



# INSTALLATION AND MAINTENANCE MANUAL

## AUSTART RS1000M RELAY VALVE



### **K.H. EQUIPMENT PTY LTD**

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## NOTICE

**THIS MANUAL CONTAINS IMPORTANT SAFETY INFORMATION. IT IS IMPORTANT THAT THE ENTIRE CONTENTS BE STUDIED BEFORE INSTALLATION AND OPERATION. IT ONLY REFLECTS GENERIC INFORMATION RELATING TO STANDARD AUSTART PRODUCTS**

## FOREWORD

This manual contains instructions for the installation, maintenance and operation of your new RS1000M Relay Valve. It has been designed to provide you with safe and reliable service. However, it is a pressure vessel, therefore operators and maintenance personnel must exercise good judgement and appropriate safety practices to avoid damage to the equipment and prevent personal injury. The instructions in this manual are intended for personnel with a general training in the operation and maintenance of air starter equipment. It should be understood that the information contained in this manual does not relieve the operating and maintenance personnel of the responsibility for exercising good normal judgement in the operation and care of air start equipment and their associated systems.

Throughout this manual you will encounter the words **WARNING**, **CAUTION** and **NOTICE**.

These paragraphs are intended to emphasise certain areas where personnel safety and satisfactory starter operation may be compromised should the message be ignored. The definitions of these words are as follows -



*An operating procedure, practice etc. that if not strictly observed, could result in personal injury.*

### CAUTION

*An operating procedure, condition etc. that if not followed could result in damage to, or the destruction of equipment.*

### NOTICE

*An operating procedure, condition etc. that is essential to highlight and observe.*

It is advisable that a safety program be established to address the safety issues detailed within this manual before installing, operating or maintaining this equipment. It is important such a program covers the hazards associated with compressed air.



*Do not install this product other than in accordance with the instructions detailed in this manual.*

These instructions should be read completely before beginning installation and should be available to personnel responsible for operating and maintaining this equipment. The unit is capable of trouble free operation when properly applied, installed and maintained.

Extra copies of this manual are available from your local Austart Air Starter Distributor or the Factory.

This manual is designed to cover all situations normally experienced when installing, operating and maintaining this equipment. In the event situations are encountered that are not covered by this manual, consult your AUSTART agent or K.H. Equipment Pty Ltd direct.

# AUSTART PRODUCT NUMBERING



**MODEL PREFIX CODES:** AS AUSTART VANE STARTER  
 ATS AUSTART TURBINE STARTER

AS50	AUSTART AIR STARTER	01	SAE 1	09	9TH 3MOD R	B	BCB (Beryllium Copper Bronze Pinion)
ATS53	AUSTART TURBINE STARTER	02	SAE 2	10	10TH 8/10 R	E	Threaded Exhaust 1.5"
ATS54	(ATS53 OH) AUSTART TURBINE STARTER	03	SAE 3	11	11TH 6/8 R	F	Threaded Exhaust 2" Bolt on
AS55	(AS50 OH) AUSTART AIR STARTER	04	SAE 4	12	12TH 8/10 R	G	Threaded Exhaust 2"
AS61	AUSTART AIR STARTER		Other options	13	12TH 8/10 L	H	Highway Special
ATS63	AUSTART TURBINE STARTER		available	14	11TH 6/8 L	I	Inertia Drive
ATS64	(ATS63 OH) AUSTART TURBINE STARTER			15	10TH 8/10 L	J	Threaded Exhaust Elbow 2"
AS66	AUSTART AIR STARTER			16	9TH 3MOD L	K	Kelly Spinner Muffler
AS67	AUSTART AIR STARTER					M	Mining Spec. (Cast Iron)
AS68	(AS6070) AUSTART AIR STARTER					N	Short Nose (Inertia ATS77)
AS69	(AS67OH) AUSTART AIR STARTER					P	Motor Ports 90°
AS70	AUSTART AIR STARTER					R	Reduced Muffler
ATS73	AUSTART TURBINE STARTER					S	Short Muffler
ATS77	AUSTART TURBINE STARTER					T	Threaded Exhaust 3"
AS75	(AS70 OH) AUSTART AIR STARTER					U	U Configuration
AS78	(AS7080) AUSTART AIR STARTER					V	Value Muffler (ATS77)
AS80	AUSTART AIR STARTER						
ATS83	AUSTART TURBINE STARTER						
ATS84	(ATS83 OH) AUSTART TURBINE STARTER						
AS85	(AS80 OH) AUSTART AIR STARTER						
AS90	AUSTART AIR STARTER						
ATS93	AUSTART TURBINE STARTER						
ATS94	(ATS93 OH) AUSTART TURBINE STARTER						
AS95	(AS90 OH) AUSTART AIR STARTER						
AS100	AUSTART AIR STARTER						
ATS103	AUSTART TURBINE STARTER						
ATS183	AUSTART TURBINE STARTER						

