



INSTALLATION AND MAINTENANCE MANUAL

AUSTART AR1000 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 AR1000 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 starter 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:-

WARNING

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.

WARNING

Do not install the AR1000 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 online @ www.austart.com

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	2	Series 2	01	SAE 1	09	9TH 3MOD R	B	BCB (Beryllium Copper Bronze Pinion)
ATS53	Austart Turbine Starter	R	Reduced Flow	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 available	13	12TH 8/10 L	H	Highway Special
ATS63	Austart Turbine Starter					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						Other options available	M	Mining Spec. (Cast Iron)
AS68	(AS67OH) Austart Air Starter							N	Short Nose (Inertia ATS77)
AS69	(AS67OH) Austart Air Starter							P	Motor Ports 90°
AS70	Austart Air Starter							R	Reduced Muffler
ATS71	Austart Turbine Starter							S	Short Muffler
ATS73	Austart Turbine Starter							T	Threaded Exhaust 3"
ATS77	Austart Turbine Starter							U	U Configuration
AS75	(AS70 OH) Austart Air Starter							V	Value Muffler (ATS77)
AS78	(AS7080) Austart Air Starter							W	Gear Ratio
AS80	Austart Air Starter							X	Special – Refer Factory
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	
ATS73-0314	CUMMINS N14	SAE3	11TH	LH
ATS73-0311I	DETROIT 12V71	SAE3	11TH	INERTIA DRIVE
ATS73-0314I	DETROIT 12V71	SAE3	11TH	INERTIA DRIVE LH
ATS73-0312M	CATERPILLAR 3306	SAE3	12TH	MINING SPEC
ATS83-0311IT	WAUKESHA 7072SAE3	11TH	INERTIA	THREADED EXHAUST

INSTALLATION AND PREPARATION FOR OPERATION



- Maximum pressure for AUSTART starting equipment is 150psi (standard operating pressure is 100psi).
- Ensure air supply is isolated before installation, removal, maintenance or adjustment of your AUSTART AR1000 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 the 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 AS1210 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 relay 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 valve internals if allowed to pass through. Periodically drain moisture from the air receiver using a drain valve connected at the receiver bottom.

2. Install the AR1000 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.

NOTICE

Ensure the inlet side of the AR1000 relay valve connects to the exit side of the 'Y' strainer.

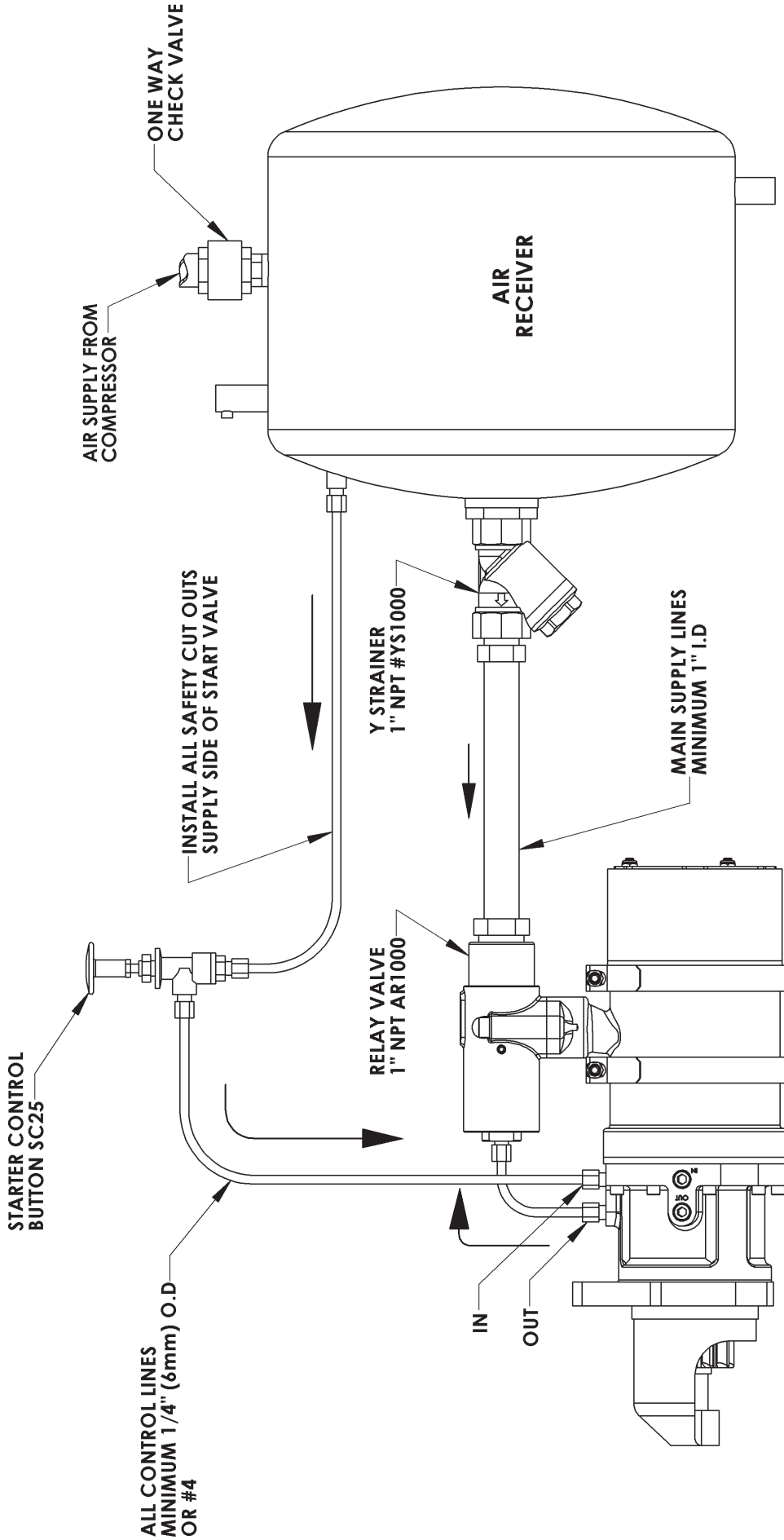
3. Mount the starter control button SC25 onto the vehicle dash-board or appropriate control panel and connect to the air receiver using a minimum of 1/4" (6mm) line.

