

**KOBELT**

## 2544 Pneumatic Control Head

*Owner's Operation, Installation &  
Maintenance Manual*



This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

RECORD DATA BEFORE INSTALLATION FOR FUTURE REFERENCE	
Model #:	
Serial #:	
Date of Purchase:	
Date of Installation:	

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# 1 INTRODUCTION

## 1.1 CONTACT

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This document is intended to clearly present comprehensive product data and provide technical information to assist the end user in design applications. Kobelt reserves the right, without notice, to change the design, or construction, of any products and to discontinue or limit distribution of any products. Kobelt also reserves the right to change, or update, without notice, any technical information contained within this document.

Kobelt recommends that customers visit our website to check for updates to this Manual. Once a product has been selected for use, it should be tested by the user to ensure proper function in all possible applications. For further instructions, please contact our distributors or visit our website.

## 1.2 SAFETY

### 1.2.1 Safety Alerts

Throughout this manual, the following symbols, and their accompanying explanation, are used to alert the user to special instructions concerning a service or operation that may be hazardous if performed incorrectly or carelessly. The associated risk levels are stated below.

 <b>DANGER</b>	This symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 <b>WARNING</b>	This symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	This symbol indicates a hazardous situation, which if not avoided, could result in minor or moderate injury.
<b>NOTICE</b>	This symbol informs the reader of events not related to personal injury but which there is a risk of damage to property or equipment.
<b>SAFETY INSTRUCTIONS</b>	This symbol informs the reader of safety-related instructions or procedures.


### 1.2.2 Notice to Installer


Disregarding the following safety measures can result in an accident causing severe injury to personnel and damage to material assets.


- Only use the product as directed in this manual.
- Never put the product into service if there is evidence of visible damage.
- Never put the product into service before fully completing installation and commissioning.
- Do not carry out any modifications to the product.

- Only use authentic Kobelt spare parts.
- Observe all local regulations, directives and laws during the installation of this product.
- All installation, commissioning, and maintenance work must only be conducted by qualified personnel. (For the purpose of this manual, qualified personnel are persons who are familiar with the assembly, installation, commissioning, and operation of the product and who have the qualifications necessary for their occupation.)
- Observe all specifications in this manual. If these guidelines are not followed and damage occurs, the warranty will be voided.

### 1.2.3 Product Hazards

 <b>DANGER</b>	<b>Equipment Starts Automatically:</b> Vessel propulsion may activate suddenly while servicing this product, causing bodily harm. Ensure that all power sources are locked out prior to performing work.
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 <b>WARNING</b>	<b>Pinch Points:</b> The 2544 control head contains pinch points, which can cause bodily harm. Ensure that hands and fingers remain clear of the pinch points when performing work.
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 <b>WARNING</b>	<b>High Pressure Fluids:</b> The 2544 control head uses compressed air. Ensure all pressure is exhausted and the pressure source locked out prior to performing work.
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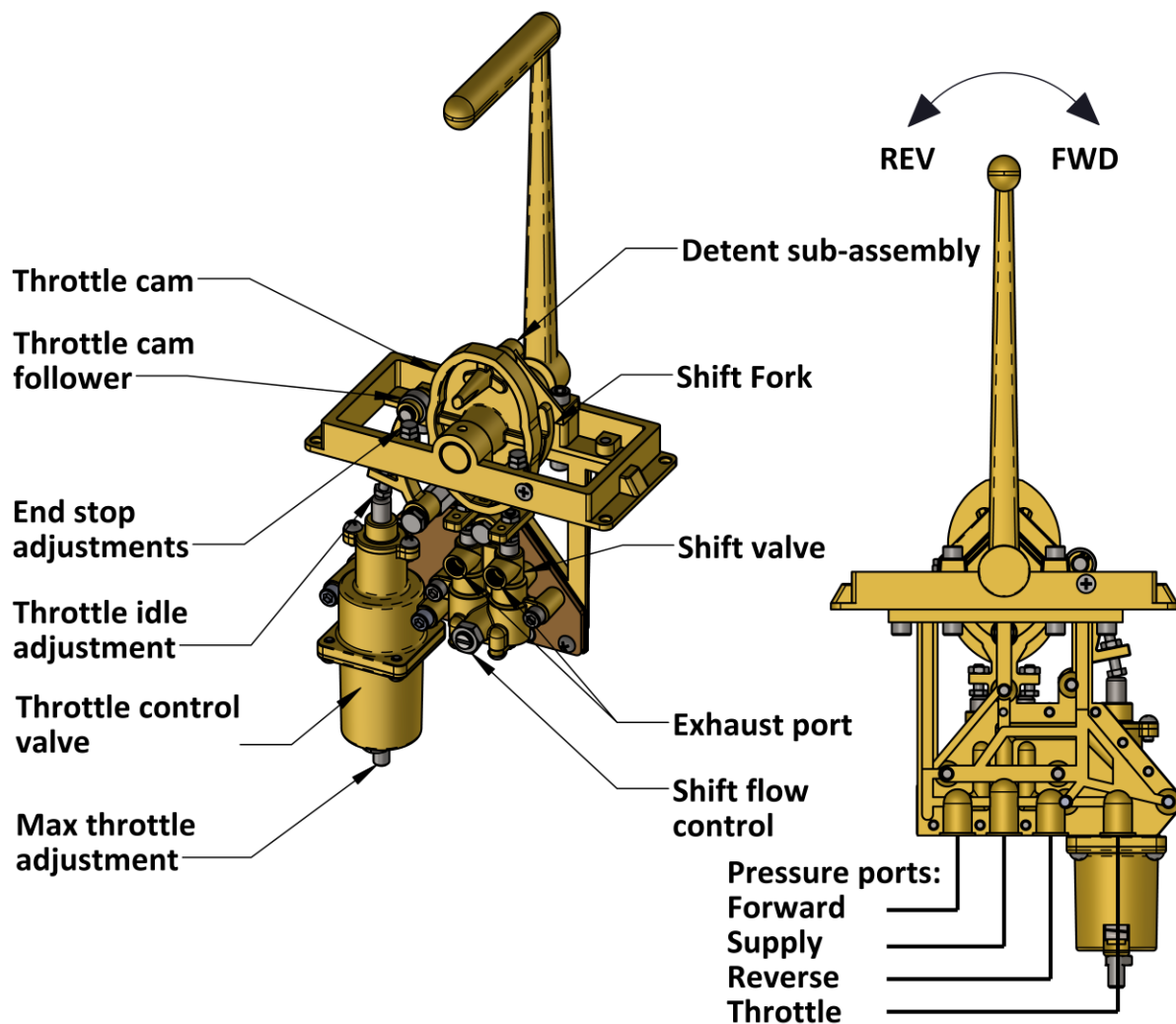
## 2 PRODUCT DESCRIPTION

### 2.1 OVERVIEW

The Kobelt 2544 pneumatic control head permits engine control with both the clutch and throttle control integrated into one lever. More specifically, this control head is intended to;

1. Control the engine throttle using Kobelt **4106**, **4107** or **4108** throttle actuators.
2. Control the engine transmission by;
  - a. Direct connection to air-piloted shift valves, or
  - b. Connection to Kobelt **4204** or **4207** clutch actuators.