**EXAMPLES OF BASIC STARTER PRODUCT NUMBERING**

ATS63-0110M	PERKINS 1006	SAE1	10TH	MINING SPEC
ATS63-0409M	MWM D916-6	SAE4	9TH	MINING SPEC
ATS73-0311	CUMMINS N14	SAE3	11TH	LH
ATS73-0314	CUMMINS N14	SAE3	11TH	INERTIA DRIVE
ATS73-0311I	DETROIT 12V71	SAE3	11TH	INERTIA DRIVE LH
ATS73-0312M	DETROIT 12V71	SAE3	11TH	MINING SPEC
ATS83-0311IT	CATERPILLAR 3306	SAE3	12TH	INERTIA THREADED EXHAUST
	WAUKESHA 7072	SAE3	11TH	

# INSTALLATION AND PREPARATION FOR OPERATION



- **Ensure air supply is isolated before installation, removal, maintenance or adjustment of your AUSTART RS1000M RELAY VALVE.**
- **Before any relay valve is taken out of service first bleed the Air Receiver of air and any moisture that may have accumulated by opening up the drain valve. Do not bleed by removing Receiver plugs.**
- **Remove air hoses to ensure complete safety once the air supply has been isolated and the Receiver has been bled.**
- **The Air Receiver must be manufactured to an applicable pressure vessel code such as AS 1210, or similar.**
- **Only use air hoses and fittings that are of adequate size as indicated in the installation schematic (page 6)**
- **Always carry out a pressure test on the complete starting system according to Clause 7 on Page 5 before beginning operation. Do not begin operations until satisfied the unit has been installed correctly.**
- **Always use recommended lubricants where prescribed by this manual. Under no circumstances use flammable or volatile liquids.**
- **Ensure all fasteners are torqued to the values prescribed in this manual. Use thread sealant where indicated.**
- **To ensure warranty provisions are not invalidated use only genuine AUSTART replacement parts. Non-genuine parts may cause service and performance problems and may affect the safe operation of your valve and starter.**