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.

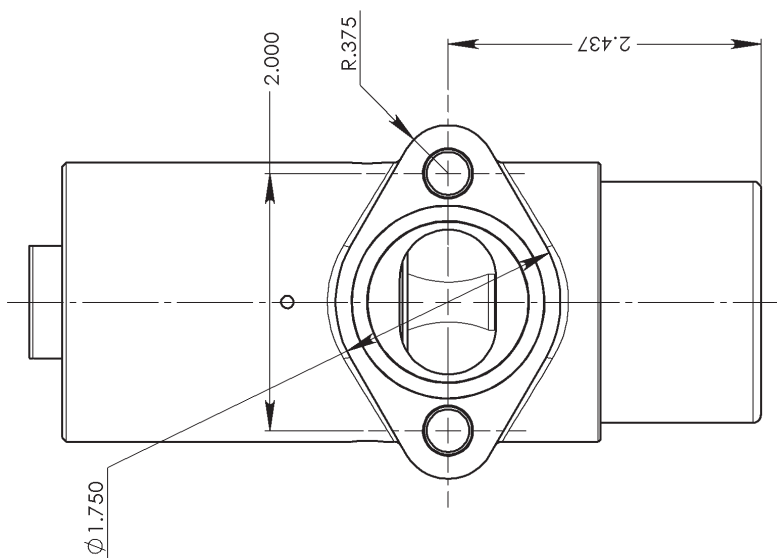
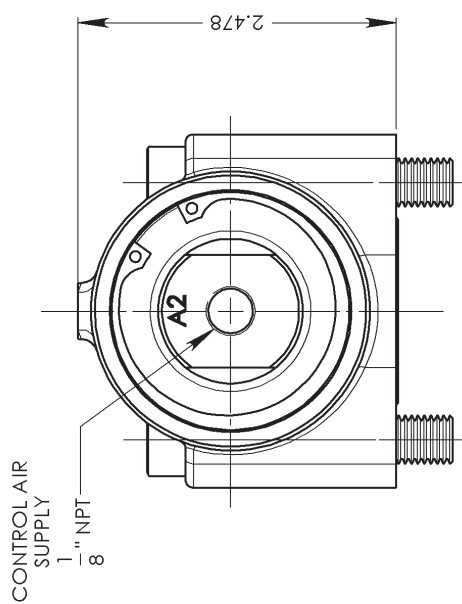
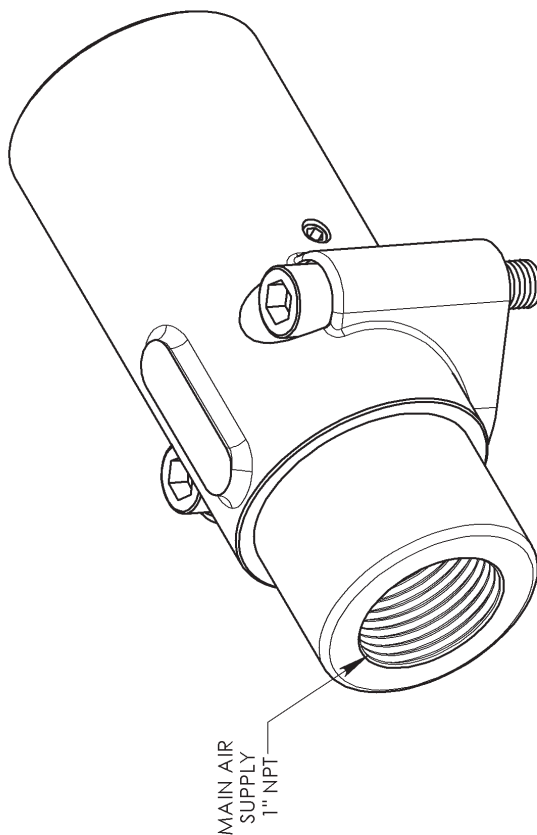
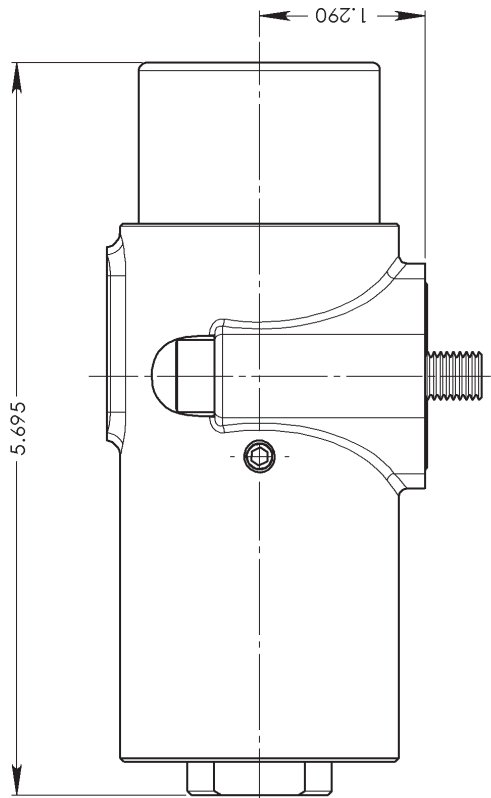
4. Determine the practicality of running the main air supply hose or pipe from the exit of the air receiver to the inlet of the AUSTART AR1000 relay valve. It may be easier to fit the hose before the AUSTART starter/or valve is mounted in position.
5. Once the AUSTART starter and/or AR1000 relay valve is mounted, fit the remaining 1/4" (6mm) control lines from the AUSTART starter to the starter control button and AR1000 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.

INSTALLATION SCHEMATIC



TITLE	SCALE: 1:3
TYPICAL AR1000-Schematic	DATE: 9-3-16
	DO NOT SCALE DRAWING
AUSTART	
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GENERAL ARRANGEMENT