The 2544 is available in a combination of black and chrome, all black, or all polished chrome to suit your appearance preference.



## 2.2 TECHNICAL DATA

### Handle Travel:

- Neutral: 0° Detented
- Clutch engage: +/- 20° Detented
- Full throttle: +/- 80° -

### Pressure Output:

- Throttle: configurable (see model code)
- Clutch: 150 psi [10.1 bar] (maximum)

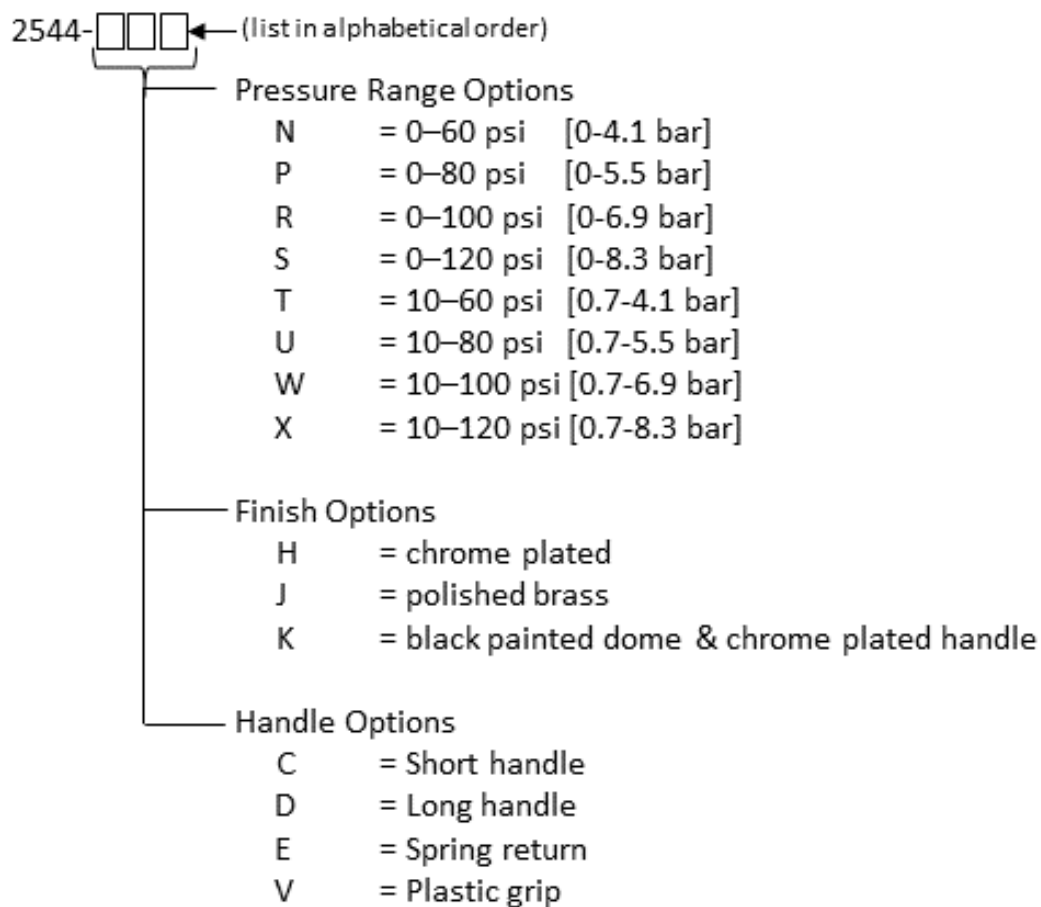
Port sizes: 1/8 NPT

Ambient Temperature: -40°F...+140°F [-40 °C... + 60 °C]

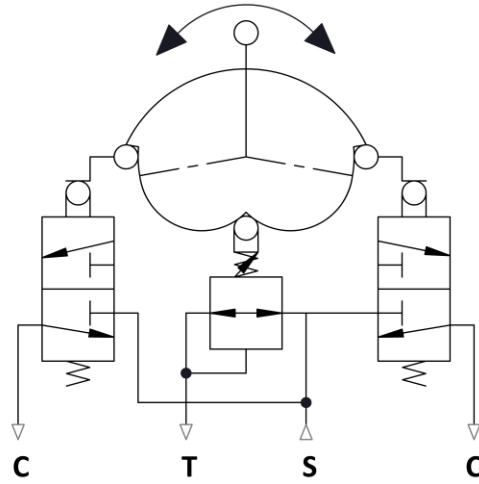
Weight: 9 lbs [4.1 kg]

## 2.3 MODEL CODE KEY

The 2544 control head can be configured in several different ways. Below is a key defining the letter code options:



## 2.4 SCHEMATIC SYMBOL





### 3 INSTALLATION

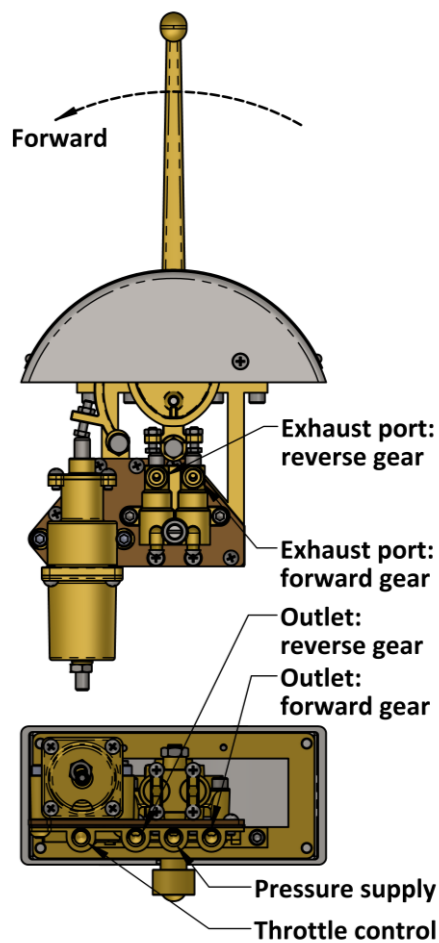
#### 3.1 MECHANICAL

The control head must be mounted on a flat surface strong and stiff enough to withstand the operating forces without excessive flexing. Choose a location that has sufficient room for the handle to swing to both extreme positions.

Use the template in [Appendix C](#) to provide the correct cut-out on the control console.

The control head is equipped with (4) four clearance holes for #10 (M5) screws or bolts inserted from underneath for direct mounting to the dash. Ensure the unit is securely fastened, preferably with an anaerobic thread locker such as Loctite 243.

#### 3.2 CONTROL HEAD CONNECTIONS



To make the proper piping connections at the control head, refer to the diagram at left.