# INSTALLING THE RELAY VALVE AND PIPEWORK

Refer to the Starter Installation Schematic drawing on page 6

1. The air supply line should ideally exit from the top or side of the Air Receiver.

## CAUTION

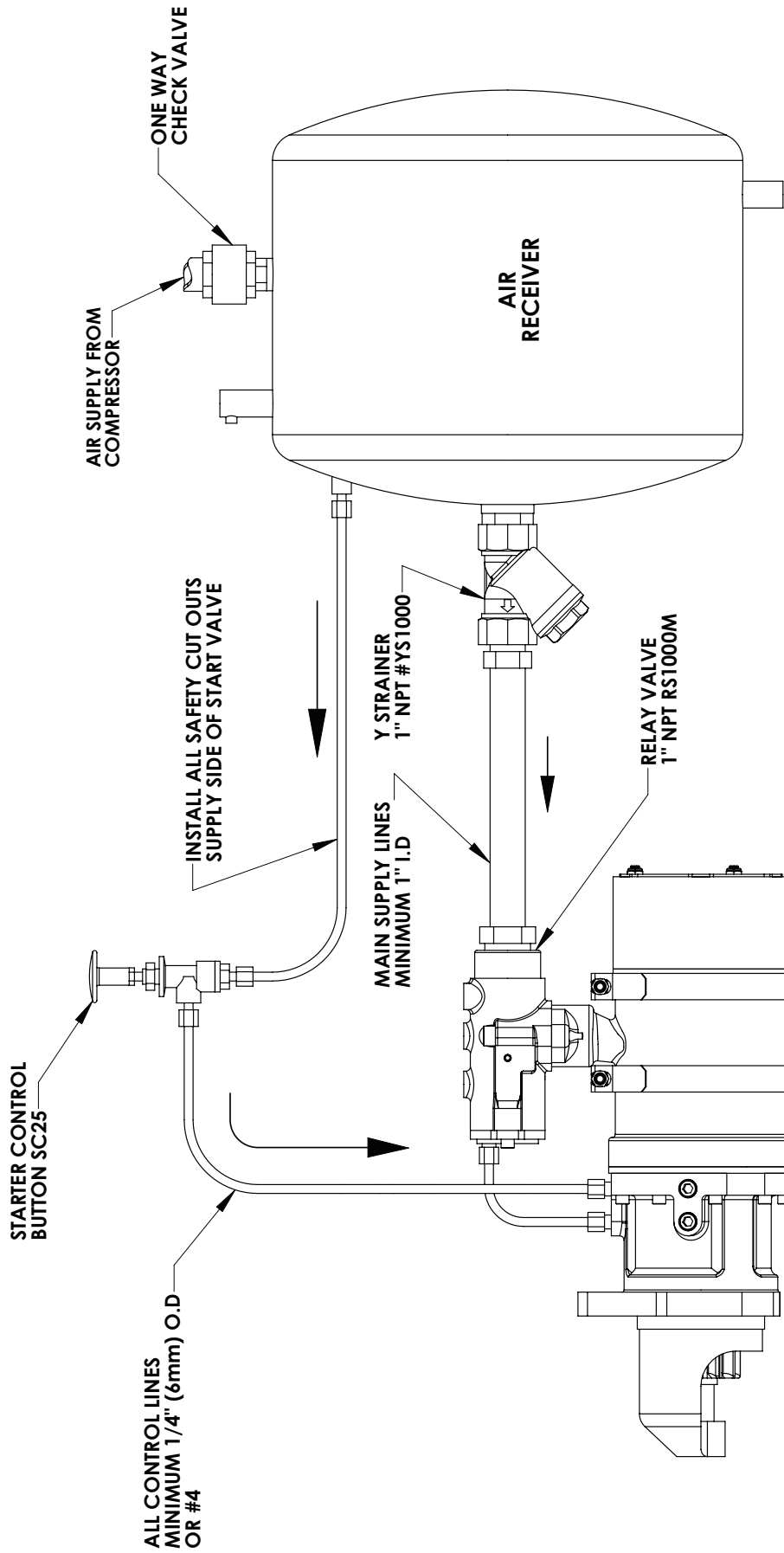
*Do not connect Air Supply Line to the bottom of the Air Receiver. Moisture and system contaminants collect at the receiver bottom and can damage the Austart Starter internals if allowed to pass through. Periodically drain moisture from the Air Receiver using a drain valve connected at the Receiver bottom.*

2. Install RS1000M Relay Valve directly onto the air starter motor inlet port with the two screws provided. An optional adaptor flange is available for remote mounting if required.
3. Mount the Starter Control Button SC25 onto the vehicle dash-board or appropriate control panel and connect to the Air Receiver using a minimum of 1/4" (6mm) line.

## NOTICE

*Ensure the inlet side of the Starter Control Button connects to the line from the Receiver. Any Safety "Switches" should be installed in this line between the Starter Control Button and the Air Receiver.*

4. Determine the practicality of running the main air hose or pipe from the exit of the air receiver to the inlet of the Austart Relay Valve. It may be easier to fit the hose before the Austart Starter and/or valve is mounted in position.
5. Once the Austart Starter and/or valve is mounted, fit the remaining 1/4" (6mm) control lines from the Austart Starter to the Starter Control Button and Relay Valve respectively (Refer page 6).
6. Make all hose or pipe connections leak proof using a suitable thread sealant.
7. Once the connections have been made pressurise the system and check for leaks using "soapy" water or similar solution.



