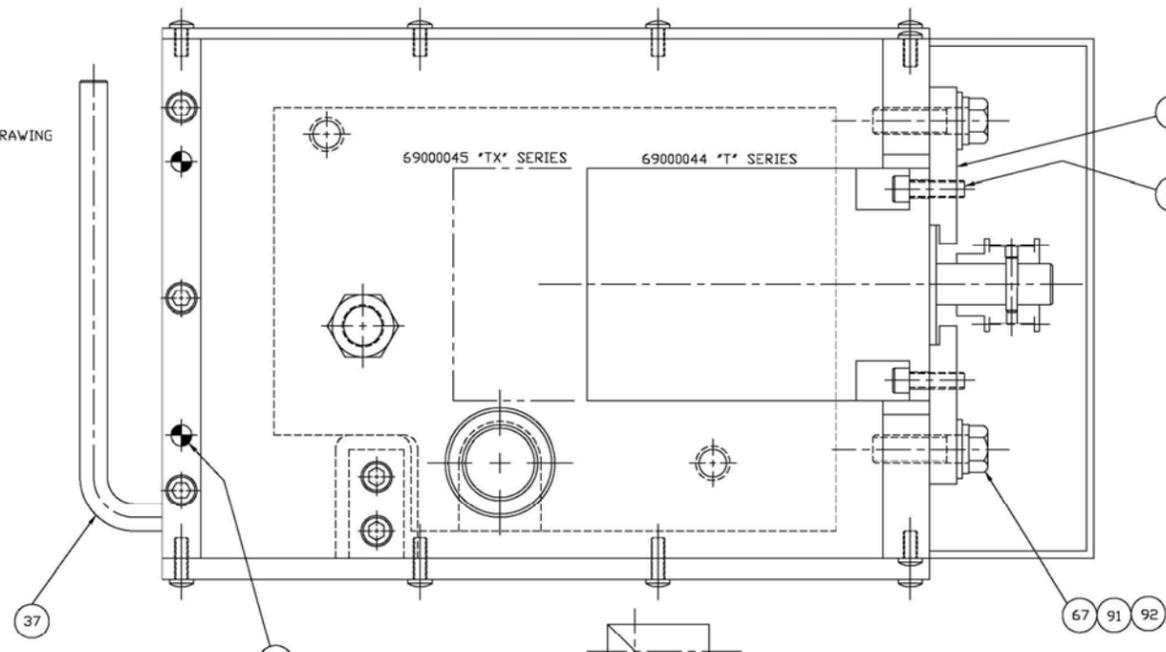
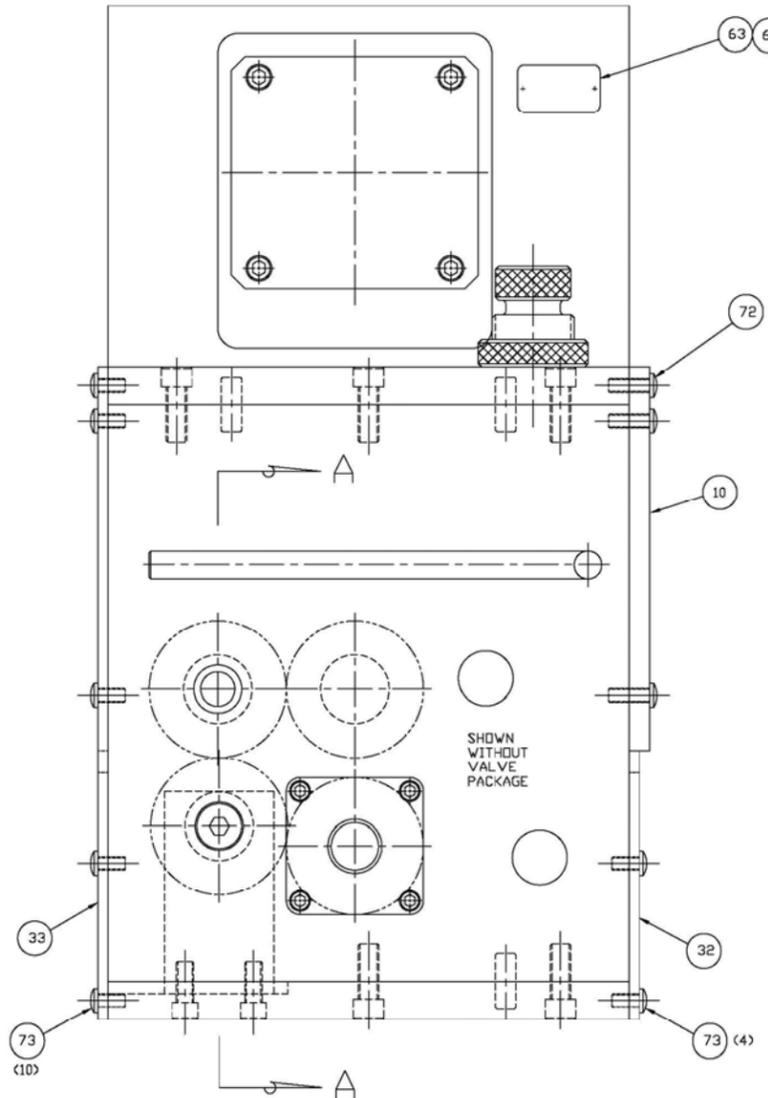
STANDARD WITH TOLERANCES UNLESS OTHERWISE SPECIFIED		MATERIAL		WEIGHT	
DESIGNED BY	DATE	DRAWN BY	DATE	CHECKED BY	DATE
ENG. PLACE	OR	OR	OR	OR	OR
FINISH	OR	OR	OR	OR	OR
FRAC.	OR	OR	OR	OR	OR
REV.	CHANGE	DATE	SCALE	DRIVING NUMBER	FINAL FINISH
			HALF	10900600	E

RAPID-AIR CORPORATION
 ROCKFORD, IL • MADISON, SD
 PART NAME: ADJUSTABLE SERVO BRACKET (200 SERIES SERVOS)

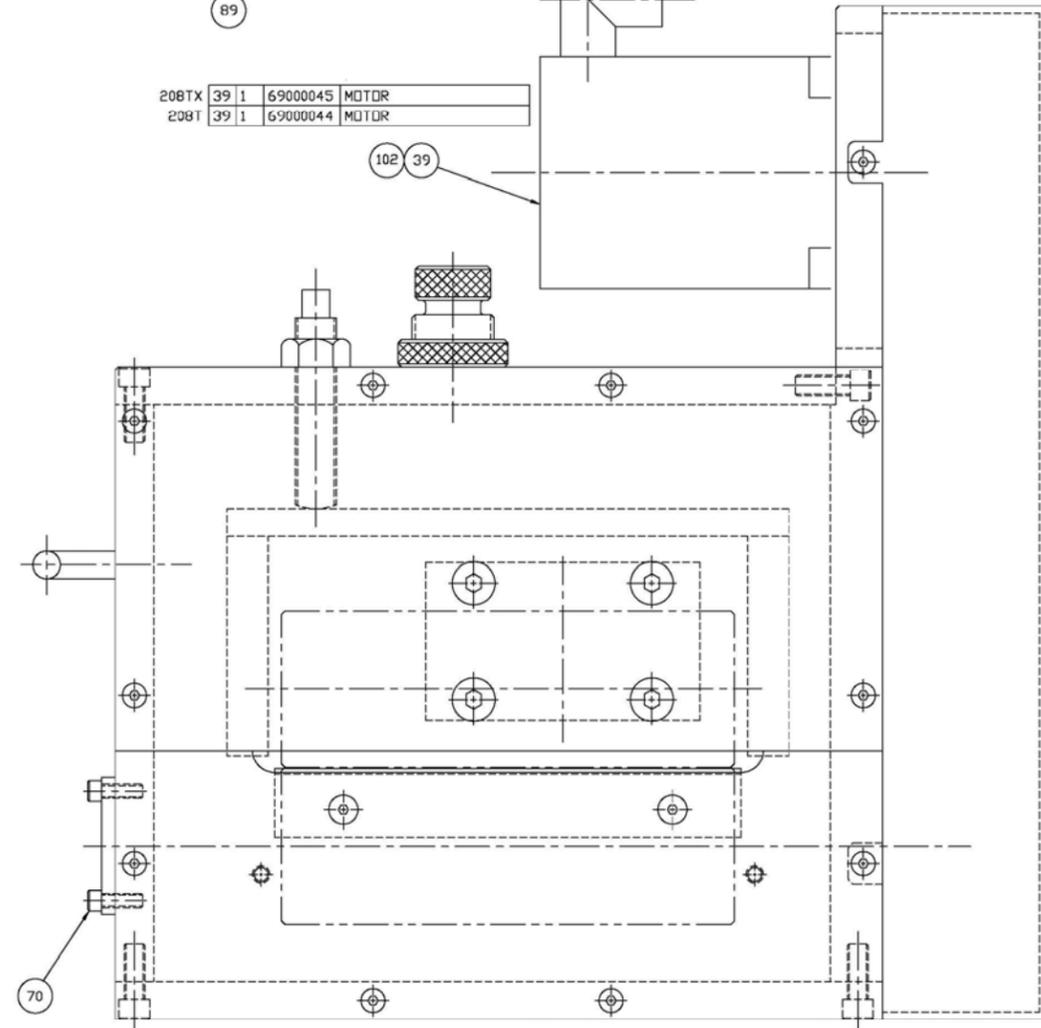
● INDICATES PARTS FOR 'AIR DOWN' OPTION

ITEM	QTY.	PART NO.	DESCRIPTION
119			
118			
117			
116			
115			
114	2	65908112	SHCS #8-32 X 1 1/8
113	1	64230010	BLACK POLY TUBE
112	4	67100121	MALE CONNECTOR 1/4 NPT 1/4 TUBE
111	1	67200001	MUFFLER
110	2	65920225	SHCS 1/4-20 X 2 1/4
109	1	34100338	SPACER
108	2	66612037	BHSCS #10-32 X 3/8
107	2	60108206	"O" RING
106	3	65906150	SHCS #6-32 X 1 1/2
105	1	39900175	INLET LABEL

ITEM	QTY.	PART NO.	DESCRIPTION
104	2	65920125	SHCS 1/4-20 X 1 1/4
103	1	60108014	"O" RING
102	1	28900446	CONTRL ASSEMBLY
101	1	32500045	TAPER PIN INSTALLATION DRAWING
100	2	60900185	RETAINING RING
99	2	60910098	RETAINING RING
98	2	60910112	RETAINING RING
97	1	60910087	RETAINING RING
96	1	60910050	RETAINING RING
95	1	60108230	"O" RING
94	1	60108228	"O" RING
93	1	60108212	"O" RING
92	2	61300050	LOCK WASHER 1/2
91	2	61200034	FLAT WASHER 1/2
90	3	62425100	ROLL PIN
89	8	62337100	DOWEL PIN 3/8 X 1
88	2	62137150	SPIRAL PIN
87	1	62500006	TAPER PIN
86	1	36800013	KEY
85	1	36800006	KEY
84	1	36800021	KEY
83	1	37500117	SPRING
82	2	63130250	PIPE PLUG
81	1	66700072	SET SCREW
80	4	66220037	SET SCREW



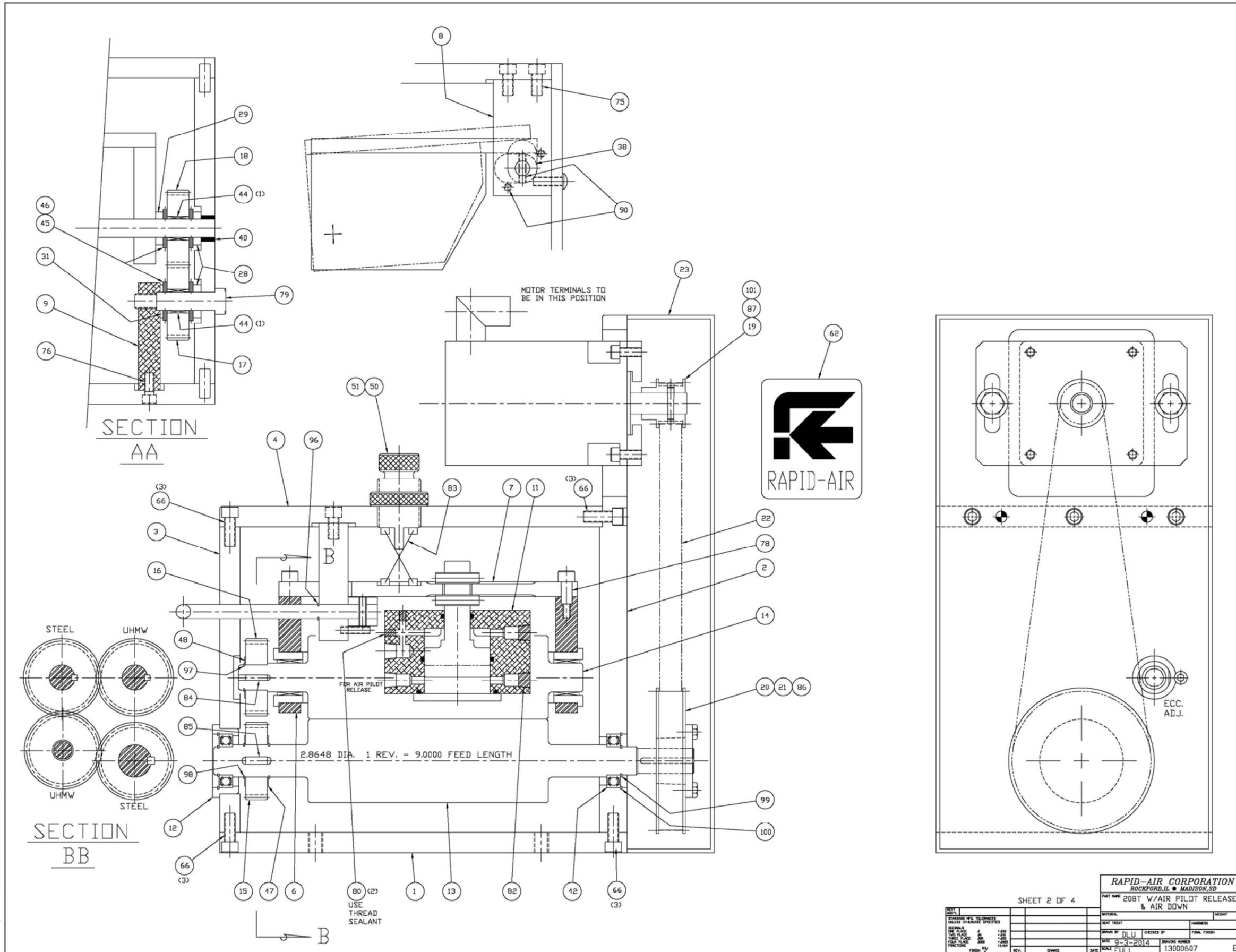
208TX	39	1	69000045	MOTOR
208T	39	1	69000044	MOTOR