The 2544 control head is equipped with four 1/8 NPT pressure ports and two 1/8 NPT exhaust ports. The exhaust ports do not need to be connected. Install the port fittings using thread sealant and tighten to 2 - 3 turns from finger tight. Use brass pipe fittings for the as steel fittings are too heavy and may split the port.

#### NOTICE

Do not over tighten the fittings as damage to the control head may occur.

### 3.3 PIPING

The piping to the throttle and clutch actuators must be adequately sized to ensure adequate response times. The piping must be selected to safely withstand the pressures required to operate the actuators. Secure the piping against vibration with pipe clamps per the schedule in the table below.

*Table 1: Pipe Clamp Table*

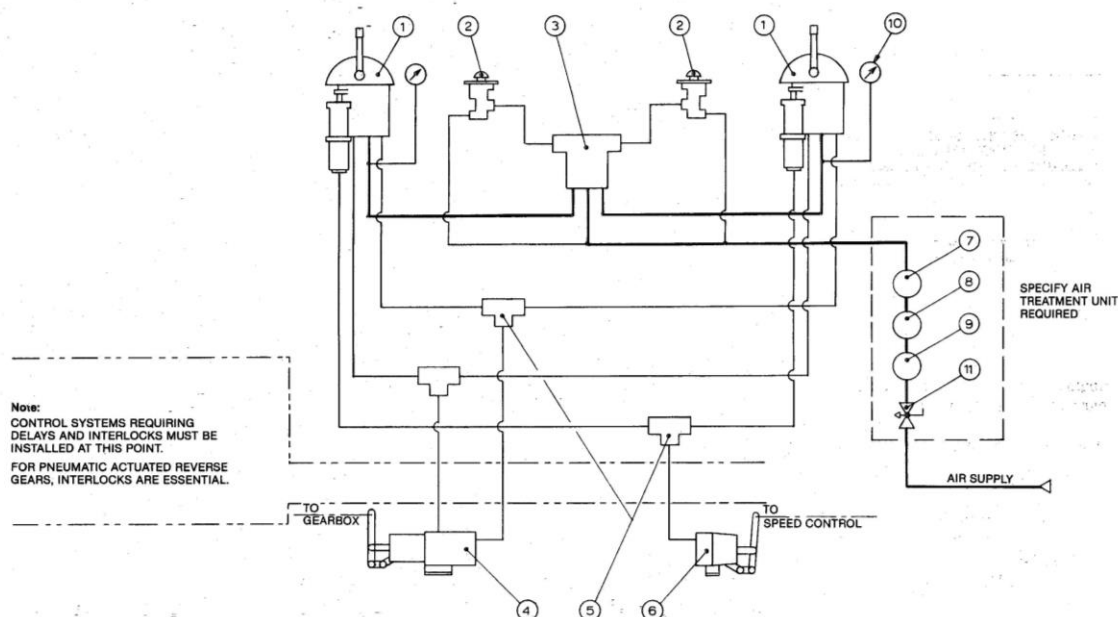
PIPE CLAMP TABLE				
PIPE SCHEDULE	3/8"-1/2" tube [DN6]	1/4" – 1/2" pipe 1/2"-3/4" tube [DN8-DN15]	3/4" pipe 1"-1.25" tube [DN20]	1" pipe 1.50" tube [DN25]
CLAMP SPACING	3 ft [914 mm]	4 ft [1219 mm]	5 ft [1524 mm]	6.5 ft [1981 mm]

All piping must be cleaned prior to connection to the actuators. Welded carbon steel piping must be pickled to remove the scale produced by welding.

Kobelt 2544 control head valves are equipped with "U" cups and "O" rings and therefore require lubrication in order to provide long service life. Unlubricated seals will have excessive friction and wear. The oil that is required for the lubricator should be a hydraulic type with a viscosity grade of 10 to 32 centistokes. Heavy oils do not work well for lubricators.

The main supply line to the control head should be equipped with a filter, regulator and lubricator. The filter's function is to remove moisture and dirt in the system, and the regulator will provide a constant air pressure to the control system.

## 3.4 MULTI-STATION CONNECTION



A-9001-2 and C-9094

ITEM	QUANTITY	PART NUMBER	DESCRIPTION
1	2	2544, 2554	Dual Function Control Head
2	2	3517	2-Pos. 3-Way Palm Valve
3	1	3403	2-Pos. 4-Way Air Piloted Valve
4	1	4204C, 4207C	Clutch Actuator
5	3	3009	Shuttle Valve
6	1	4106, 4107, 4108	Throttle Actuator
7	1	1/4"	Lubricator
8	1	1/4"	Regulator
9	1	1/4"	Filter
10	2	82408	Pressure Gauge
11	1	1/4"	Vented Ball Valve

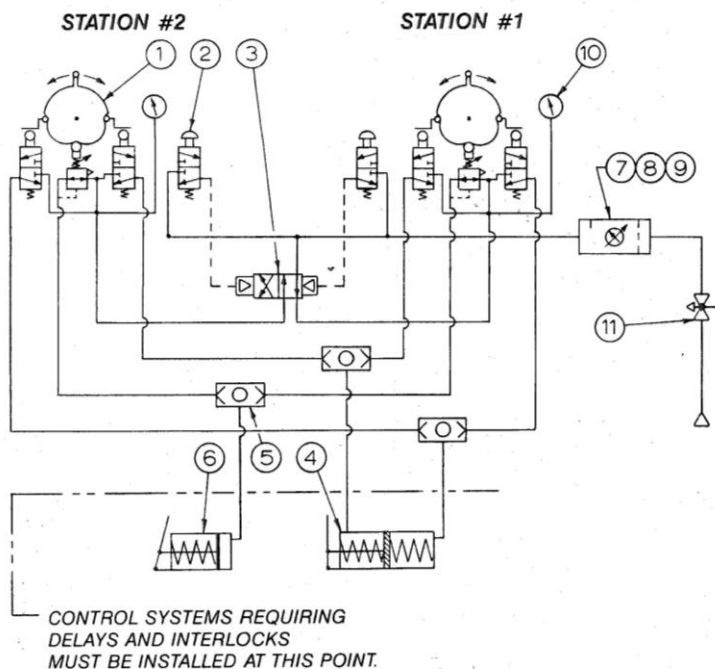
**Notes:**

- 1) 1/4" dia. all supply lines  
1/8" dia. all other lines
- 2) Keep all lines and fittings free of dirt during installation
- 3) Use pipe sealant on all pipe fittings to prevent leakage  
(Teflon tape not recommended)
- 4) During station transfer, the Palm Valve 3517 must be depressed long enough to ensure a complete shift of the 3403. On short tubing runs a minimum of one second, and on longer runs up to three seconds is required

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TWO STATION, SINGLE ENGINE CLUTCH AND THROTTLE CONTROL WITH NO TIMING OR INTERLOCK FOR HYDRAULICALLY ACTUATED GEARS

Dwg. no. C-9094

**DESCRIPTION****REMOTE STATION SELECTION**

When the Push Button Valve #3517 at Station #1 is pressed, it sends a momentary air signal to the directional control valve #3403. Supply air going to #3403 is then directed to the Dual Function Control Head #2544/54. The Control is now on Station #1.