TITLE

**TYPICAL RS1000M-Schematic**

SCALE 1:3

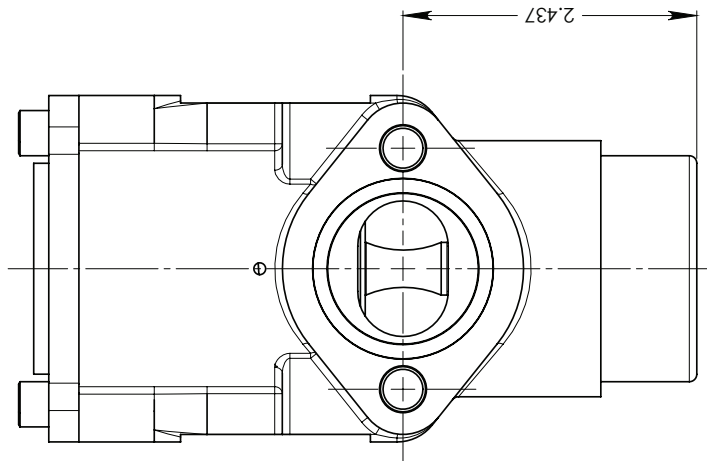
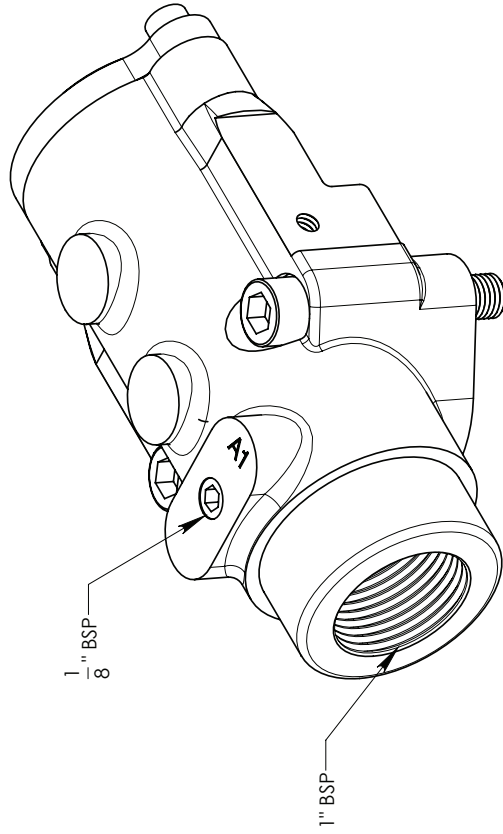
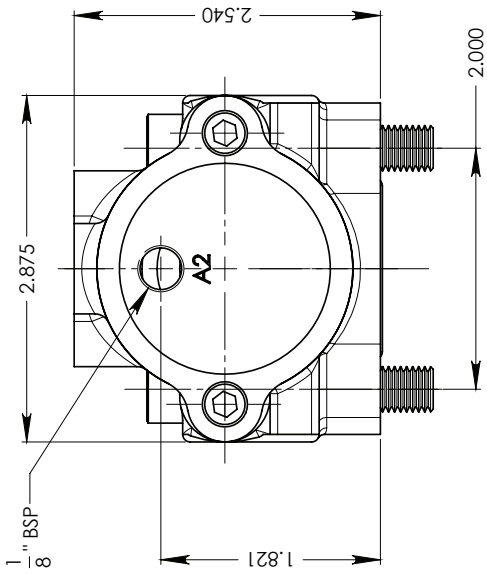
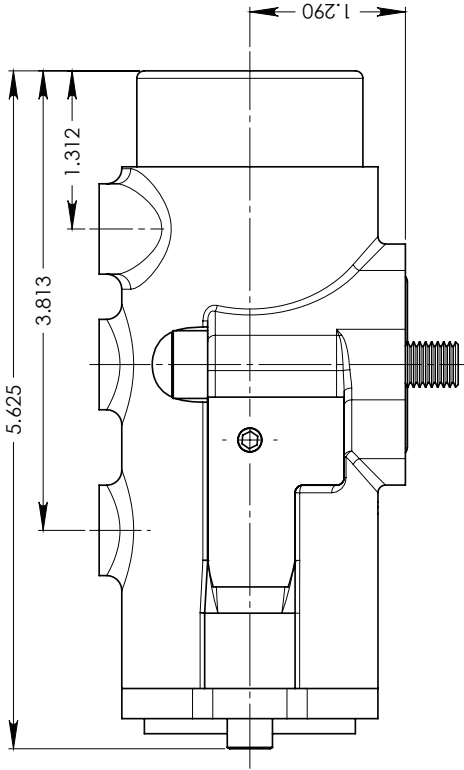
DO NOT SCALE DRAWING