TITLE

AR1000 - General Arrangement

SCALE: 1:1

DATE: 9-3-16

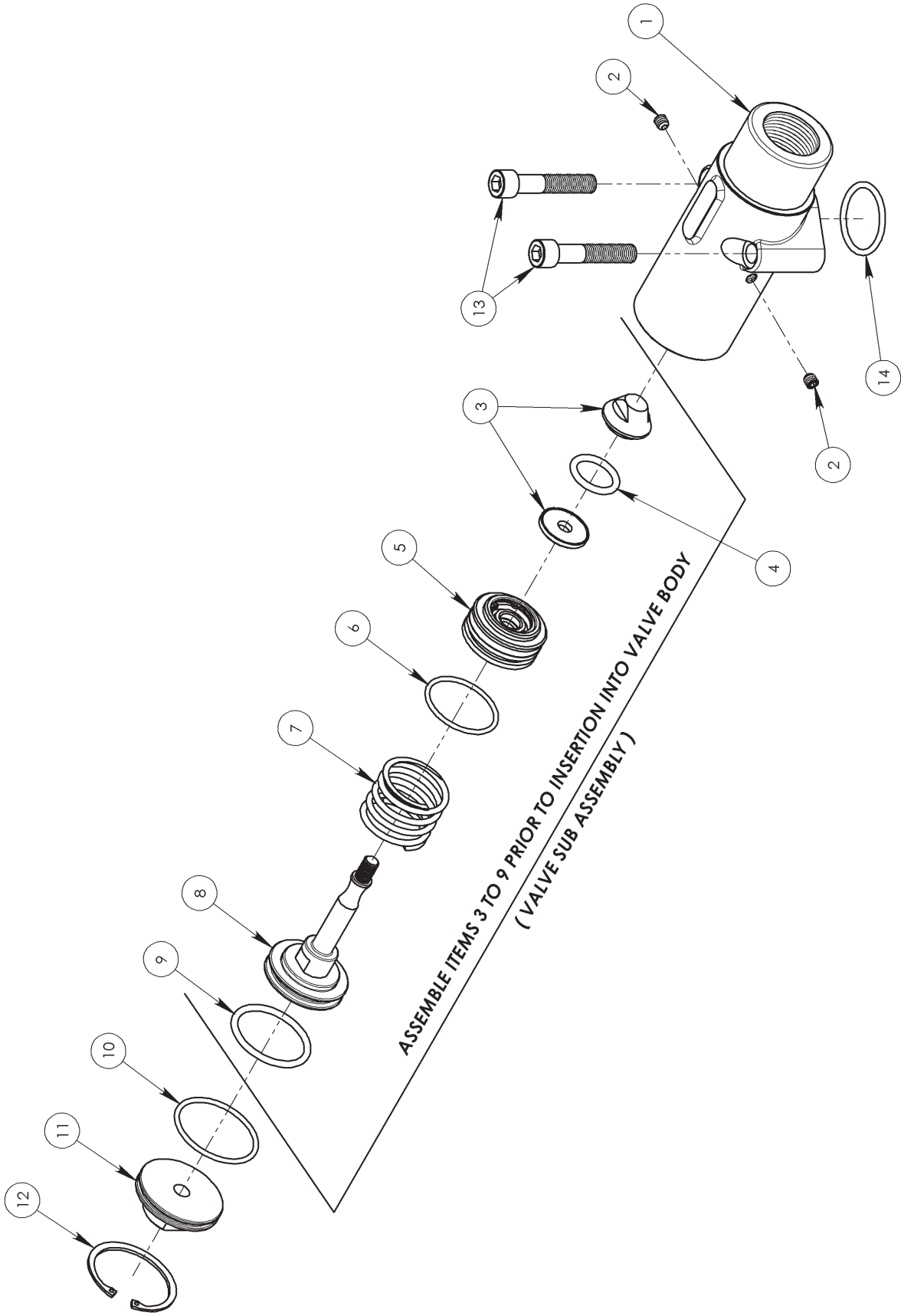
DO NOT SCALE
DRAWING

AUSTART

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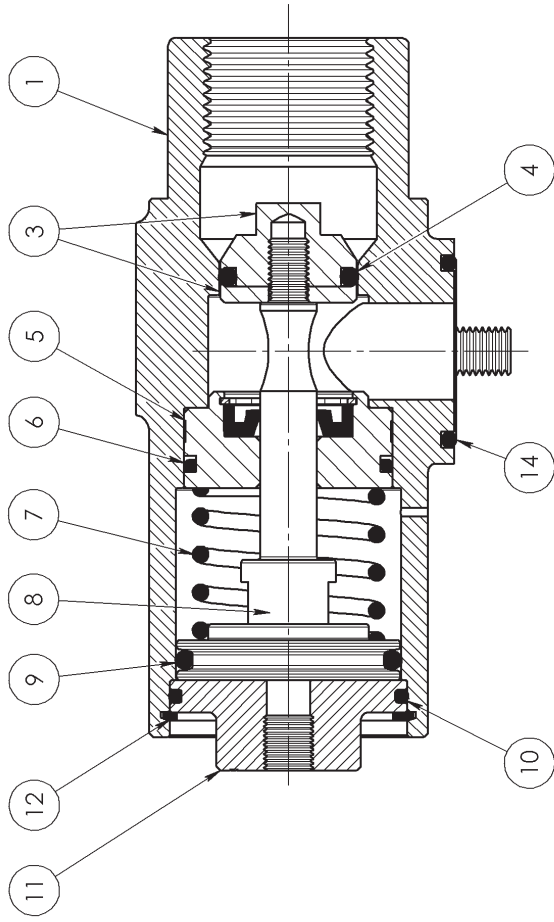
EXPLODED VIEW