When the push button valve #3517 at Station #2 is pressed, it sends a momentary air signal to the directional control valve #3403. Supply air going to Station #1 is automatically re-directed to the Dual Function Control Head at Station #2. The Control is now at Station #2.

**CLUTCH AND THROTTLE CONTROL**

Movement of the dual function control head #2544/54 handle through the first 20° in either direction actuates one of the 3-way valves delivering full pressure to the clutch actuator #4207 or 4204. Further movement of the handle beyond 20° actuates the regulating valve delivering pressure to the throttle actuator #4106/7/8 proportional to the handle position.

Shuttle Valves #3009 are used to direct two inputs into a single output while isolating one input from the other.

**KOBELT** MANUFACTURING COMPANY LIMITED

TWO STATION, SINGLE ENGINE CLUTCH AND THROTTLE CONTROL WITH NO TIMING OR INTERLOCK FOR HYDRAULICALLY ACTUATED GEARS (ANSI SCHEMATIC)


Dwg. no. A-9001-2

## 4 COMMISSIONING

### 4.1 ADJUSTMENT

The control head is adjusted and at the factory and, as such, will not require any further adjustment after installation.

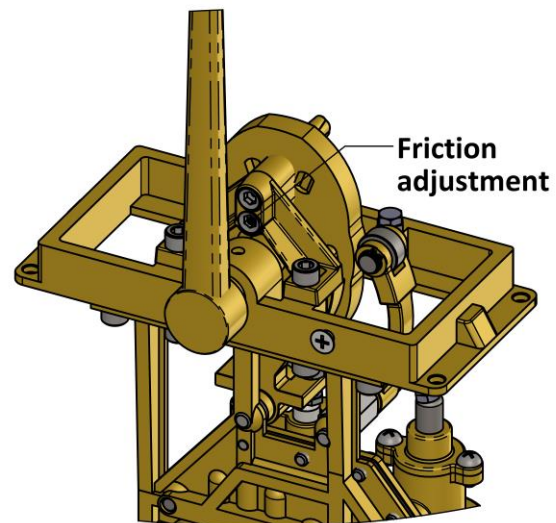
### 4.2 FUNCTIONAL TEST

 <b>CAUTION</b>	Do not put the vessel into service until the control head has been tested. The Functional Test should be carried out while the vessel is still at dock.
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After installation, test that the clutch control valve goes from neutral to both forward and then reverse gear properly.

Also, ensure that full speed range is obtained with full handle travel.

Ensure that the throttle friction adjustment is adequate to hold the throttle position. Adjust if necessary.



## 5 MAINTENANCE

### 5.1 PREVENTATIVE MAINTENANCE

- Quarterly (4 times per year)
  - Ensure that the throttle friction adjustment is adequate.
  - Inspect unit for air leaks
- Every 2 years
  - Lubricate pins & rollers
  - Inspect throttle & clutch bushings for wear

### 5.2 ADJUSTMENT

After events such as repair kit installation or a major overhaul, it will be necessary to set all the adjustment points correctly.

1. Throttle idle screw adjustment:

Tools: 5/32 in Allen key + ½ in wrench

Turn this screw CW to the desired initial pressure output setting. Note that the handle must be vertical, in the neutral position.

2. Throttle plunger adjustment:

Tools: 5/16 in wrench + 3/8 in wrench

Turn the screw CCW until the slack has been removed from the throttle valve plunger.

3. Clutch valve plunger adjustment:

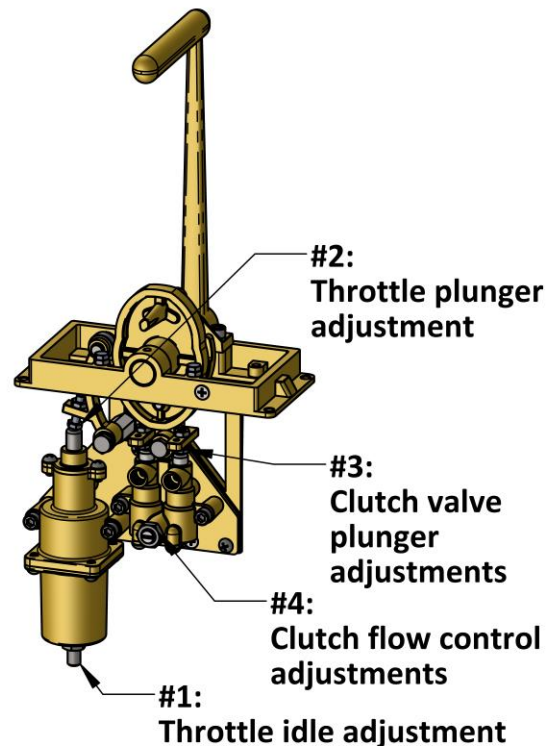
Tools: 5/16 in wrench + 3/8 in wrench

With the handle in the neutral position, adjust the two screws out until they lightly touch the clutch valve plungers.

4. Clutch flow control adjustment:

Tools: 9/16 in wrench + flat screwdriver

Turning the screw CW, restricts the airflow. Adjust to produce the desired reaction time.

**CAUTION**

Do not over adjust the screw in the CW direction as clutch control flow will be shutoff.

## 5. Handle detent adjustment:

Tools: 5/32 in Allen key

Turn the set screw CW to produce the desired feel.

## 6. Handle friction adjustment:

Tools: 5/32 in Allen key

Turn the set screw CW until the handle does not drift back due to valve spring force.

## 7. Handle end stop adjustment:

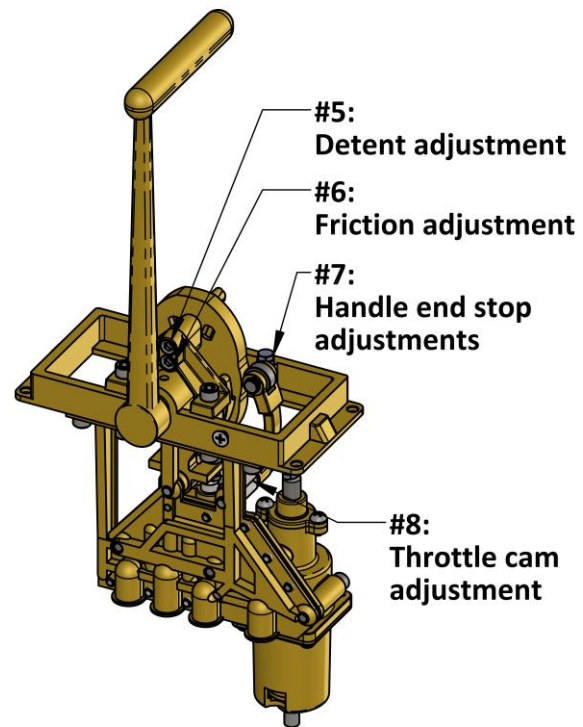
Tools: 5/16 in wrench + 3/8 in wrench

These two screws set the travel limits of the handle. Set the height to produce the maximum desired throttle control pressure.