**AUSTART**

**A3**

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PORTS	
A1	AIR SUPPLY (OPTION)
A2	CONTROL



TITLE

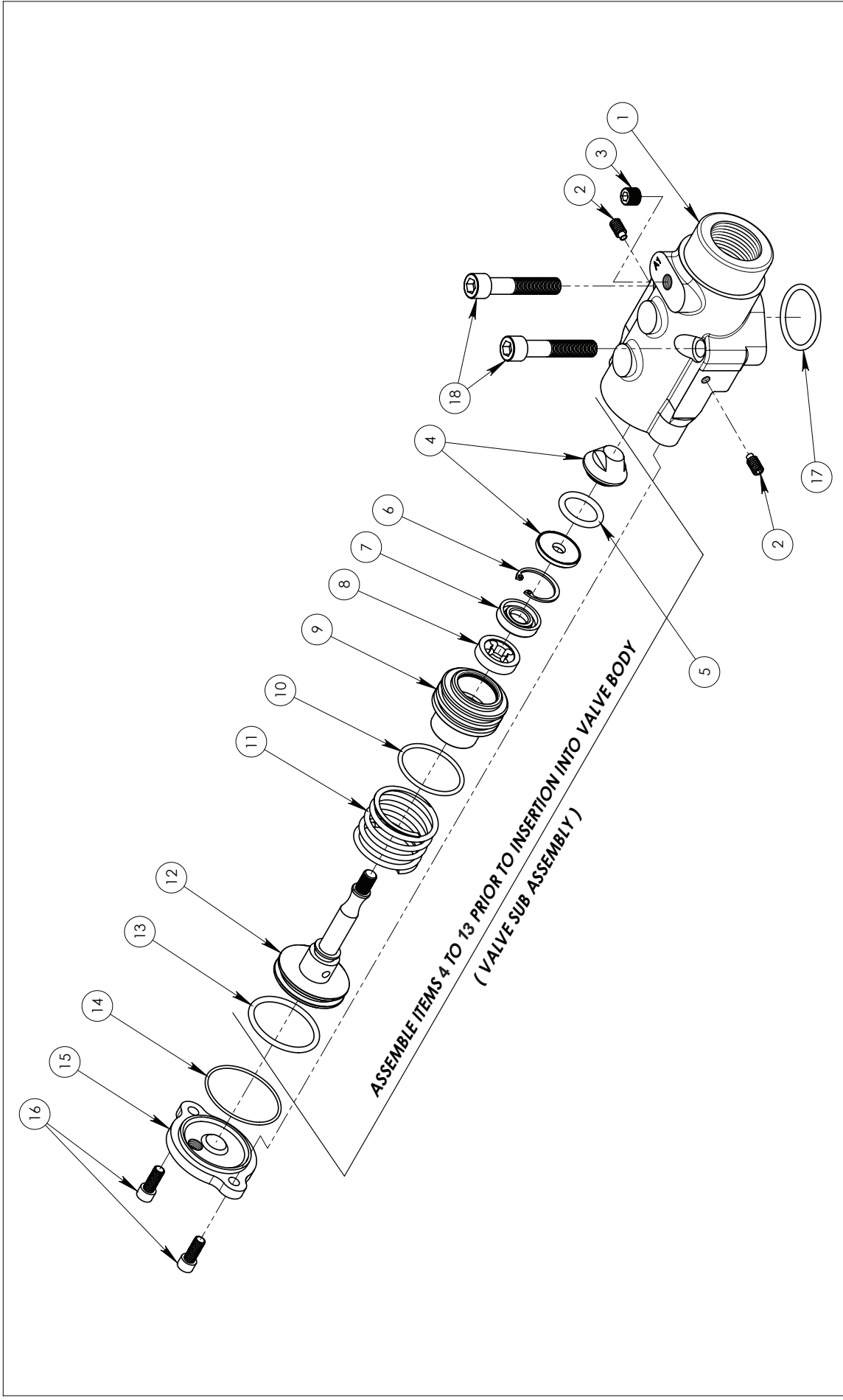
**RS1000M - General Arrangement**

SCALE: 1:1  
DO NOT SCALE  
DRAWING

**AUSTART**

**A3**

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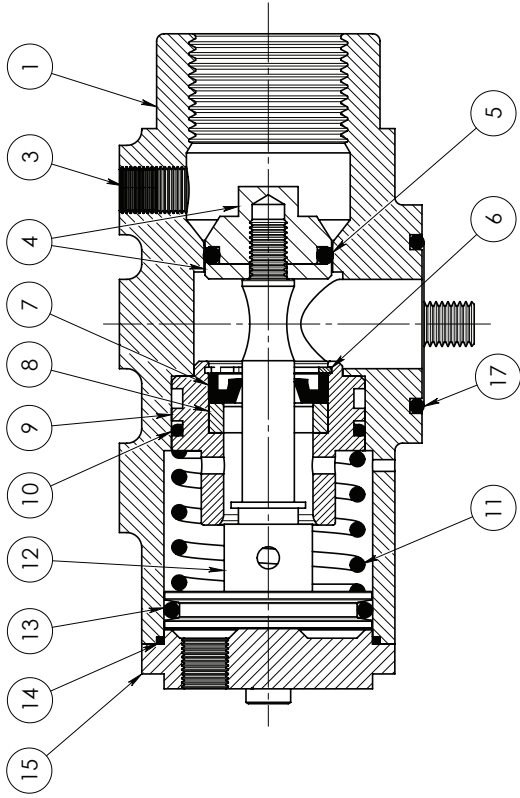


TITLE	RS1000M - Exploded View	SCALE: 1:2