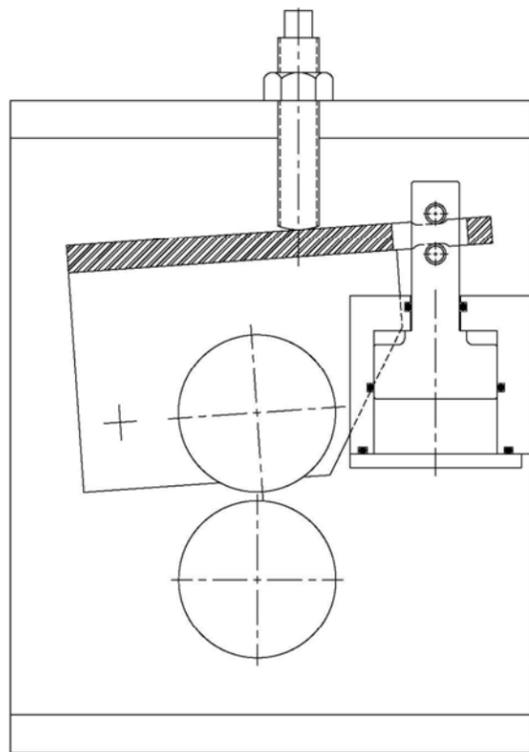
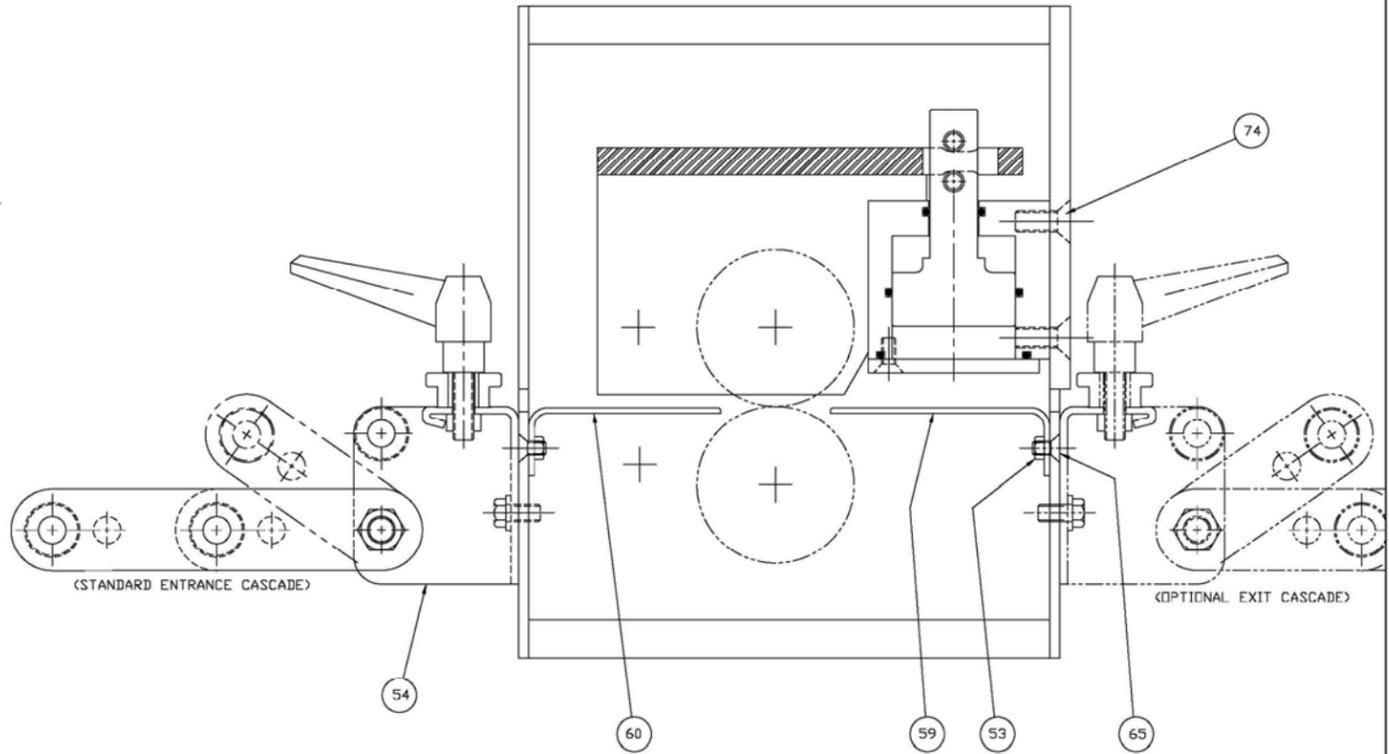
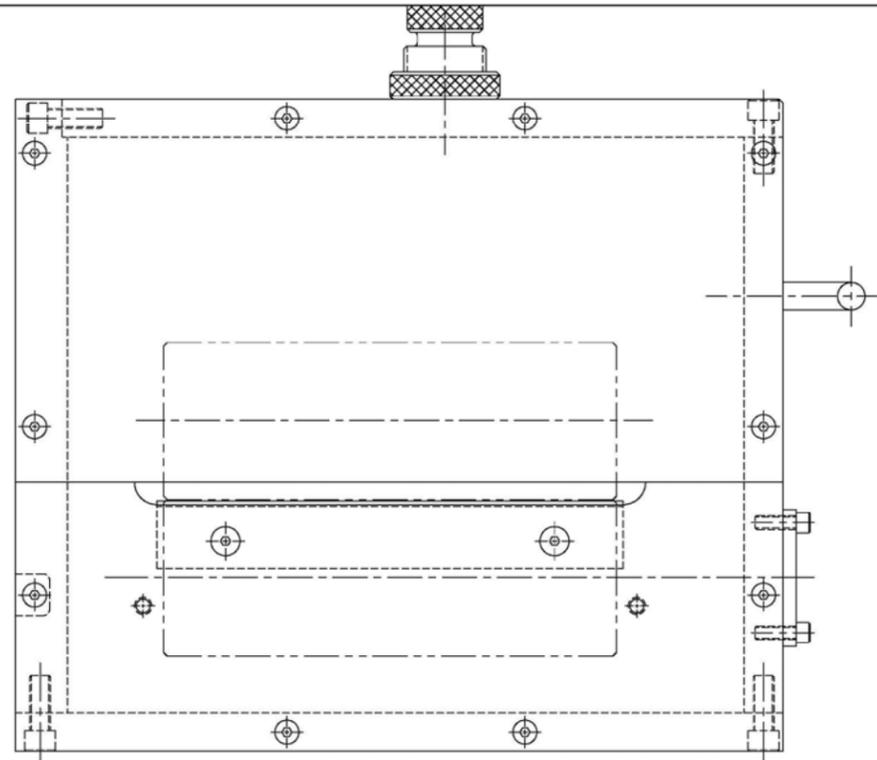
79	1	66162200	SHOULDER SCREW
78	4	66137075	SHOULDER SCREW
77	1	36300004	GAUGE FITTING
76	2	65931075	SHCS 5/16-18 X 3/4
75	2	65936075	SHCS 3/8-16 X 3/4
74	4	66536100	BHSCS 3/8-16 X 1
73	14	66620050	BHSCS 1/4-20 X 1/2
72	6	66620075	BHSCS 1/4-20 X 3/4
71	1	69200027	VALVE
70	4	65920075	SHCS 1/4-20 X 3/4
69	4	66520062	FHSCS 1/4-20 X 5/8
68	4	65931100	SHCS 5/16-18 X 1
67	2	65853150	HEX BOLT 1/2-13 X 1 1/2
66	12	65936100	SHCS 3/8-16 X 1
65	4	66520050	FHSCS 1/4-20 X 1/2
64	2	66300250	DRIVE SCREW
63	1	39900051	S/N TAG
62	1	39900246	RAPID-AIR LOGO
61	1	68000024	REGULATOR
60	1	31500493	ENTRANCE GUIDE
59	1	31500492	EXIT GUIDE
58	1	68000026	GAUGE
57	1	31702137	REGULATOR RETAINING PLATE
56	1	34100236	GAUGE SPACER
55	1	31702113	GAUGE & REGULATOR PLATE
54	1	10900506	CASCADE ASSEMBLY
53	4	65102520	HEX NUT 1/4-20
52	1	65117516	JAM NUT 3/4-16
51	1	36200031	ADJUSTING SCREW LOCKNUT
50	1	36100078	ADJUSTING SCREW
49	1	36100104	POSITIVE STOP SCREW
48	1	64520022	THRUST WASHER
47	2	64520025	THRUST WASHER
46	8	64520008	THRUST WASHER
45	4	64510002	THRUST BEARING
44	2	64500057	NEEDLE BEARING
43	2	64500066	NEEDLE BEARING
42	2	64600049	BALL BEARING
41	1	64100046	DILITE BUSHING
40	1	64100075	DILITE BUSHING
39	1	SEE DETAIL	MOTOR
38	1	36500045	CAM
37	1	36600036	CAM HANDLE
36	1	35500231	PISTON
35	1	31702112	MANIFOLD PLATE
34	1	31400550	PISTON COVER
33	1	31500491	ENTRANCE GUARD
32	1	31500490	LOWER EXIT GUARD
31	1	34100325	SPACER
30	1	34100381	SPACER
29	1	34100323	SPACER
28	2	34100322	SPACER
27	2	34100321	ROLLER SPACER
26	2	33900265	BEARING SLEEVE
25	1	32900858	ECCENTRIC SHAFT
24	1	32900859	PIVOT SHAFT
23	1	31500489	BELT COVER
22	1	32500046	TIMING BELT
21	1	32500036	BUSHING (FOR 32500029)
20	1	32500029	PULLEY (LOWER ROLL)
19	1	32500044	MOTOR PULLEY
18	1	32600233	UPPER IDLER SPUR GEAR
17	1	32600232	LOWER IDLER SPUR GEAR
16	1	32600234	UPPER ROLLER SPUR GEAR
15	1	32600235	LOWER ROLLER SPUR GEAR
14	1	34200385	UPPER ROLLER
13	1	34200384	LOWER ROLLER
12	1	30100290	BEARING HOUSING
11	1	30100292	PISTON HOUSING
10	1	31702474	PISTON HOUSING MOUNTING PLATE
9	1	31702115	GEAR SUPPORT PLATE
8	1	31702111	CAM PIVOT PLATE
7	1	31702116	ROLLER TOP PLATE
6	2	31702106	ROLLER SIDE PLATE
5	1	31702473	MOTOR MOUNTING PLATE
4	1	31702472	TOP PLATE
3	1	31702471	L.H. SIDE PLATE
2	1	31702470	R.H. SIDE PLATE
1	1	31702469	BOTTOM PLATE

SHEET 1 OF 4

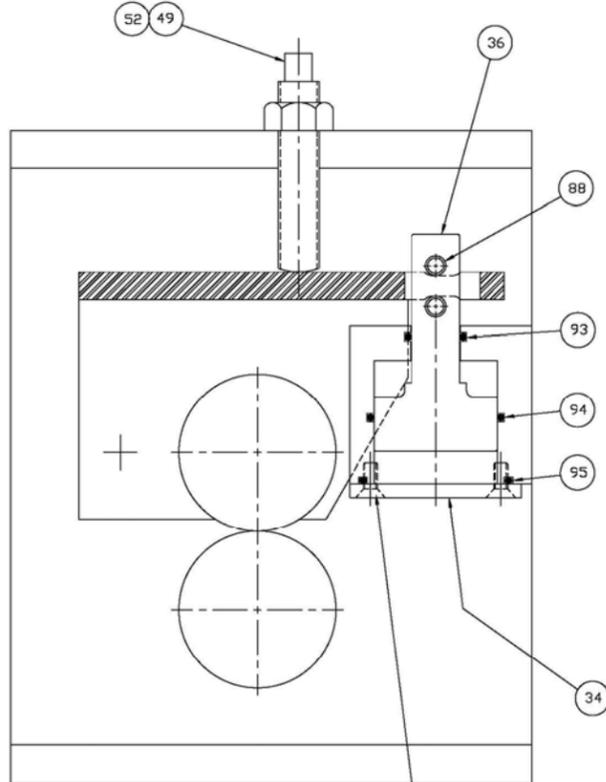
PART NAME		DESCRIPTION	
208T W/AIR PILOT RELEASE & AIR DOWN		RAPID-AIR CORPORATION ROCKFORD, IL • MADISON, SD	
REV.	CHG	DATE	BY
		9-3-2014	DLU