## 8. Throttle cam eccentric adjustment:

Tools: 7/16 in wrench + 1/2 in wrench

Loosen the assembly bolt and turn the hexagon standoff to set the height of the throttle follower to the midpoint of the two detents. Ensure that the handle is vertical, in the neutral position.



### 5.3 RECOMMENDED SPARE PARTS AND KITS

The spare parts kept on hand will depend on the severity of the service. The User should monitor the condition of their control head to predict necessary spare parts and ensure they are on hand when needed. As a minimum Kobelt recommends keeping the following parts for each brake in service:

1. One 3217-RK regulating valve repair kit
2. One 3803-RK directional valve repair kit
3. One friction button

Refer to the parts list drawings in [Appendix B](#) for a complete list of parts. When purchasing spare parts refer to Appendix B: Parts List at the back of this manual for Kobelt component Part Numbers.

**NOTICE**

It is recommended that any required service work on a Kobelt unit be performed by a factory authorized service representative. Please contact the nearest Kobelt authorized distributor for assistance.

## 6 WARRANTY

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Kobelt Manufacturing Co. Ltd. ("Kobelt") warrants the Products and Parts manufactured by Kobelt to be free from defects in workmanship or material and that said products are designed mechanically and functionally to perform to specifications.

This warranty is effective providing:

- The equipment is used within the intended operating conditions and in accordance with Kobelt recommendations
- The equipment is installed according to equipment diagrams, specifications and recommendations which Kobelt has provided

This warranty becomes invalid if the factory supplied serial number has been removed or altered on the product. This warranty does not cover cosmetic damage or damage caused by an act of God, accident, misuse, abuse, negligence or modification of any part of the product. This warranty does not cover damage due to improper operation or maintenance, connection to inappropriate equipment or attempted repair by anyone other than an authorized Kobelt representative.

Upon identification of a potential issue or defect with a Kobelt Product or Part, the Warranty Applicant ("Applicant") must immediately contact Kobelt and describe the issue in writing, by letter, fax, email or other electronic conveyance. Kobelt will then assess the cause of the defect and determine warranty applicability and appropriate remediation.

If any part is found to be defective, Kobelt will replace said part FOB the Kobelt factory provided that any such defective part is returned by the Buyer with freight and applicable forwarding charges prepaid by the Buyer. Kobelt's sole obligation to the Applicant will be to repair or replace the defective part with same or similar product, to a maximum value of the list price of the product or part. The Kobelt warranty does not cover labour charges, travel or any other associated expenses.

All Products and Parts manufactured by Kobelt, are subject to a warranty against manufacturer's defects in materials or workmanship for a period of two (2) years from the date of purchase.

Kobelt will be responsible for all Products or Parts sold by Kobelt but manufactured by 3<sup>rd</sup> party manufacturing companies. However, these products and parts are subject to applicable 3<sup>rd</sup> party warranties and may not be the same as the Kobelt warranty.

## 7 APPENDIX A: INSTALLATION DIMENSIONS

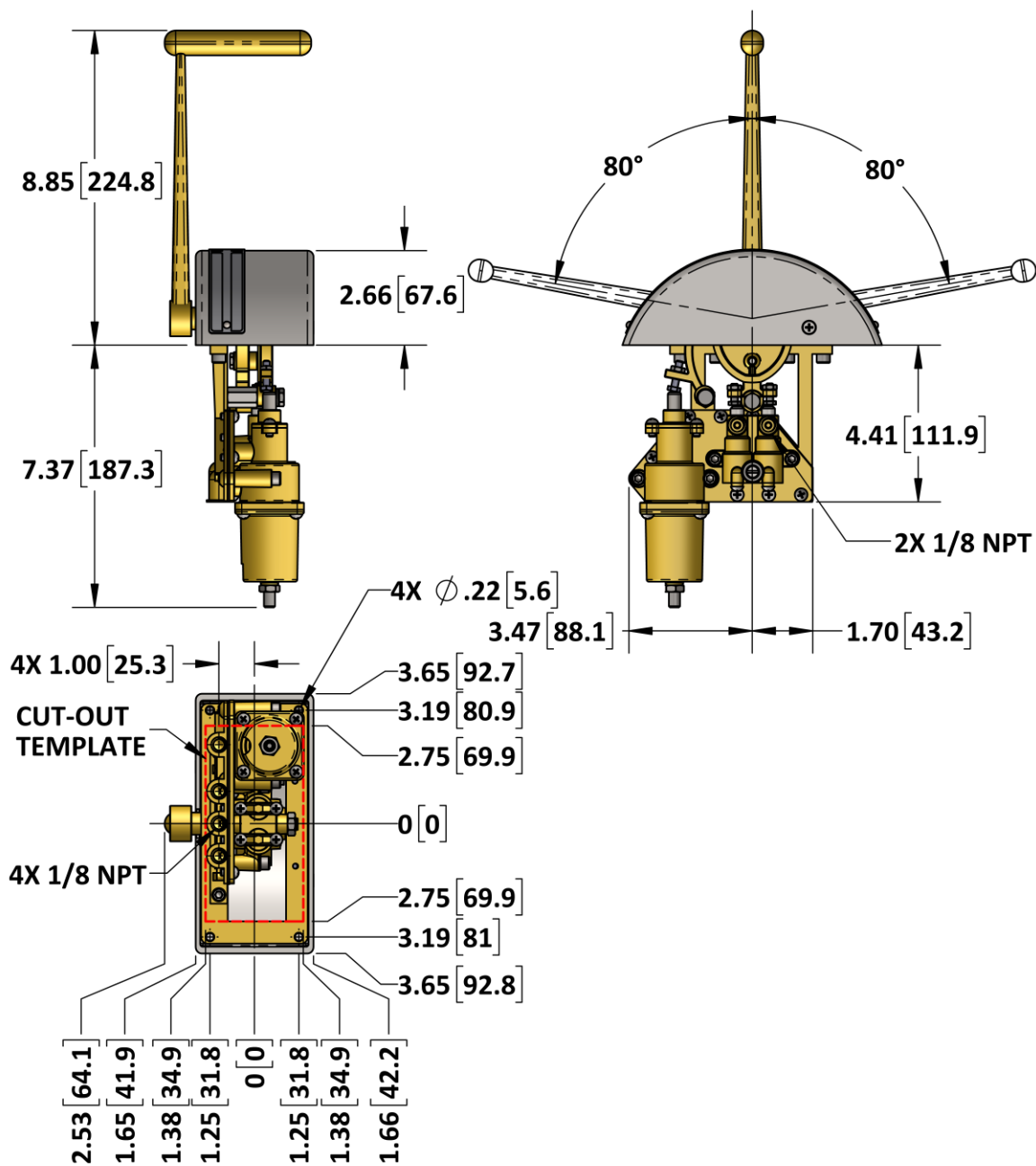
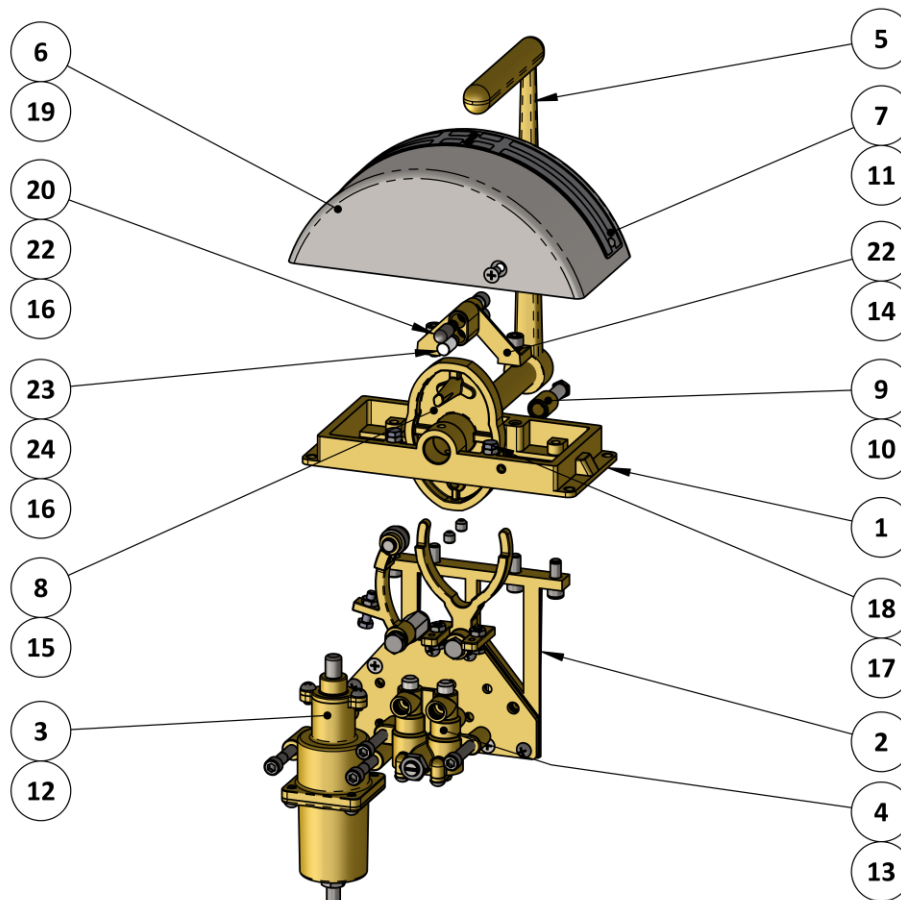