		DO NOT SCALE DRAWING
<p><b>AUSTART</b></p> <p><small>This drawing is the property of K.H.Equipment Pty.Ltd. It is to be used for manufacturing purposes only and is not to be disclosed to anyone else or reproduced or used for manufacturing purposes without the express written permission of K.H.Equipment Pty.Ltd.</small></p>		A3

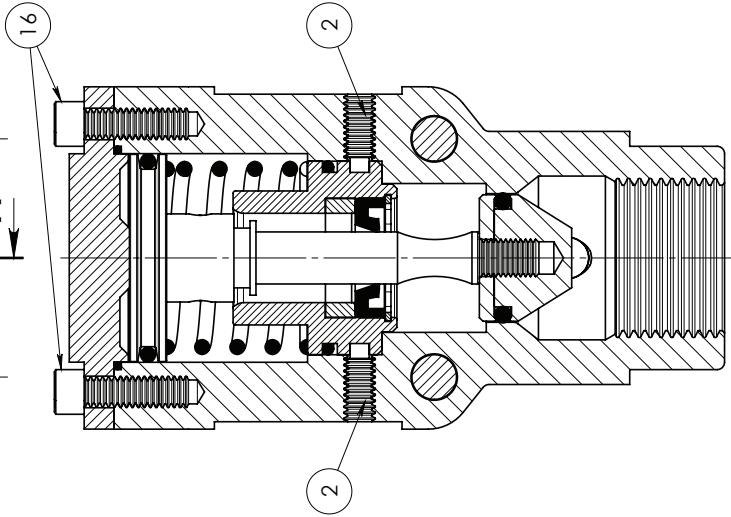
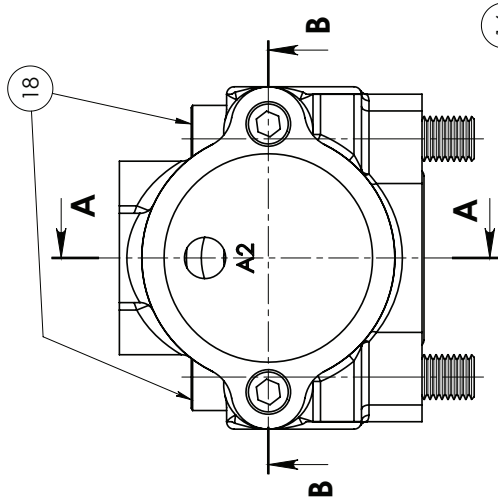