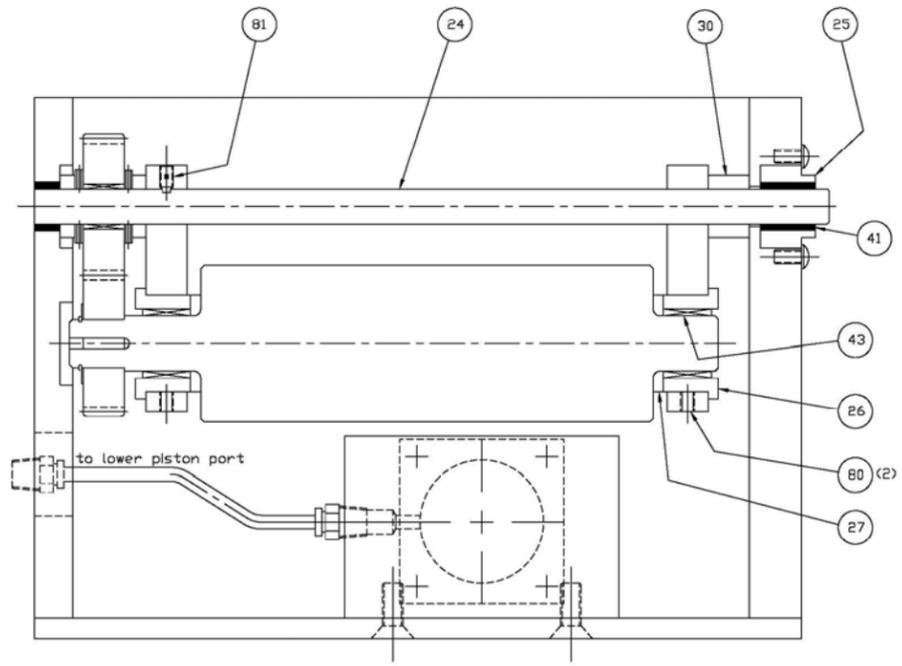
RAPID-AIR CORPORATION ROCKFORD, ILL. • MADISON, SD.	
PART NAME: 208T W/AIR PILOT RELEASE & AIR DOWN	
SHEET 2 OF 4	
DRAWN BY: DLU DATE: 9-3-2014	CHECKED BY: [] DATE: []
FINISH: [] REV. []	WORKING NUMBER: 13000607 DATE: []



ROLLERS OPEN

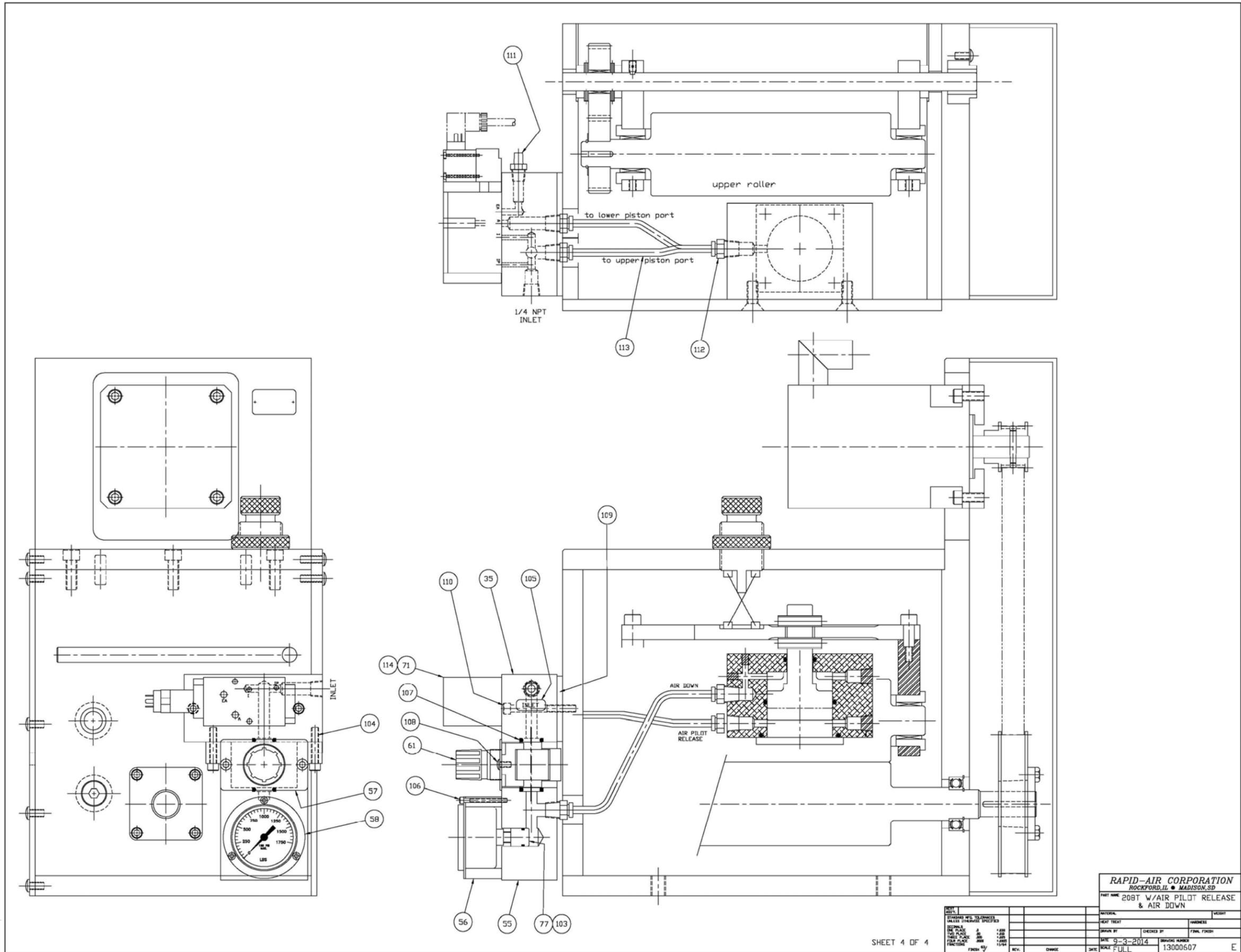


ROLLERS CLOSED



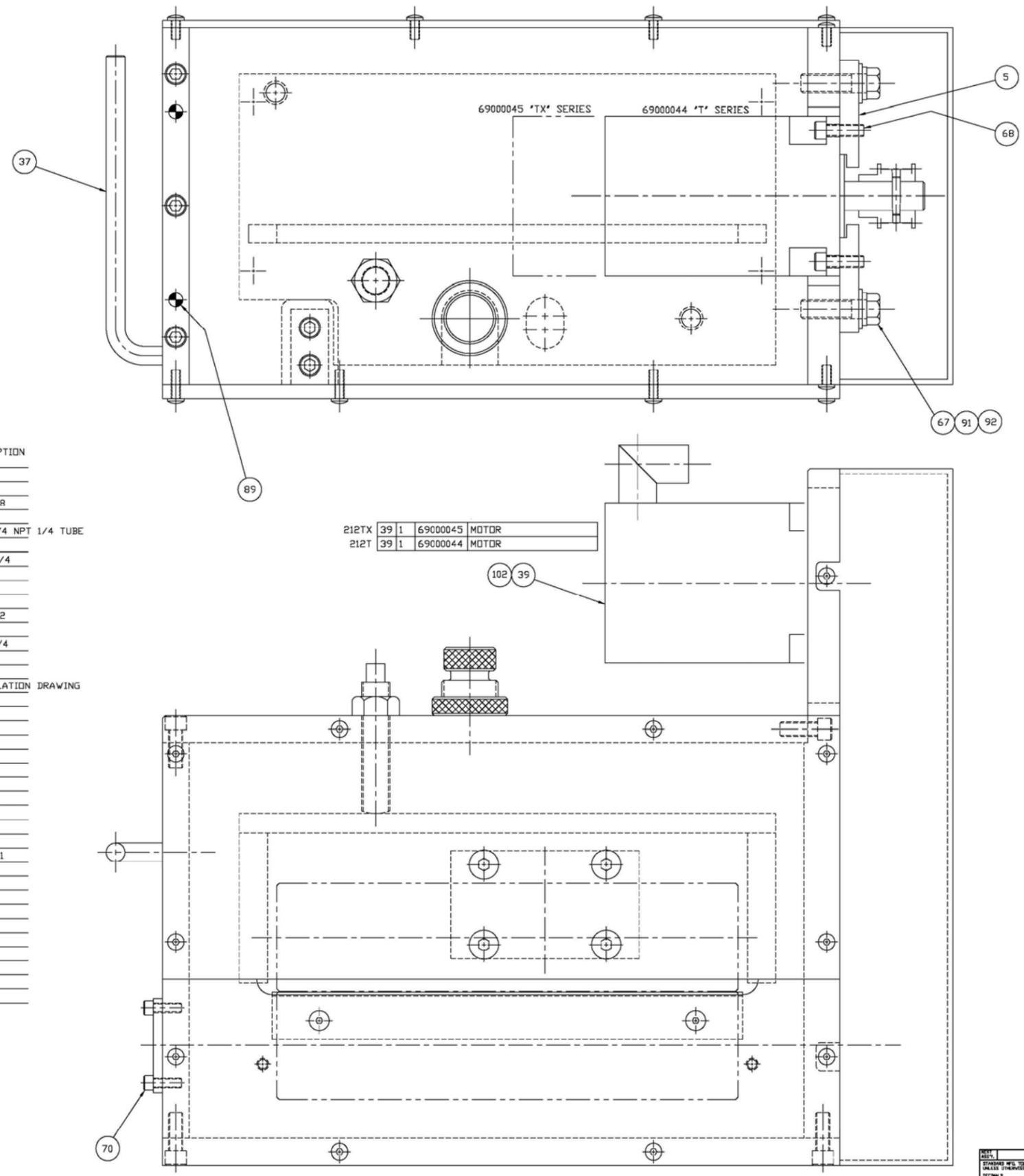
SHEET 3 OF 4

RAPID-AIR CORPORATION ROCKFORD, IL • MADISON, SD		PART NAME: 20BT W/AIR PILOT RELEASE & AIR DOWN	
BEST COPY STANDARD PER. TO DIMENSIONS UNLESS OTHERWISE SPECIFIED	MATERIAL: _____ HEAT TREAT: _____ FINISH: _____	WEIGHT: _____ DRAWN BY: DLU DATE: 9-3-2014	CHECKED BY: _____ DATE: _____ DRAWING NUMBER: 13000607
REVISIONS: 1. REV. _____ 2. REV. _____ 3. REV. _____ 4. REV. _____ 5. REV. _____	REV. _____ CHKD _____ DATE _____	FINISH: _____ DRWG. NO.: _____ DATE: _____	



RAPID-AIR CORPORATION ROCKFORD, IL • MADISON, SD	
PART NAME: 20BT W/AIR PILOT RELEASE & AIR DOWN	
SHEET: 4 OF 4	MATERIAL:
STANDARD:	HEAT TREAT:
FINISH:	WEIGHT:
DATE: 9-3-2014	DRAWN BY:
CHECKED BY:	FINISH:
WORKING NUMBER: 13000607	DATE:
REV:	CHG:

SHEET 4 OF 4



● INDICATES PARTS FOR 'AIR DOWN' OPTION

ITEM	QTY.	PART NO.	DESCRIPTION
● 114	2	65908112	SHCS #8-32 X 1 1/8
● 113	1	64230010	BLACK POLY TUBE
● 112	4	67100121	MALE CONNECTOR 1/4 NPT 1/4 TUBE
● 111	1	67200001	MUFFLER
● 110	2	65920225	SHCS 1/4-20 X 2 1/4
● 109	1	34100338	SPACER
● 108	2	66612037	66612037
● 107	2	60108206	*O* RING
● 106	3	65906150	SHCS #6-32 X 1 1/2
● 105	1	39900175	INLET LABEL
● 104	2	65920125	SHCS 1/4-20 X 1 1/4
● 103	1	60108014	*O* RING
● 102	1	28900446	CONTRDL ASSEMBLY
101	1	32500045	TAPER PIN INSTALLATION DRAWING
100	2	60900185	RETAINING RING
99	2	60910098	RETAINING RING
98	2	60910112	RETAINING RING
97	1	60910087	RETAINING RING
96	1	60910050	RETAINING RING
95	1	60108230	*O* RING
94	1	60108228	*O* RING
93	1	60108212	*O* RING
92	2	61300050	LOCK WASHER 1/2
91	2	61200034	FLAT WASHER 1/2
90	3	62425100	ROLL PIN
89	8	62337100	DOWEL PIN 3/8 X 1
88	2	62137150	SPIRAL PIN
87	1	62500006	TAPER PIN
86	1	36800013	KEY
85	1	36800006	KEY
84	1	36800021	KEY
83	1	37500117	SPRING
82	2	63130250	PIPE PLUG
81	1	66700072	SET SCREW
80	4	66220037	SET SCREW