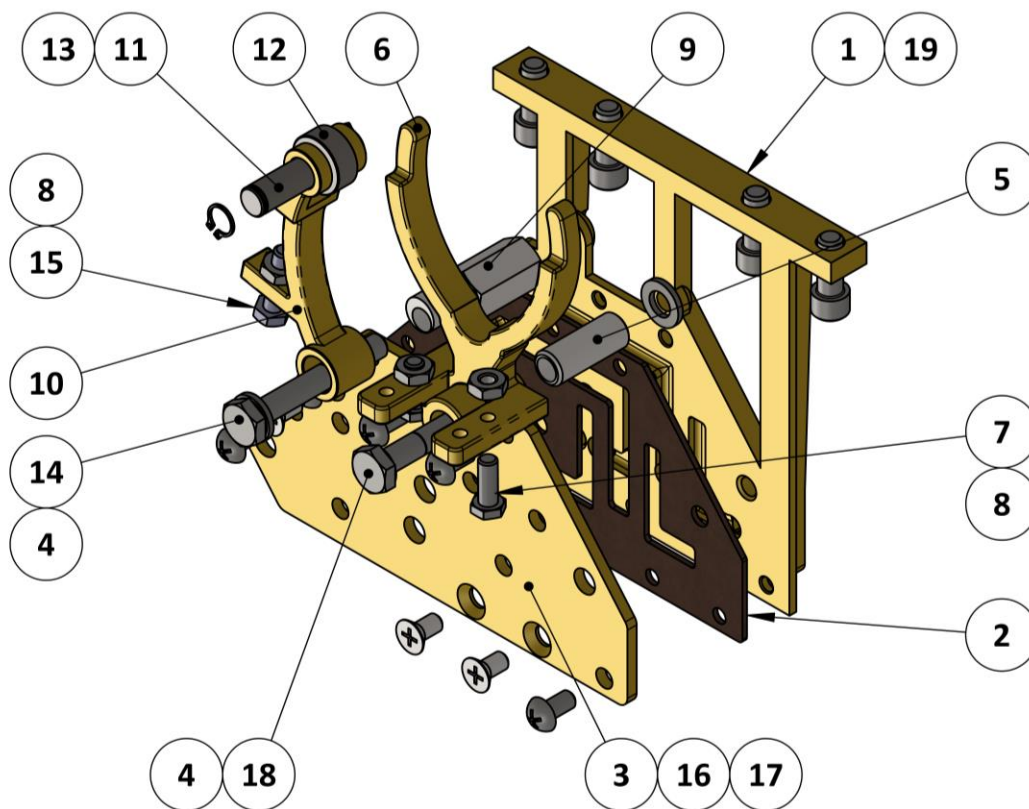
Figure 6: 2544 Installation Dimensions



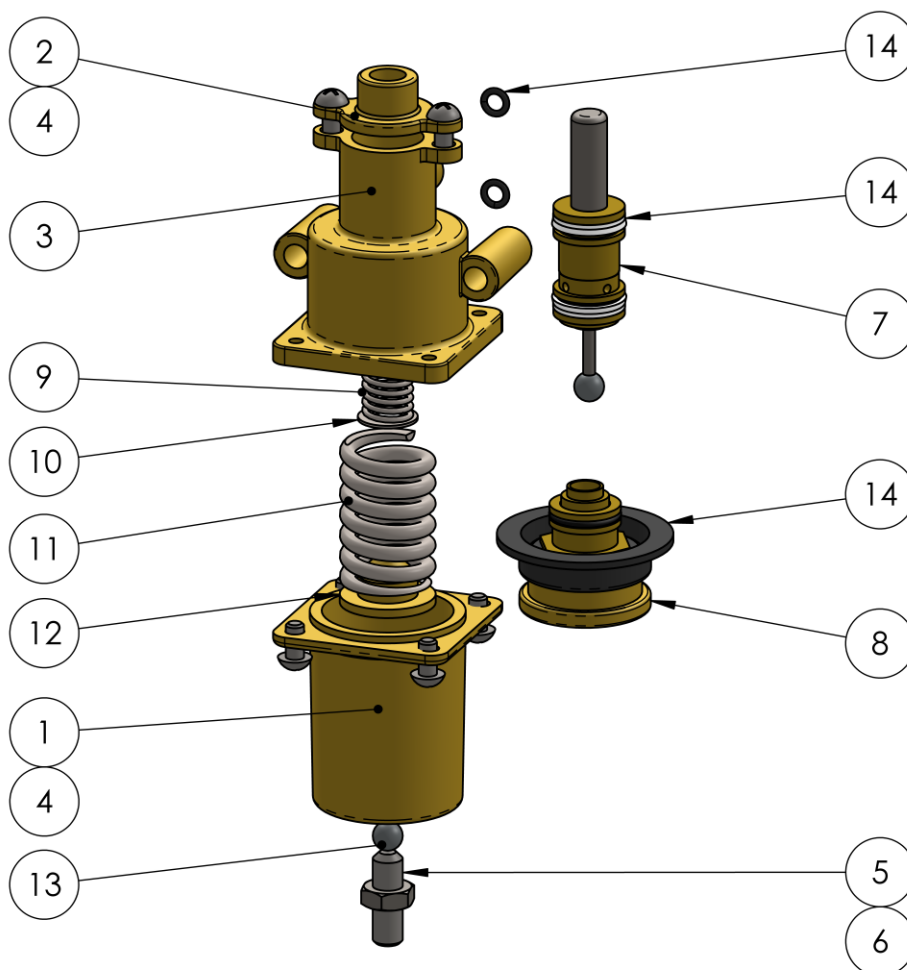
## 8 APPENDIX B: PARTS LIST



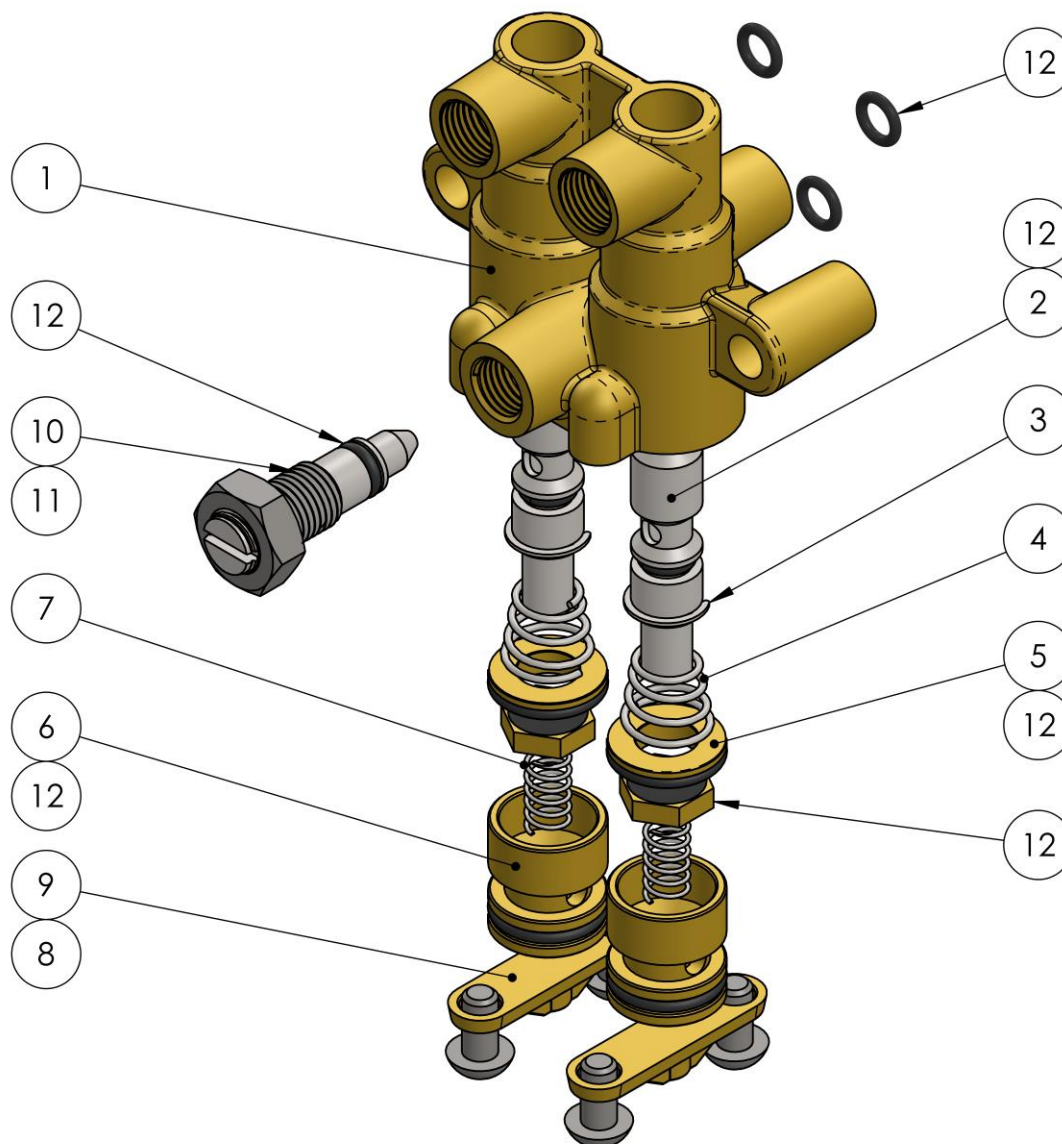
ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	2543-1002	FRAME PRESSURE CONTROL HEAD DUAL OUTPUT
2	1	2544-2000	SUB ASSEMBLY; CLUTCH & THROTTLE FOLLOWERS
3	1	3217	COMPENSATING VALVE, 1/8", 0-60 PSI
4	1	3803	DIRECTIONAL VALVE - PNEUMATIC; 3/2-WAY, 1/8 NPT
5	1	2545-0014	HANDLE (LONG)
6	1	2543-1001	DOMES WITH SIDE HOLES
7	1	2545-0013	SCALE; THROTTLE & FWD - N - REV
8	1	2545-0003	CAM; PNEUMATIC CONTROL HEAD
9	1	2544-0004	ROLLER; CLUTCH CAM
10	1	2544-0005	SHOULDER BOLT; CLUTCH CAM
11	2	1032-0304	SCREW, U-DRIVE, #4 X 3/16, SS
12	2	1002-1024	SOCKET HEAD CAPSCREW 1/4-20 X 1 1/2 SS
13	2	1002-1020	CAP SCREW, SKT HD, 1/4-20 X 1-1/4, 18-8
14	2	1002-1008	SCREW - SKT HD CAP; 1/4 UNC X 1/2 LG, 18-8
15	2	1016-1004	SCREW, SET, SKT, 1/4-20 X 1/4, 18-8
16	2	1016-1205	SCREW, SET, SKT, 3/8 UNC X 5/16, 18-8
17	2	1022-0108	NUT, HEX, #10-24, GR 18-8
18	2	1001-0812	SCREW - HX HD CAP; #10-24 X 1/2 IN, 18-8
19	2	1009-0806	SCREW, FLAT HD, PHL, 10-24 X 3/8, 18-8
20	1	2545-0012	DETENT PIN
21	1	1201-0062	SPRING, DETENT
22	1	2542-0009	BRACKET; CONTROL HEAD DETENT + FRICTION
23	1	2545-0021	FRICTION BUTTON
24	1	1201-0003	SPRING, 0.25 DIA X 5