# AUSTART RS1000M

ITEM	PART NO.	EXT.	DESCRIPTION	QTY	ITEM	PART NO.	EXT.	DESCRIPTION	QTY
1	1001	-210	VALVE BODY	1					
2	1002	-100	RETAINING SCREW	2		1040	-910	SERVICE KIT	A.R
3	1003	-000	PLUG SCREW	1				Items marked +	
4	1004	-900	PISTON ASSY	1					
5	1005	-000	O'RING	+		1100	-900	VALVE SUB ASSY	A.R
6	1006	-000	CIRCLIP	1				Items 4 to 13	
7	1007	-000	SEAL	+					
8	1008	-500	BEARING	1					
9	1009	-300	SEAL SLEEVE	1					
10	1010	-000	O'RING	+					
11	1011	-000	SPRING	1					
12	1013	-100	PISTON SHAFT	1					
13	1014	-000	O'RING	+					
14	1015	-000	O'RING	+					
15	1016	-200	END CAP	1					
16	6005	-000	SCREW	2					
17	1018	-000	O'RING	+					
18	1019	-000	SCREW	2					



SECTION A-A



SECTION B-B

TITLE

RS1000M - Section View

SCALE: 1:1  
DO NOT SCALE  
DRAWING

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# MAINTENANCE



## DISASSEMBLY

*Refer to the Cross Sectional and the Exploded View drawings on pages 8 & 10*

1. Begin by removing Retaining Screws (2) from Valve Body (1)  
Unscrew the Piston Head (4) from the Piston Shaft (12).
2. Remove screws (16), End Cap (15)
3. Support Valve Body (1) firmly using a suitable pressing tool push out Valve Sub Assembly, pushing from Piston Head (4) thru the Valve Body (1).
4. Invert Valve Sub Assembly, using a vice hold on to the Piston Head (4) by the machine flat's.
5. Using a small pin punch or similar tool, insert into the drilled hole in the Piston Shaft (12) (The Piston Head (4) is threaded on to the Piston Shaft (12)).
6. Remove Seal Sleeve assembly (9) and spring (11). Holding Seal Sleeve assembly (9) remove Circlip (6).
7. Support Seal Sleeve assembly (9) and using an appropriate pressing tool push out the bearing (8) and seal (7) together.
8. Remove "O" Rings (5), (10), (13), and (14).

The Relay Valve is now disassembled and ready for inspection.

## INSPECTION

*Refer to the Cross Sectional and the Exploded View drawings on pages 8 & 10*

1. Visually inspect all parts removed during disassembly for excessive wear or damage. Replace any damaged or questionable parts.
2. Pay particular attention to internal bores in the Valve Body (1) and Seal Sleeve (9) for uneven wear patterns, scoring and corrosions.
3. Clean all other parts that are going to be reused with commercially approved solvents.



*Ensure cleaning operations are carried out in a properly vented area away from open flames.*

4. It is recommended that when servicing your Austart RS1000M Relay Valve always replace complete repair kit contents.

# REASSEMBLY

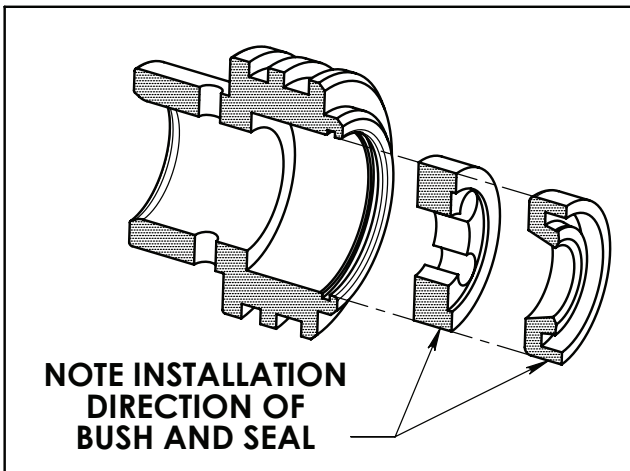
Refer to the Cross Sectional and the Exploded View drawings on pages 8 & 10