79	1	66162200	SHOULDER SCREW
78	4	66137075	SHOULDER SCREW
77	1	36300004	GAUGE FITTING
76	2	65931075	SHCS 5/16-18 X 3/4
75	2	65936075	SHCS 3/8-16 X 3/4
74	4	66536100	BHSCS 3/8-16 X 1
73	16	66620050	BHSCS 1/4-20 X 1/2
72	6	66620075	BHSCS 1/4-20 X 3/4
71	1	69200027	VALVE
70	4	65920075	SHCS 1/4-20 X 3/4
69	4	66520062	FHSCS 1/4-20 X 5/8
68	4	65931100	SHCS 5/16-18 X 1
67	2	65853150	HEX BOLT 1/2-13 X 1 1/2
66	12	65936100	SHCS 3/8-16 X 1
65	4	66520050	FHSCS 1/4-20 X 1/2
64	2	66300250	DRIVE SCREW
63	1	39900051	S/N TAG
62	1	39900246	RAPID-AIR LOGO
● 61	1	68000024	REGULATOR
60	1	31500497	ENTRANCE GUIDE
59	1	31500496	EXIT GUIDE
● 58	1	68000026	GAUGE
● 57	1	31702137	REGULATOR RETAINING PLATE
● 56	1	34100236	GAUGE SPACER
● 55	1	31702113	GAUGE & REGULATOR PLATE
54	1	10900507	CASCADE ASSEMBLY
53	4	65102520	HEX NUT 1/4-20
52	1	65117516	JAM NUT 3/4-16
51	1	36200031	ADJUSTING SCREW LOCKNUT
50	1	36100078	ADJUSTING SCREW
49	1	36100104	POSITIVE STOP SCREW
48	1	64520022	THRUST WASHER
47	2	64520025	THRUST WASHER
46	8	64520008	THRUST WASHER
45	4	64510002	THRUST BEARING
44	2	64500057	NEEDLE BEARING
43	2	64500066	NEEDLE BEARING
42	2	64600049	BALL BEARING
41	1	64100046	DILITE BUSHING
40	1	64100075	DILITE BUSHING
39	1	SEE DETAIL	MOTOR
38	1	36500045	CAM
37	1	36600036	CAM HANDLE
36	1	35500231	PISTON
● 35	1	31702112	MANIFOLD PLATE
34	1	31400550	PISTON COVER
33	1	31500495	ENTRANCE GUARD
32	1	31500494	LOWER EXIT GUARD
31	1	34100325	SPACER
30	1	34100381	SPACER
29	1	34100323	SPACER
28	2	34100322	SPACER
27	2	34100321	ROLLER SPACER
26	2	33900265	BEARING SLEEVE
25	1	32900858	ECCENTRIC SHAFT
24	1	32900857	PIVOT SHAFT
23	1	31500489	BELT COVER
22	1	32500046	TIMING BELT
21	1	32500036	BUSHING (FOR 32500029)
20	1	32500029	PULLEY (LOWER ROLL)
19	1	32500044	MOTOR PULLEY
18	1	32600233	UPPER IDLER SPUR GEAR
17	1	32600232	LOWER IDLER SPUR GEAR
16	1	32600234	UPPER ROLLER SPUR GEAR
15	1	32600235	LOWER ROLLER SPUR GEAR
14	1	34200383	UPPER ROLLER
13	1	34200382	LOWER ROLLER
12	1	30100290	BEARING HOUSING
11	1	30100292	PISTON HOUSING
10	1	31702489	PISTON HOUSING MOUNTING PLATE
9	1	31702115	GEAR SUPPORT PLATE
8	1	31702111	CAM PIVOT PLATE
7	1	21900254	ROLLER TOP PLATE ASSEMBLY
6	2	31702106	ROLLER SIDE PLATE
5	1	31702473	MOTOR MOUNTING PLATE
4	1	31702488	TOP PLATE
3	1	31702471	L.H. SIDE PLATE
2	1	31702470	R.H. SIDE PLATE
1	1	31702487	BOTTOM PLATE

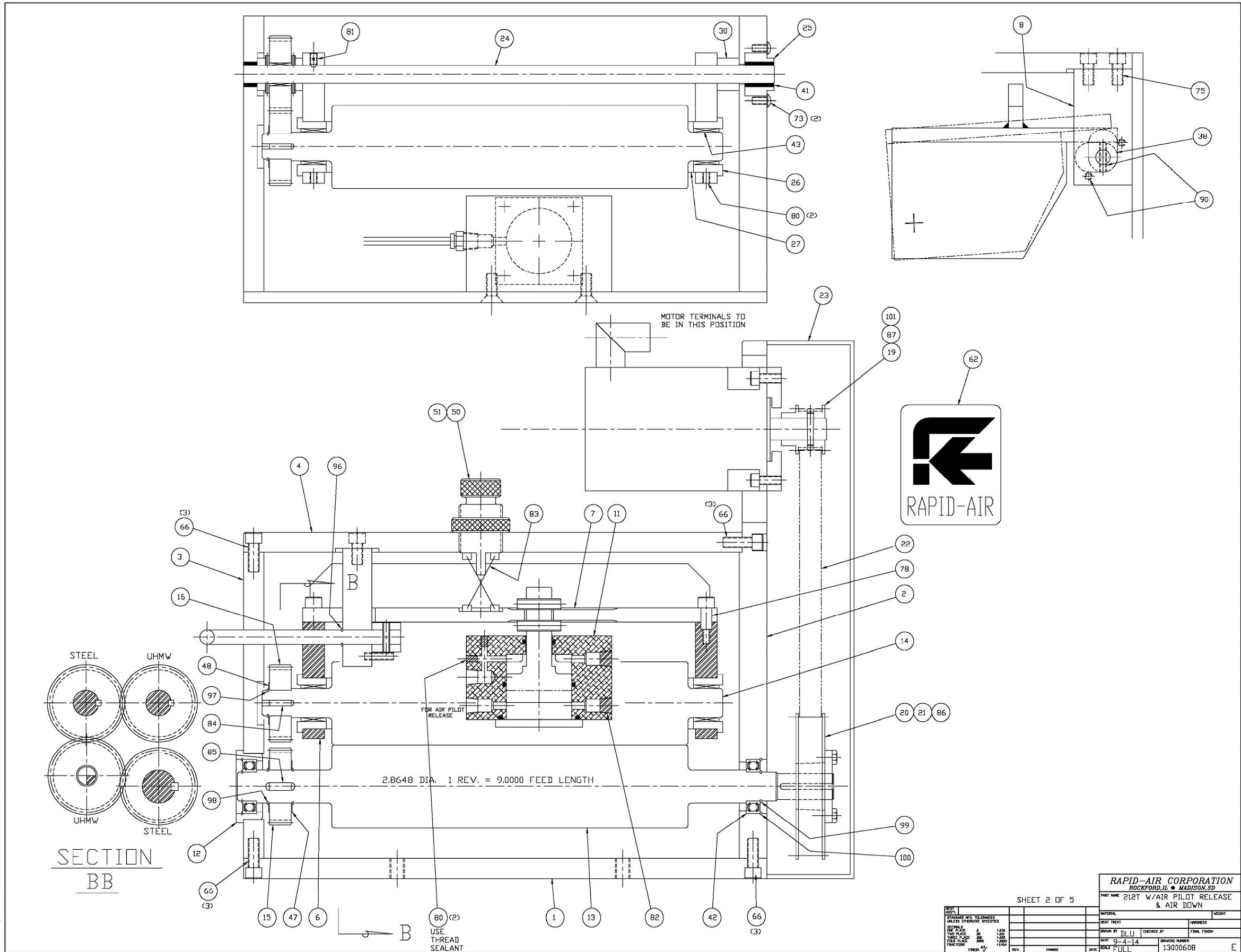
SHEET 1 OF 5

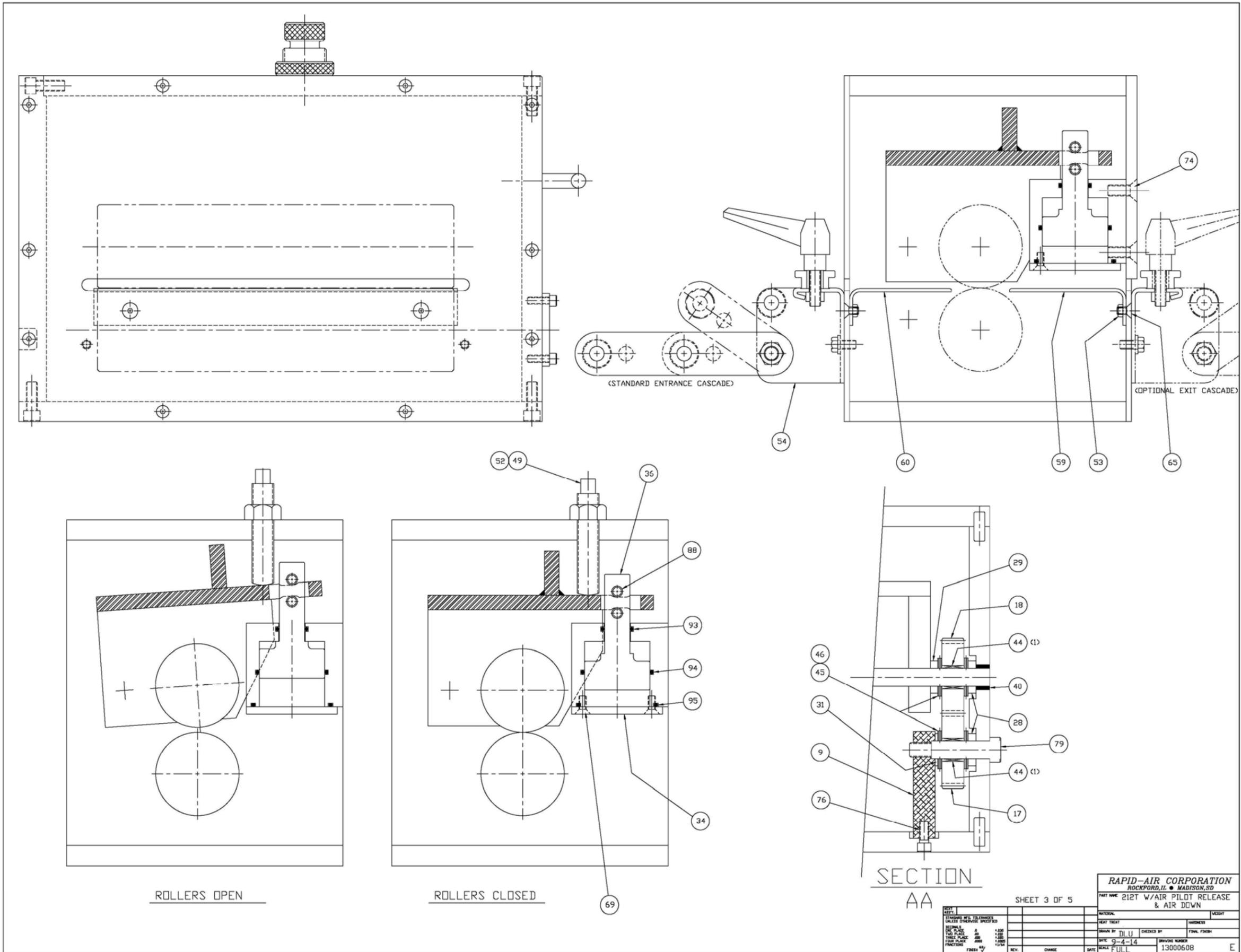
RAPID-AIR CORPORATION
 ROCKFORD, IL • MADISON, SD

PART NAME: 212T W/AIR PILOT RELEASE & AIR DOWN

DESIGNED BY	DATE	REV.	CHGCD	DATE	BY	CHKD	DATE
DRAWN BY	DATE	REV.	CHGCD	DATE	BY	CHKD	DATE
CHECKED BY	DATE	REV.	CHGCD	DATE	BY	CHKD	DATE
APPROVED BY	DATE	REV.	CHGCD	DATE	BY	CHKD	DATE

DATE: 9-4-14
 DRAWING NUMBER: 13000608



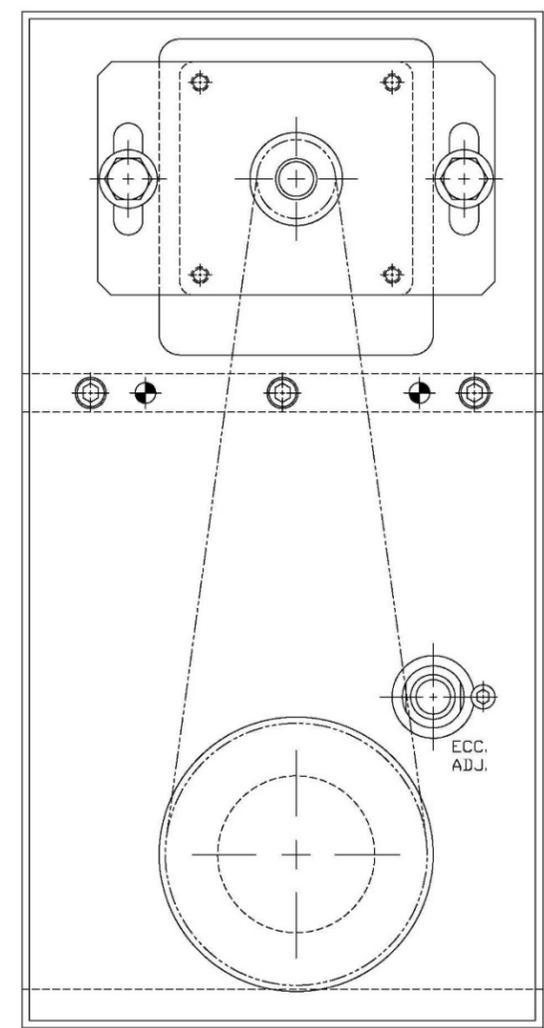
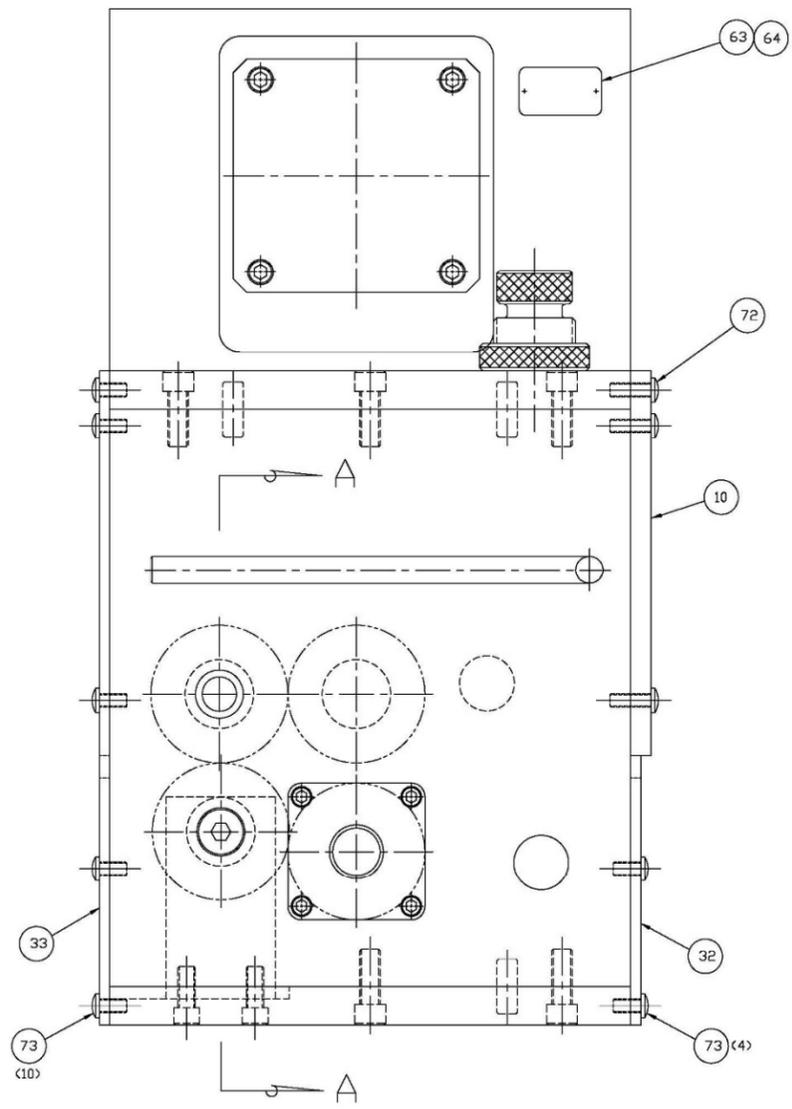