2544-2000 Sub Assembly

ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	2544-0001	BRACKET; PNEUMATIC CONTROL HEAD
2	1	2544-0008	GASKET; PNEUMATIC CONTROL HEAD
3	1	2544-0003-P	PROFILE, PLATE, 2544 CONTROL HEAD
4	2	1023-0216	FLAT WASHER, 1/4, TYPE B, NARROW, 18-8
5	1	2544-0007	BUSHING; CLUTCH FORK
6	1	2545-0008	FOLLOWER; CLUTCH CAM
7	2	1001-0808	SCREW - HX HD MACH; #10-24 X 1/2IN, 18-8
8	3	1022-0108	NUT, HEX, #10-24, GR 18-8
9	1	2545-0002	ECCENTRIC; THROTTLE FOLLOWER
10	1	2545-0001	THROTTLE FOLLOWER
11	1	2542-0011	PIN; THROTTLE ROLLER
12	1	2543-0009	ROLLER; THROTTLE FOLLOWER
13	2	1029-1031	RETAINING RING, 5/16 SHAFT
14	1	1001-1028	SCREW - HEX HD CAP, 1/4-20 x 1-3/4, 18-8
15	1	1001-0812	SCREW - HX HD CAP; #10-24 x 1/2 IN, 18-8
16	3	1009-0806	SCREW, FLAT HD, PHL, 10-24 X 3/8, 18-8
17	5	1010-0806	SCREW, RND HD PHL, 10-24 X 3/8, 18-8
18	1	1001-1020	SCREW - HEX HD; 1/4-20 X 1-1/4, 18-8
19	4	1002-1010	SCREW - SKT HD CAP; 1/4 UNC X 5/8 LG 18-8

3217-N Compensating Valve

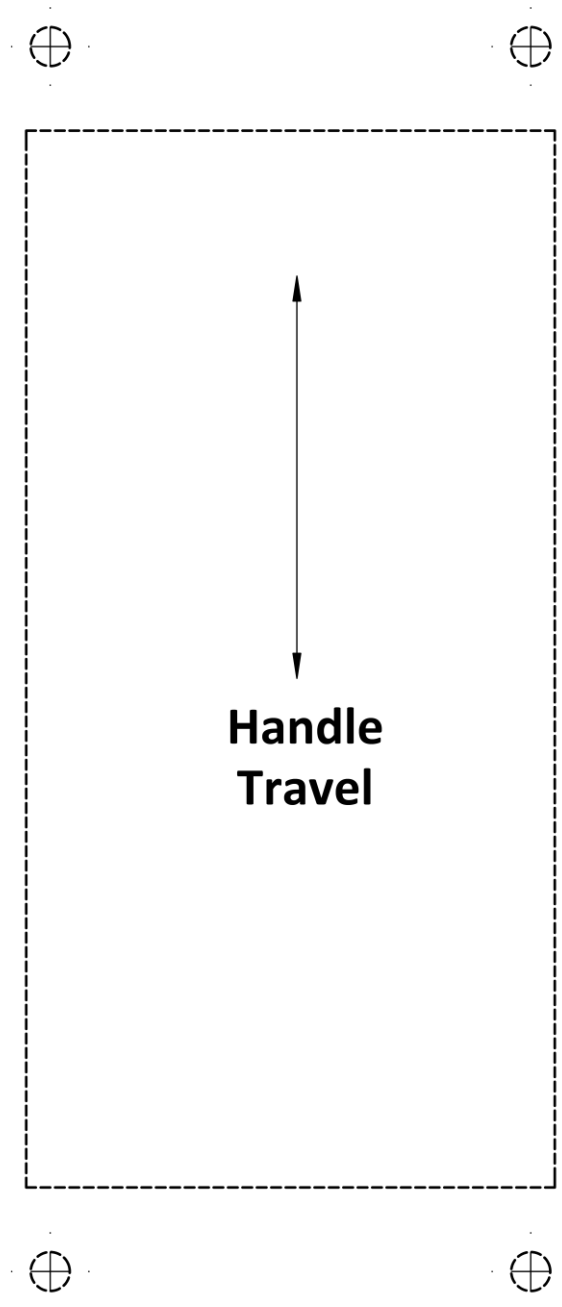
ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	3217-0004	BODY, LOWER HALF
2	1	3217-0017	END CAP
3	1	3217-0018	BODY, UPPER HALF
4	6	1010-0806	SCREW, RND HD PHL, 10-24 X 3/8, 18-8
5	1	1016-1116	SET SCREW, CUP, 5/16 UNC X 1, 18-8
6	1	1022-0211	NUT, JAM, 5/16-18 UNC, SS
7	1	3217-1001	SPOOL SUB ASSEMBLY
8	1	3217-1002	PISTON & DIAPHRAGM SUB ASSEMBLY
9	1	1201-0005	SPRING, COMPRESSION, .535 OD X .062 WIRE
10	1	1023-0242	WASHER, FLAT, SAE, 3/8 X 5/8 X 1/32, SS
11	1	1201-0007	SPRING, COMPRESSION, 1.0 OD X .162 WIRE
12	1	3217-0011	SPRING RETAINER
13	1	1301-0110	BALL, 5/16 D, HARDENED CHROMED STEEL
14	1	3217-RK	REPAIR KIT, 3217 COMPENSATING VALVE

3803 Directional Valve

ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	3803-0002	VALVE BODY; 3/2 WAY POPPET
2	2	3803-0001	VALVE SPOOL; 3/2 WAY POPPET
3	2	1029-2037	RETAINING RING - EXTERNAL; 3/8 IN
4	2	1201-0013	SPRING - TAPERED;
5	2	3803-0003	POPPET SEAT; 3/2 WAY VALVE
6	2	3803-0005	END CAP; 3/2 WAY VALVE
7	2	1201-0004	SPRING, COMPRESSION, .25 OD X .025 WIRE
8	4	1010-0806	SCREW, RND HD PHL, 10-24 X 3/8, 18-8
9	2	3803-0007	RETAINER; VALVE POPPET
10	1	3803-0006	NEEDLE SCREW; 3/2 WAY VALVE
11	1	1022-0262	JAM NUT 3/8-24 NF 18-8
12	1	3803-RK	SEAL KIT; 3/2 WAY DIRECTIONAL VALVE

## 9 APPENDIX C: INSTALLATION CUT-OUT TEMPLATE

*Figure 9: Installation Cut-out Template*

**NOTICE**

Scale may not be exactly 1:1 due to PDF and printer scaling. Verify primary dimension with a ruler after printing and before using to cut.

Reference [Appendix A: Installation Dimensions](#), for the cut-out dimensions.



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