Reassembly of the RS1000M Relay Valve as detailed in the exploded view on *page 8* is basically in the reverse order shown. Refer also to the following instructions:

1. Begin by Holding the Seal Sleeve (9) and fitting the "O" Ring (10) then smear the largest bore of the Seal Sleeve (9) with a light oil.
2. Place Seal Sleeve on a bench and fit bearing (8), seal (7) and then circlip (6) using circlip pliers.

## CAUTION

*Ensure the Bearing (8) and Seal (7) is fitted the correct way. The Bearing undercut should be facing towards the Seal (7) and the tapered leading edge in Seal (7) must be engaged first. SEE DIAGRAM BELOW.*



3. Liberally grease the Seal (7), Bearing (8) and internal bore of Seal Sleeve (9) with PBR rubber grease part no RG70 or similar.
4. Using rubber grease apply to "O" Ring (13) and assemble on to Piston Shaft (12) smear a small amount of rubber grease on to Piston Shaft (12)
5. Place Spring (11) on to Piston Shaft (12) insert Seal Sleeve assembly (9) on to Piston Shaft (12) and push down.

6. Fit Piston Head Back-plate on to Piston Shaft (12), apply rubber grease to "O" Ring (5) and insert on to Piston Head (4)
7. Apply a small amount of Loctite 243 thread locker to threaded hole of Piston Head (4) and screw on to the Piston Shaft (12)
8. Place in vice by gripping on the machined flats of Piston Head (4) with a small pin punch or similar tool inset into the drilled hole in Piston Shaft (12) and tighten.
9. The Valve Sub Assembly is now ready for the Valve Body (1).
10. Apply rubber grease to the bores of the Valve Body (1) invert and place on a bench with the threaded inlet port facing down.
11. Insert Valve Sub assembly and firmly push down so the retaining grooves in Seal Sleeve (9) line up with the Retaining Screw (2) holes.
12. Apply a small amount of Loctite 515 Flange Sealant to Retaining Screw (2) hole insert retaining screw (2) in to Valve Body (1). Do not over tighten Retaining Screw (2) as it could distort the Seal Sleeve (9)
13. Apply rubber grease to "O" Ring (14) and slip on to End Cap (15).
14. Assemble End Cap (15) on to Valve Body (1) and tighten using Screws (16).
15. Finally assemble "O" Ring (17) on to Valve Body (1).

The RS1000M Relay Valve is now assembled, test by applying air to port A2 and activating valve a number of times to check for smooth action.

# **WARRANTY POLICY**

**All Austart Products supplied by K.H. Equipment Pty. Ltd. (herein called “the Manufacturer”) is warranted to be free from any defect in workmanship and material under conditions of normal use and service for engine starting applications for a period of 12 months from the date of purchase by the first user. Normal wear and tear is excluded from the warranty cover.**

**The Manufacturer will replace or repair at their works, without cost, any Austart Starter or parts found to be defective or at their discretion choose to refund the purchase price less a reasonable allowance for depreciation in exchange for the starter or part should the item prove impossible to repair or replace.**

**This warranty shall not apply to any Austart Starter or parts which have been altered or repaired or purchased outside the Manufacturer and its assigned agents nor to equipment or parts that have been subject to misuse including overloading, neglect, accident or damage, nor to any part or parts improperly applied or installed.**

**This warranty is in lieu of all other warranties and conditions statutory or otherwise expressed or implied and of all other obligations or liabilities on the Manufacturer’s part. The Manufacturer’s maximum liability is limited to the purchase price of the starter and is not liable for any consequential damage, loss or expense.**

**Repeat engine starting attempts must be delayed for 15 seconds to allow all Austart Starter and engine components to stop rotating to avoid damage or adverse wear of components.**



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