RAPID-AIR CORPORATION
 ROCKFORD, IL • MADISON, SD

PART NAME 212T W/AIR PILOT RELEASE & AIR DOWN

REV.	CHANGE	DATE	BY	CHKD.	APP'D.	QTY.	UNIT	PRICE	TOTAL
1									

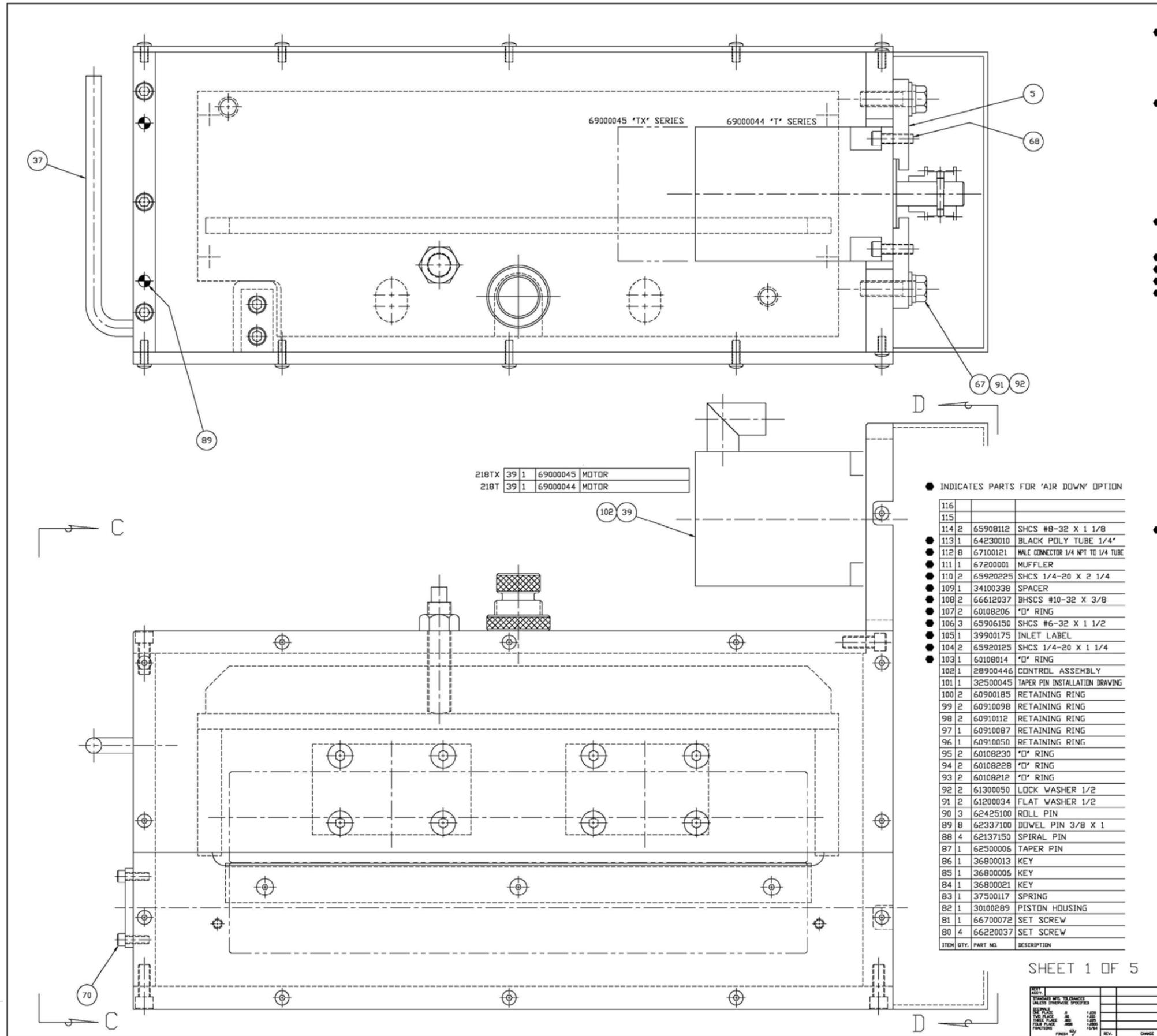
MATERIAL: _____ WEIGHT: _____
 HEAT TREAT: _____
 FINISH: _____
 DATE: 9-4-14
 DRAWING NUMBER: 13000608
 SHEET: FULL



SHEET 4 OF 5

RAPID-AIR CORPORATION ROCKFORD, IL • MADISON, SD	
PART NAME 212T W/AIR PILOT RELEASE & AIR DOWN	
MATERIAL	WEIGHT
TEAT TREAT	FINISHES
DRAWN BY DLU	CHECKED BY
DATE 9-4-14	DRWING NUMBER 13000608
SCALE FULL	

REV.	CHGEC	DATE
STANDARD MFG. TOLERANCES UNLESS OTHERWISE SPECIFIED		
SECURALS		
1ST PLACE	±.001	
2ND PLACE	±.002	
3RD PLACE	±.005	
4TH PLACE	±.010	
FUNCTION	±.015	
FRESH	±.020	



218TX	39	1	69000045	MOTOR
218T	39	1	69000044	MOTOR

● INDICATES PARTS FOR 'AIR DOWN' OPTION

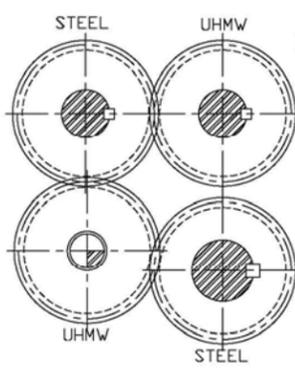
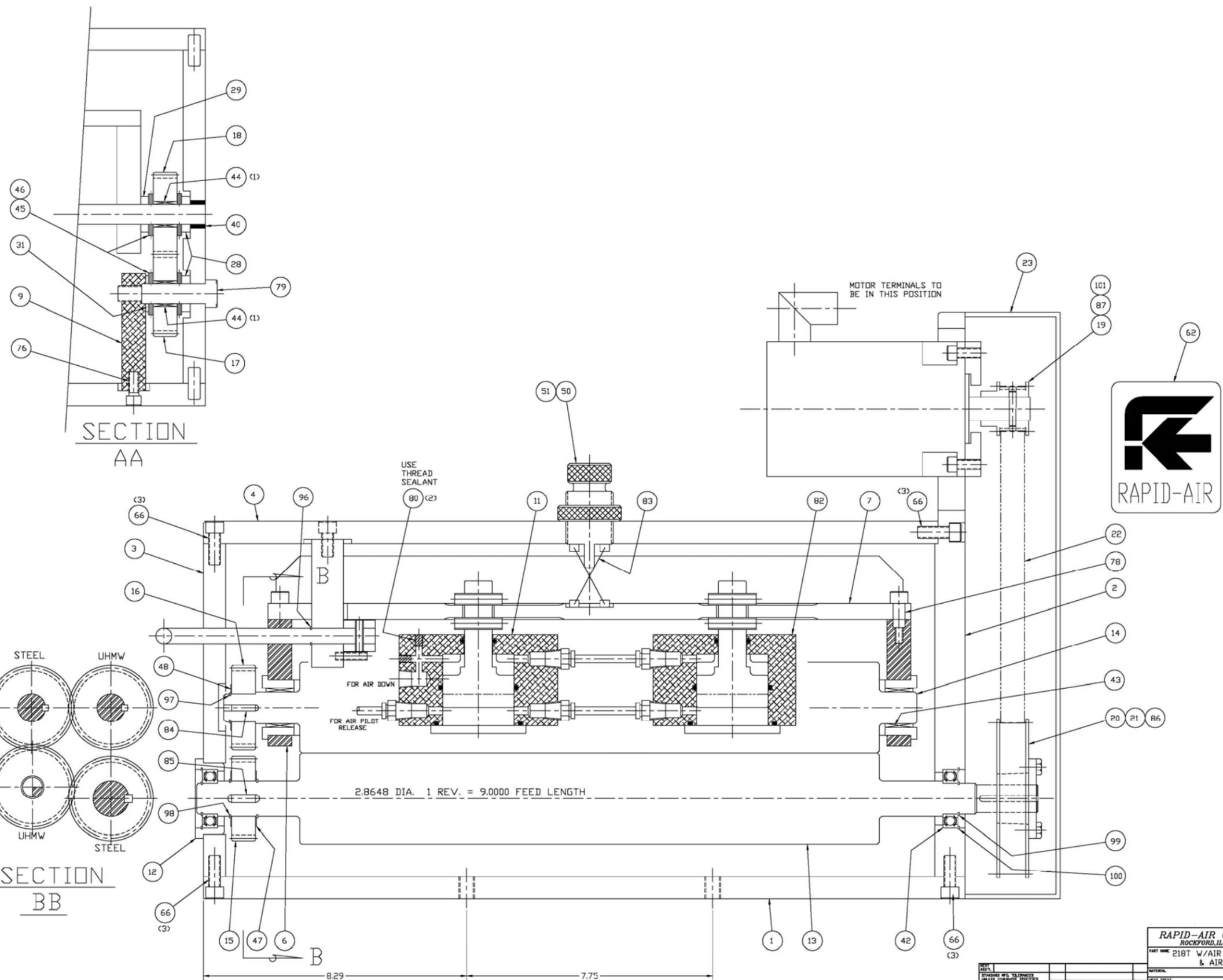
116				
115				
114	2	65908112	SHCS #8-32 X 1 1/8	
113	1	64230010	BLACK POLY TUBE 1/4"	
112	8	67100121	MALE CONNECTOR 1/4 NPT TO 1/4 TUBE	
111	1	67200001	MUFFLER	
110	2	65920225	SHCS 1/4-20 X 2 1/4	
109	1	34100338	SPACER	
108	2	66612037	BHSCS #10-32 X 3/8	
107	2	60108206	'O' RING	
106	3	65906150	SHCS #6-32 X 1 1/2	
105	1	39900175	INLET LABEL	
104	2	65920125	SHCS 1/4-20 X 1 1/4	
103	1	60108014	'O' RING	
102	1	28900446	CONTROL ASSEMBLY	
101	1	32500045	TAPER PIN INSTALLATION DRAWING	
100	2	60900185	RETAINING RING	
99	2	60910098	RETAINING RING	
98	2	60910112	RETAINING RING	
97	1	60910087	RETAINING RING	
96	1	60910050	RETAINING RING	
95	2	60108230	'O' RING	
94	2	60108228	'O' RING	
93	2	60108212	'O' RING	
92	2	61300050	LOCK WASHER 1/2	
91	2	61200034	FLAT WASHER 1/2	
90	3	62425100	ROLL PIN	
89	8	62337100	DOWEL PIN 3/8 X 1	
88	4	62137150	SPIRAL PIN	
87	1	62500006	TAPER PIN	
86	1	36800013	KEY	
85	1	36800006	KEY	
84	1	36800021	KEY	
83	1	37500117	SPRING	
82	1	30100289	PISTON HOUSING	
81	1	66700072	SET SCREW	
80	4	66220037	SET SCREW	
ITEM	QTY.	PART NO.	DESCRIPTION	

79	1	66162200	SHOULDER SCREW	
78	4	66137075	SHOULDER SCREW	
77	1	36300004	GAUGE FITTING	
76	2	65931075	SHCS 5/16-18 X 3/4	
75	2	65936075	SHCS 3/8-16 X 3/4	
74	8	66536100	BHSCS 3/8-16 X 1	
73	19	66620050	BHSCS 1/4-20 X 1/2	
72	7	66620075	BHSCS 1/4-20 X 3/4	
71	1	69200027	VALVE	
70	4	65920075	SHCS 1/4-20 X 3/4	
69	8	66520062	FHSCS 1/4-20 X 5/8	
68	4	65931100	SHCS 5/16-18 X 1	
67	2	65853150	HEX BOLT 1/2-13 X 1 1/2	
66	12	65936100	SHCS 3/8-16 X 1	
65	6	66520050	FHSCS 1/4-20 X 1/2	
64	2	66300250	DRIVE SCREW	
63	1	39900051	S/N TAG	
62	1	39900246	RAPID-AIR LOGO	
61	1	68000024	REGULATOR	
60	1	31500501	ENTRANCE GUIDE	
59	1	31500500	EXIT GUIDE	
58	1	68000026	GAUGE	
57	1	31702137	REGULATOR RETAINING PLATE	
56	1	34100236	GAUGE SPACER	
55	1	31702113	GAUGE & REGULATOR PLATE	
54	1	10900508	CASCADE ASSEMBLY	
53	6	65102520	HEX NUT 1/4-20	
52	1	65117516	JAM NUT 3/4-16	
51	1	36200031	ADJUSTING SCREW LOCKNUT	
50	1	36100078	ADJUSTING SCREW	
49	1	36100104	POSITIVE STOP SCREW	
48	1	64520022	THRUST WASHER	
47	2	64520025	THRUST WASHER	
46	8	64520008	THRUST WASHER	
45	4	64510002	THRUST BEARING	
44	2	64500057	NEEDLE BEARING	
43	2	64500066	NEEDLE BEARING	
42	2	64600049	BALL BEARING	
41	1	64100046	DILITE BUSHING	
40	1	64100075	DILITE BUSHING	
39	1	SEE DETAIL	MOTOR	
38	1	36500045	CAM	
37	1	36600036	CAM HANDLE	
36	2	35500231	PISTON	
35	1	31702112	MANIFOLD PLATE	
34	2	31400550	PISTON COVER	
33	1	31500499	ENTRANCE GUARD	
32	1	31500498	LOWER EXIT GUARD	
31	1	34100325	SPACER	
30	1	34100381	SPACER	
29	1	34100323	SPACER	
28	2	34100322	SPACER	
27	2	34100321	ROLLER SPACER	
26	2	33900265	BEARING SLEEVE	
25	1	32900858	ECCENTRIC SHAFT	
24	1	32900861	PIVOT SHAFT	
23	1	31500489	BELT COVER	
22	1	32500046	TIMING BELT	
21	1	32500036	BUSHING (FOR 32500029)	
20	1	32500029	PULLEY (LOWER ROLL)	
19	1	32500044	MOTOR PULLEY	
18	1	32600233	UPPER IDLER SPUR GEAR	
17	1	32600232	LOWER IDLER SPUR GEAR	
16	1	32600234	UPPER ROLLER SPUR GEAR	
15	1	32600235	LOWER ROLLER SPUR GEAR	
14	1	34200389	UPPER ROLLER	
13	1	34200388	LOWER ROLLER	
12	1	30100290	BEARING HOUSING	
11	1	30100292	PISTON HOUSING	
10	1	31702500	PISTON HOUSING MOUNTING PLATE	
9	1	31702115	GEAR SUPPORT PLATE	
8	1	31702111	CAM PIVOT PLATE	
7	1	21900262	ROLLER TOP PLATE ASSEMBLY	
6	2	31702106	ROLLER SIDE PLATE	
5	1	31702473	MOTOR MOUNTING PLATE	
4	1	31702499	TOP PLATE	
3	1	31702471	L.H. SIDE PLATE	
2	1	31702470	R.H. SIDE PLATE	
1	1	31702498	BOTTOM PLATE	
ITEM	QTY.	PART NO.	DESCRIPTION	

SHEET 1 OF 5

STANDARD REV. TELEPHONE		DATE		BY	
DRAWN BY		CHECKED BY		DATE	
REV.		CHANGE		DATE	

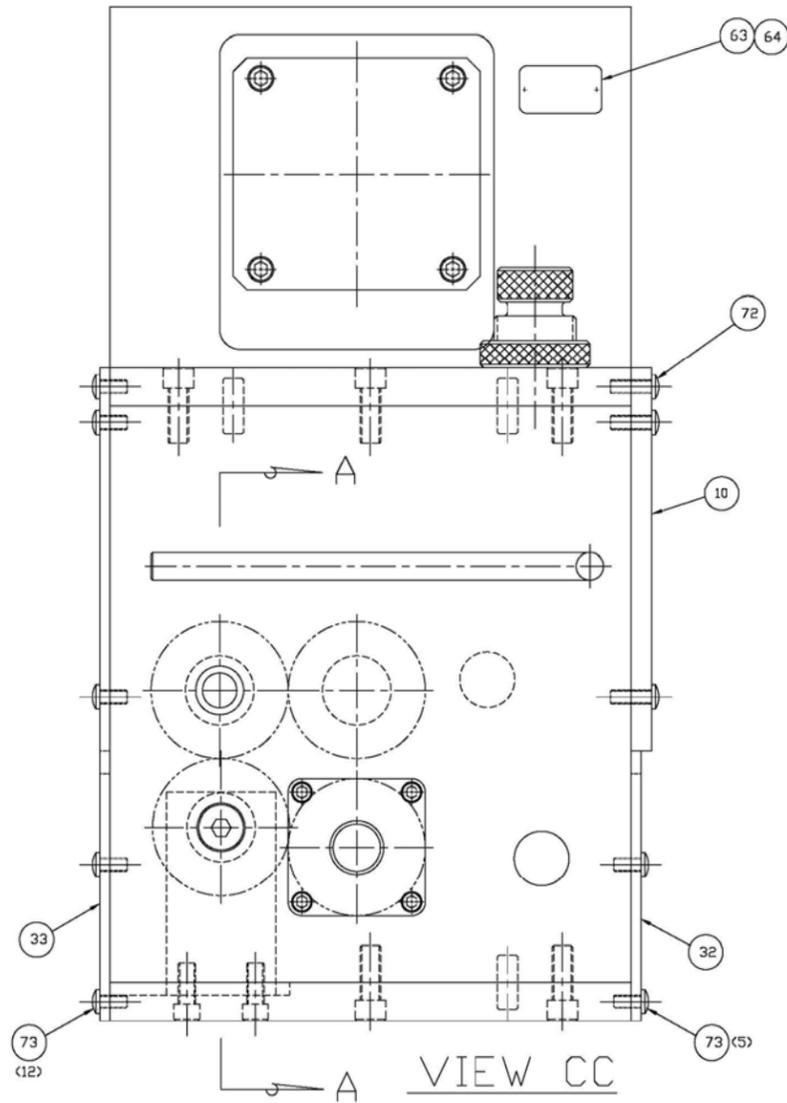
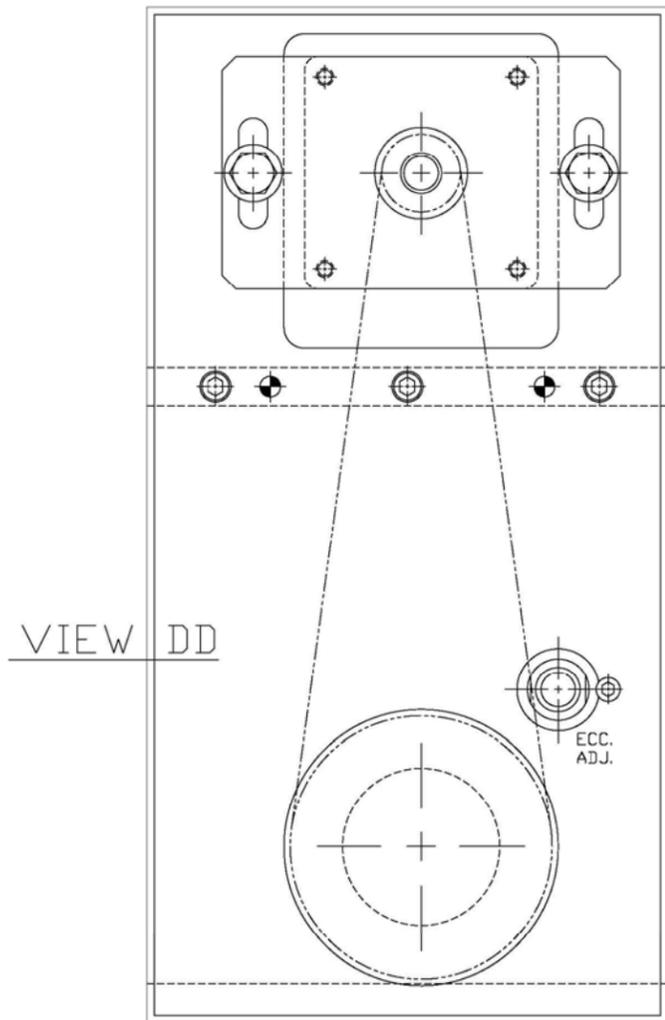
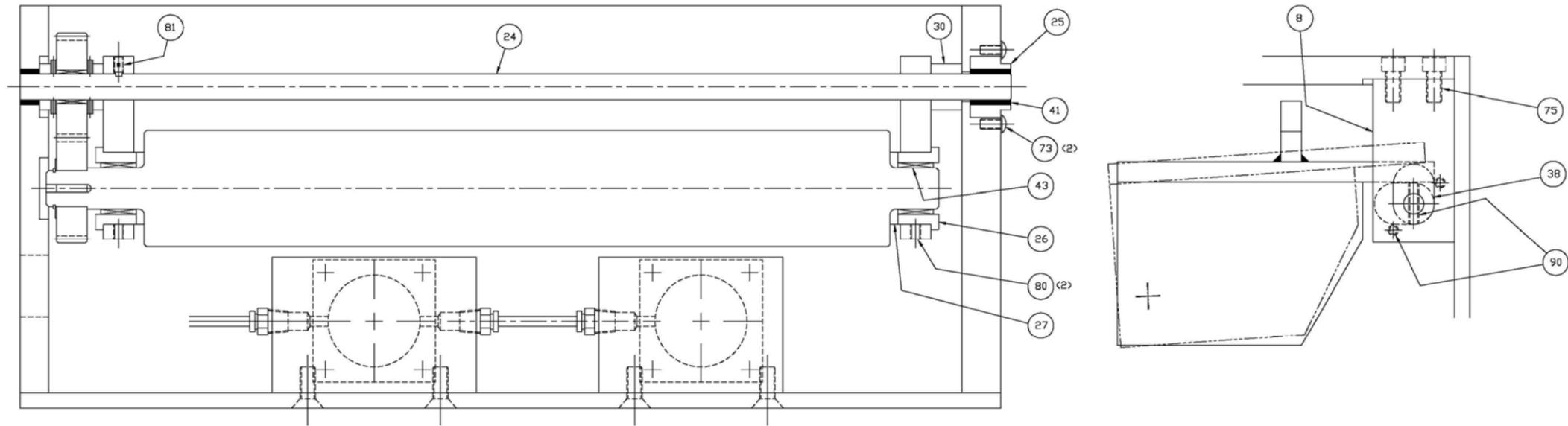
RAPID-AIR CORPORATION
 ROCKFORD, IL • MADISON, SD
 PART NAME 218T W/AIR PILOT RELEASE & AIR DOWN
 DATE 9-10-14
 DRAWING NUMBER 13000609



SECTION BB

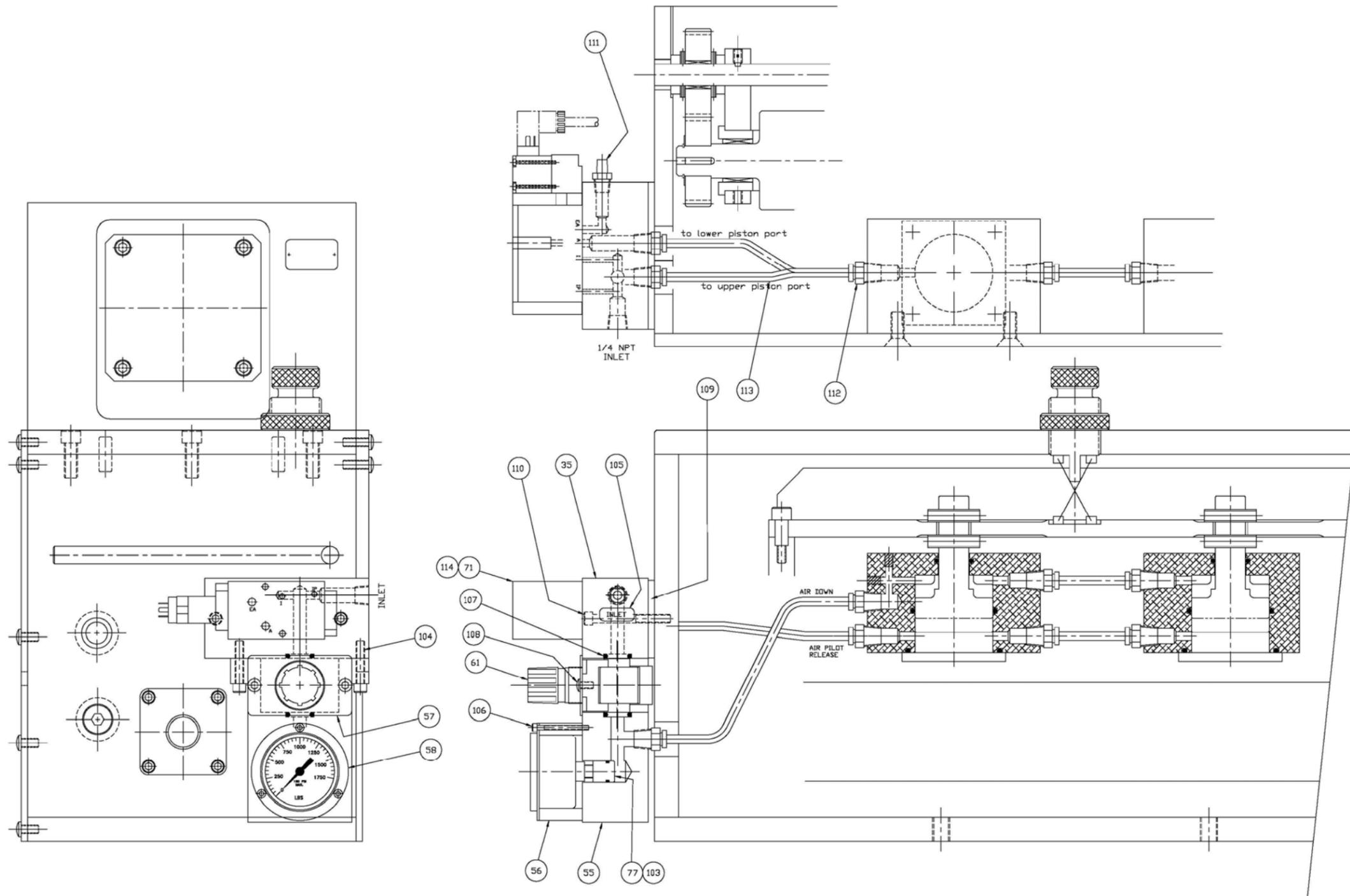
RAPID-AIR CORPORATION ROCKFORD, IL • MADISON, SD	
PART NAME: 218T W/AIR PILOT RELEASE & AIR DOWN	
DATE: 9-10-14	DRAWN BY: DLU
CHECKED BY:	FINISH:
REV. 1	DATE: 1/24
CHG:	DATE:
DATE:	DATE:

STANDARD:	FINISH:
SPEC:	FINISH:
TYP:	FINISH:



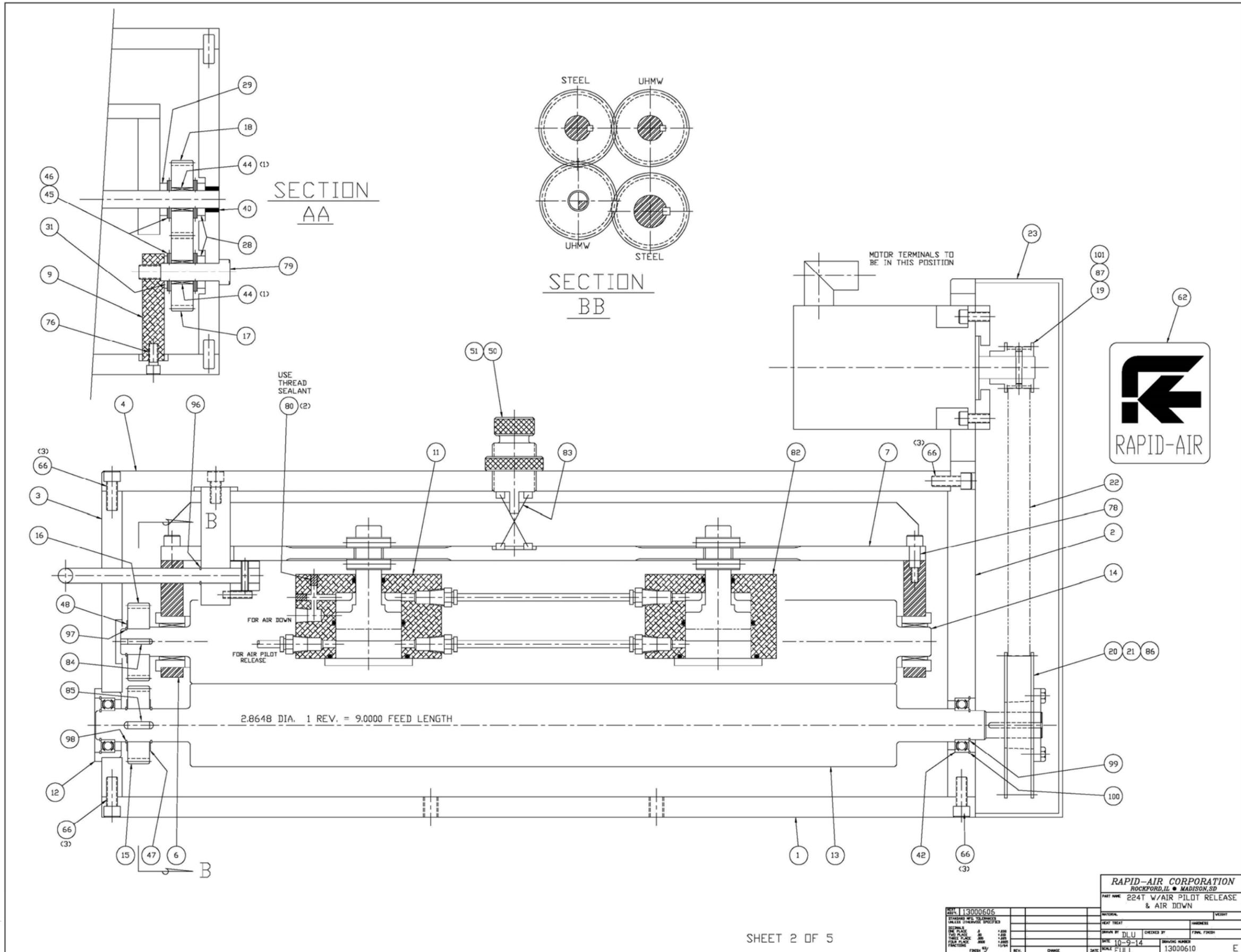
SHEET 3 OF 5

Rapid-Air Corporation Rockford, IL • Madison, SD				PART NAME 218T W/AIR PILOT RELEASE & AIR DOWN	
STANDARD	REV. 12/2008	DATE	12/08	ISSUED	12/08
DESIGNED BY	DLU	CHECKED BY	DLU	FINISH	12/08
DRAWN BY	DLU	DATE	9-10-14	WORKING NUMBER	13000609
DATE	9-10-14	REV.	CHG	DATE	12/08

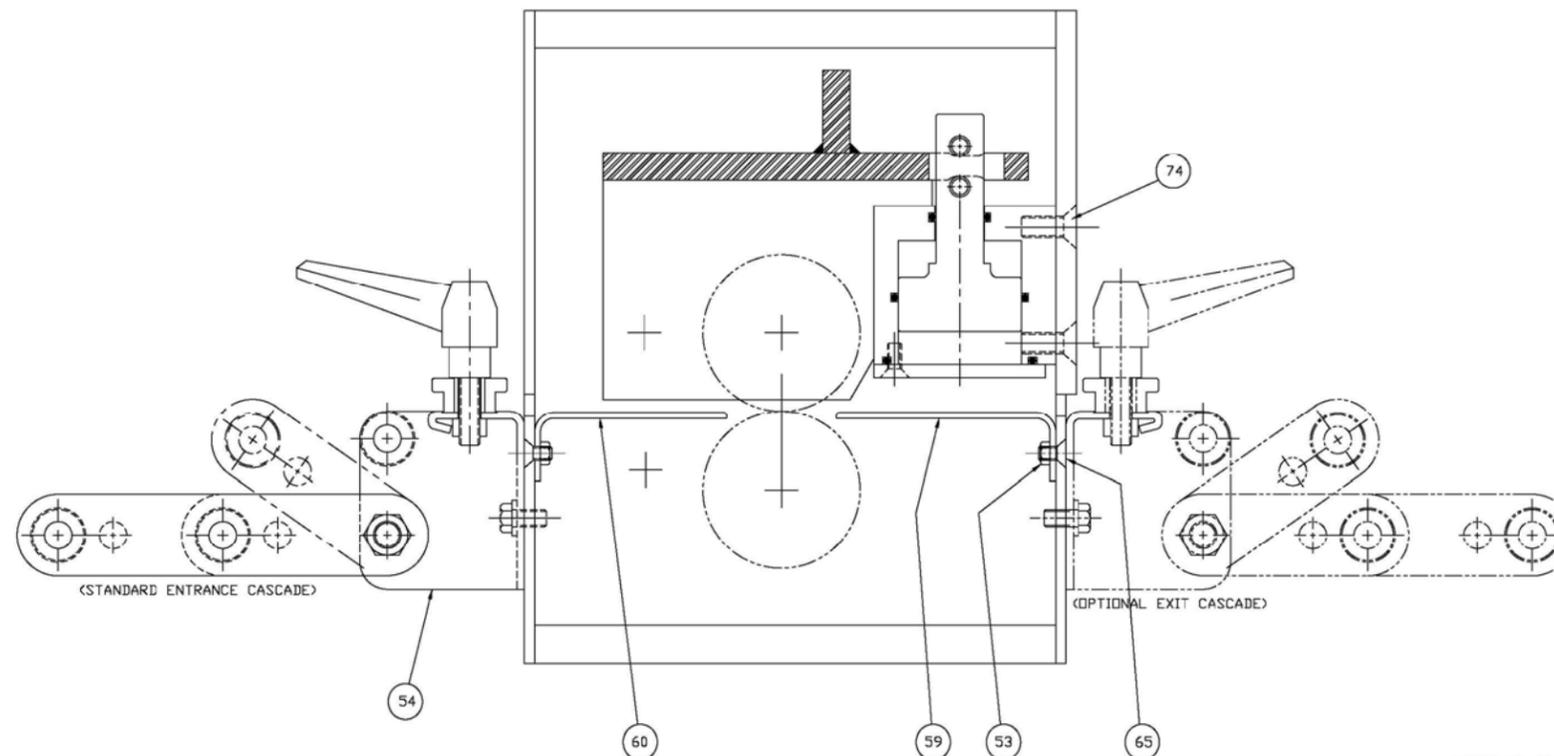
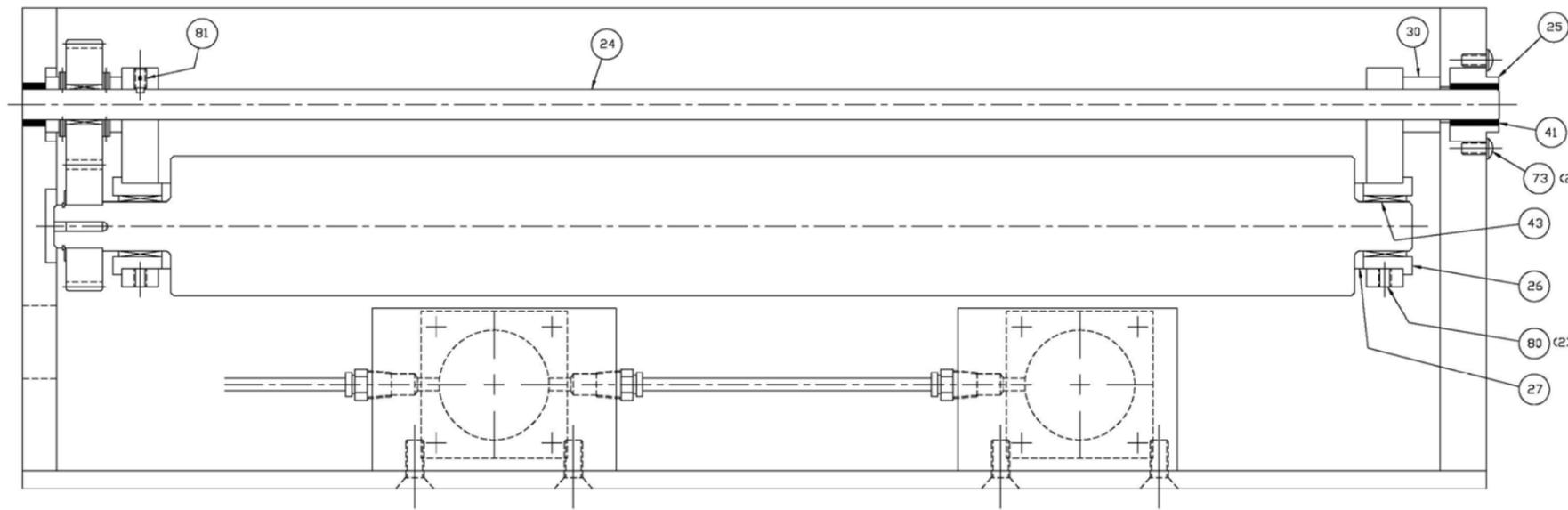


SHEET 5 OF 5

RAPID-AIR CORPORATION ROCKFORD, IL • MADISON, SD		MATERIAL _____ WEIGHT _____	
PART NAME: 218T W/AIR PILOT RELEASE & AIR DOWN		FINISHES _____	
STANDARD MFG. TOLERANCES UNLESS OTHERWISE SPECIFIED		DATE 9-10-14 DRAWING NUMBER 13000609	
DIMENSIONS: 1/16" 1/32" 1/64"	TYP. PLACE: 1:100	DRAWN BY: DLU	CHECKED BY: _____
TYP. PLACE: 1:100	TYP. PLACE: 1:100	DATE: 9-10-14	SCALE: FULL
TYP. PLACE: 1:100	TYP. PLACE: 1:100	REV. _____	DATE: _____
TYP. PLACE: 1:100	TYP. PLACE: 1:100	FINISH: _____	DATE: _____



PART 13000606		MATERIAL		FINISH
STANDARD PER. TO DIMENSIONS		HEAT TREAT		WEIGHT
MATERIAL SPECIFICATIONS		FINISH		
DESIGNER	DATE	BY	CHECKED BY	FINAL FINISH
DRAWN BY	DATE	BY	CHECKED BY	FINAL FINISH
DATE	10-9-14	DATE	10-9-14	
REV.	CHG	DATE	BY	13000610



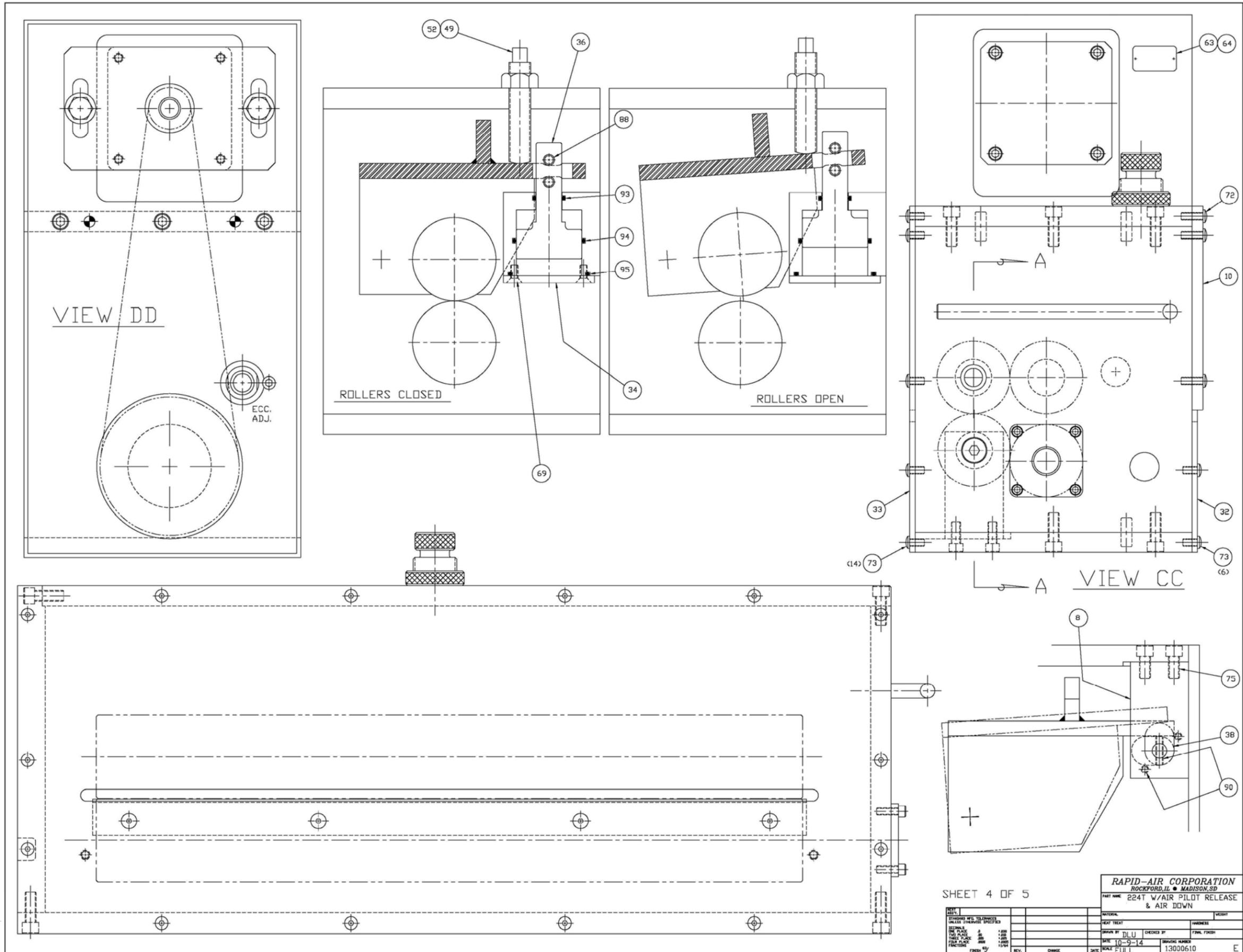
● INDICATES PARTS FOR 'AIR DOWN' OPTION

116			
115			
114	2	65908112 SHCS #8-32 X 1 1/8	
113	1	64230010 BLACK POLY TUBE 1/4"	
112	8	67100121 MALE CONNECTOR 1/4 NPT TO 1/4 TUBE	
111	1	67200001 MUFFLER	
110	2	65920225 SHCS 1/4-20 X 2 1/4	
109	1	34100338 SPACER	
108	2	66612037 BHSCS #10-32 X 3/8	
107	2	60108206 "O" RING	
106	3	65906150 SHCS #6-32 X 1 1/2	
105	1	39900175 INLET LABEL	
104	2	65920125 SHCS 1/4-20 X 1 1/4	
103	1	60108014 "O" RING	
102	1	28900446 CONTROL ASSEMBLY	
101	1	32500045 TAPER PIN INSTALLATION DRAWING	
100	2	60900185 RETAINING RING	
99	2	60910098 RETAINING RING	
98	2	60910112 RETAINING RING	
97	1	60910087 RETAINING RING	
96	1	60910050 RETAINING RING	
95	2	60108230 "O" RING	
94	2	60108228 "O" RING	
93	2	60108212 "O" RING	
92	2	61300050 LOCK WASHER 1/2	
91	2	61200034 FLAT WASHER 1/2	
90	3	62425100 ROLL PIN	
89	8	62337100 DWEL PIN 3/8 X 1	
88	4	62137150 SPIRAL PIN	
87	1	62500006 TAPER PIN	
86	1	36800013 KEY	
85	1	36800006 KEY	
84	1	36800021 KEY	
83	1	37500117 SPRING	
82	1	30100289 PISTON HOUSING	
81	1	66700072 SET SCREW	
80	4	66220037 SET SCREW	
ITEM	QTY.	PART NO.	DESCRIPTION

79	1	66162200	SHOULDER SCREW
78	4	66137075	SHOULDER SCREW
77	1	36300004	GAUGE FITTING
76	2	65931075	SHCS 5/16-18 X 3/4
75	2	65936075	SHCS 3/8-16 X 3/4
74	8	66536100	BHSCS 3/8-16 X 1
73	22	66620050	BHSCS 1/4-20 X 1/2
72	8	66620075	BHSCS 1/4-20 X 3/4
71	1	69200027	VALVE
70	4	65920075	SHCS 1/4-20 X 3/4
69	8	66520062	FHSCS 1/4-20 X 5/8
68	4	65931100	SHCS 5/16-18 X 1
67	2	65853150	HEX BOLT 1/2-13 X 1 1/2
66	12	65936100	SHCS 3/8-16 X 1
65	8	66520050	FHSCS 1/4-20 X 1/2
64	2	66300250	DRIVE SCREW
63	1	39900051	S/N TAG
62	1	39900246	RAPID-AIR LOGO
61	1	68000024	REGULATOR
60	1	31500505	ENTRANCE GUIDE
59	1	31500504	EXIT GUIDE
58	1	68000026	GAUGE
57	1	31702137	REGULATOR RETAINING PLATE
56	1	34100236	GAUGE SPACER
55	1	31702113	GAUGE & REGULATOR PLATE
54	1	10900509	CASCADE ASSEMBLY
53	8	65102520	HEX NUT 1/4-20
52	1	65117516	JAM NUT 3/4-16
51	1	36200031	ADJUSTING SCREW LOCKNUT
50	1	36100078	ADJUSTING SCREW
49	1	36100104	POSITIVE STOP SCREW
48	1	64520022	THRUST WASHER
47	2	64520025	THRUST WASHER
46	8	64520008	THRUST WASHER
45	4	64510002	THRUST BEARING
44	2	64500057	NEEDLE BEARING
43	2	64500066	NEEDLE BEARING
42	2	64600049	BALL BEARING
41	1	64100046	DILITE BUSHING
40	1	64100075	DILITE BUSHING
39	1	SEE DETAIL	MOTOR
38	1	36500045	CAM
37	1	36600036	CAM HANDLE
36	2	35500231	PISTON
35	1	31702112	MANIFOLD PLATE
34	2	31400550	PISTON COVER
33	1	31500503	ENTRANCE GUARD
32	1	31500502	LOWER EXIT GUARD
31	1	34100325	SPACER
30	1	34100381	SPACER
29	1	34100323	SPACER
28	2	34100322	SPACER
27	2	34100321	ROLLER SPACER
26	2	33900265	BEARING SLEEVE
25	1	32900858	ECCENTRIC SHAFT
24	1	32900860	PIVOT SHAFT
23	1	31500489	BELT COVER
22	1	32500046	TIMING BELT
21	1	32500036	BUSHING (FOR 32500029)
20	1	32500029	PULLEY (LOWER ROLL)
19	1	32500044	MOTOR PULLEY
18	1	32600233	UPPER IDLER SPUR GEAR
17	1	32600232	LOWER IDLER SPUR GEAR
16	1	32600234	UPPER ROLLER SPUR GEAR
15	1	32600235	LOWER ROLLER SPUR GEAR
14	1	34200387	UPPER ROLLER
13	1	34200386	LOWER ROLLER
12	1	30100290	BEARING HOUSING
11	1	30100292	PISTON HOUSING
10	1	31702503	PISTON HOUSING MOUNTING PLATE
9	1	31702115	GEAR SUPPORT PLATE
8	1	31702111	CAM PIVOT PLATE
7	1	21900259	ROLLER TOP PLATE ASSEMBLY
6	2	31702106	ROLLER SIDE PLATE
5	1	31702473	MOTOR MOUNTING PLATE
4	1	31702502	TOP PLATE
3	1	31702471	L.H. SIDE PLATE
2	1	31702470	R.H. SIDE PLATE
1	1	31702501	BOTTOM PLATE
ITEM	QTY.	PART NO.	DESCRIPTION

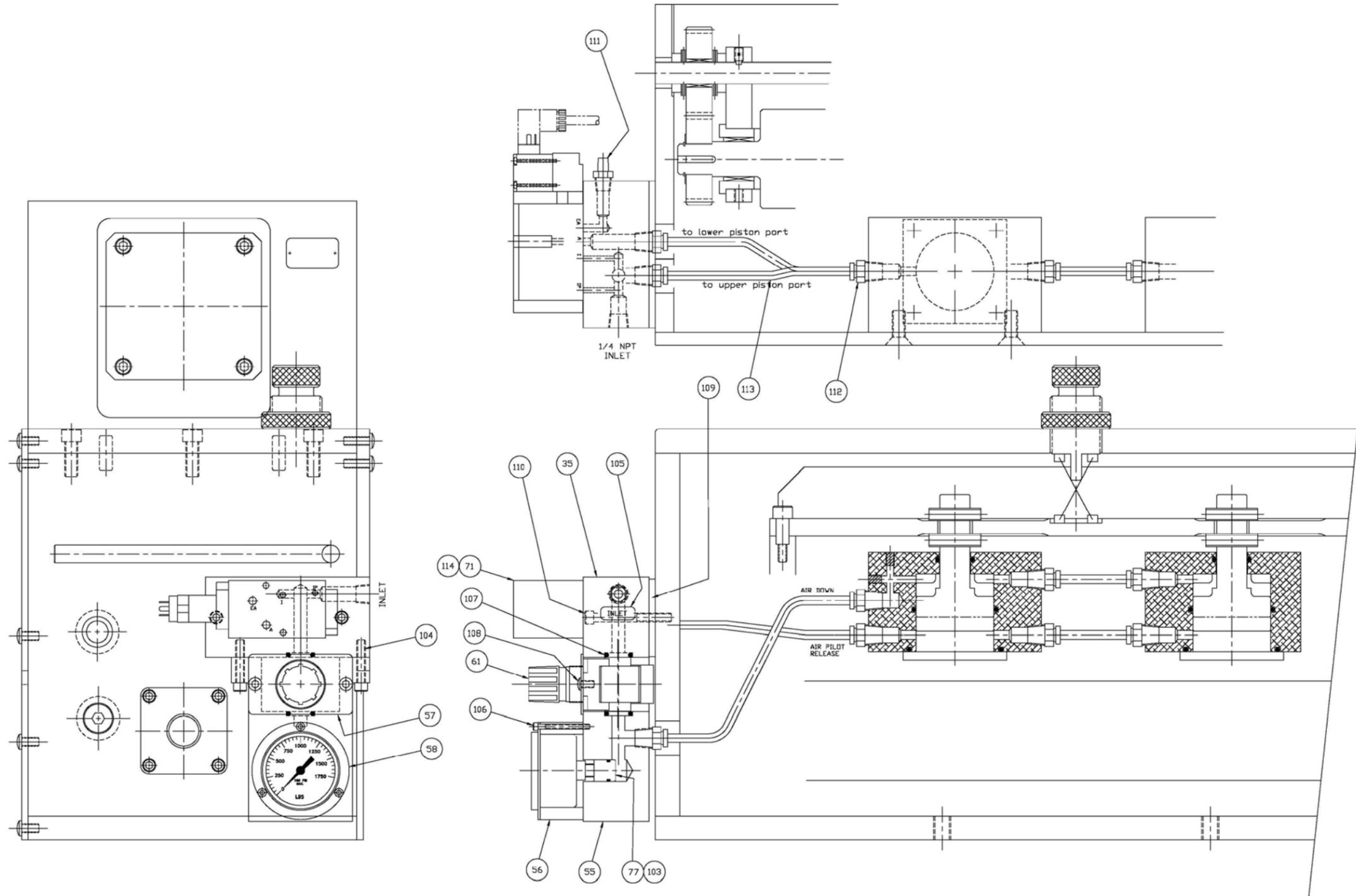
RAPID-AIR CORPORATION
 ROCKFORD, IL • MADISON, SD
 PART NAME 224T V/AIR PILOT RELEASE & AIR DOWN

REV. 01	DATE 10-9-14	BY DLU	CHKD BY	DATE	13000610
REV. 02					
REV. 03					
REV. 04					
REV. 05					
REV. 06					
REV. 07					
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SHEET 4 OF 5

RAPID-AIR CORPORATION ROCKFORD, ILL. MADISON, SD.	
PART NAME: 224T V/AIR PILOT RELEASE & AIR DOWN	
DRAWN BY: DLU CHECKED BY: FANL FISHB DATE: 10-9-14 REV. 1	FINISHES: NONE WEIGHT: 13030610



RAPID-AIR CORPORATION ROCKFORD, IL • MADISON, SD		PART NAME 224T V/AIR PILOT RELEASE & AIR DOWN	
FINISH FRESH ✓	REV. CHNG	DATE 10-9-14	DRWG. NUMBER 13000610
STANDARD PER. TO CONFORM UNLESS OTHERWISE SPECIFIED	FINISH NONE	DESIGNED BY DLU	CHECKED BY FINL. FINISH
TEMPERATURE 200 PLACE 200 250 PLACE 250 300 PLACE 300 350 PLACE 350 400 PLACE 400 450 PLACE 450 500 PLACE 500 550 PLACE 550 600 PLACE 600 650 PLACE 650 700 PLACE 700 750 PLACE 750 800 PLACE 800 850 PLACE 850 900 PLACE 900 950 PLACE 950 1000 PLACE 1000 1050 PLACE 1050 1100 PLACE 1100 1150 PLACE 1150 1200 PLACE 1200 1250 PLACE 1250 1300 PLACE 1300 1350 PLACE 1350 1400 PLACE 1400 1450 PLACE 1450 1500 PLACE 1500 1550 PLACE 1550 1600 PLACE 1600 1650 PLACE 1650 1700 PLACE 1700 1750 PLACE 1750 1800 PLACE 1800 1850 PLACE 1850 1900 PLACE 1900 1950 PLACE 1950 2000 PLACE 2000	WEIGHT NONE	DATE 10-9-14	SCALE FULL