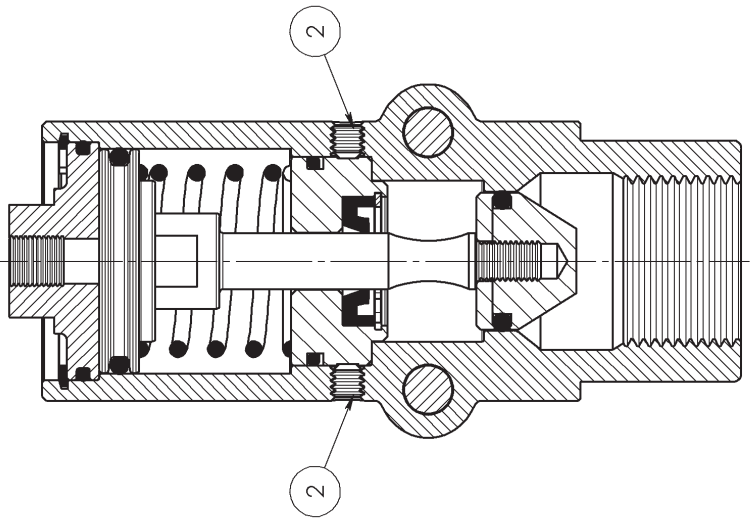
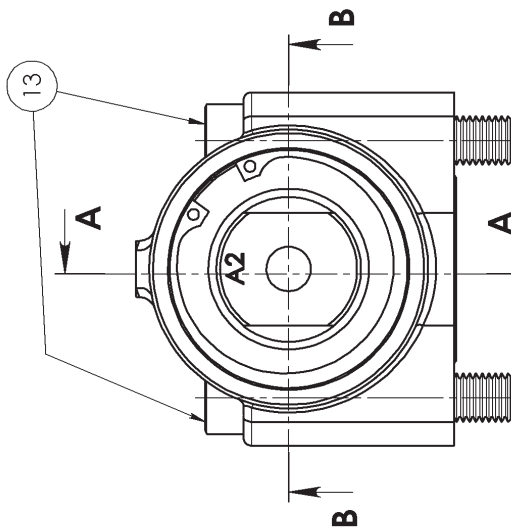
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AR1000 - Exploded View	DATE: 9-3-16
	DO NOT SCALE DRAWING
	A3

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SECTION VIEW



SECTION A-A



SECTION B-B

TITLE	SCALE: 1:1
AR1000 - Section View	DATE: 9-3-16
	DO NOT SCALE DRAWING
<p><small>"This drawing is the property of K.H. Equipment Pty Ltd. It is furnished to you for confidential information 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>	
<h1>AUSTART</h1>	
<h2>A3</h2>	

MAINTENANCE



DISASSEMBLY

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

1. Begin by removing retaining screws (2) from valve body (1).
2. Remove bevelled circlip (12) using circlip pliers.
3. Support valve body (1) firmly. Using a suitable pressing tool, push out valve sub-assembly and end cap (11), pushing from piston head (3) through the valve body (1)
4. Invert valve sub-assembly, using a vice hold onto the piston head (3) by the special flats provided.
5. Using a 5/8 AF open end spanner, insert onto the machined flats of the piston shaft assembly (8), unscrew and loosen the piston shaft assembly (8) from the piston head (3).
6. Remove seal sleeve assembly (5) and spring (7).
7. Remove o'rings (4), (6), (9) and (10).

The AR1000 relay valve is now disassembled and ready for inspection.

INSPECTION

Refer to the Exploded View and Cross Sectional 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 the internal bores in the valve body (1) for uneven wear patterns, scoring and corrosion.
3. Clean all other parts that are going to be reused with commercially approved solvents.



Ensure cleaning operations are carried out in a properly ventilated area, away from open flames.

4. It is recommended that when servicing your AUSTART AR1000 relay valve, always replace complete repair kit contents.

REASSEMBLY

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

Reassembly of the AR1000 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 (5) and fitting the o'ring (6).
 2. Liberally grease the seal and internal bore of seal sleeve assembly (5) with PBR rubber grease RG70 or similar.
 3. Apply rubber grease to o'ring (9) and assemble onto piston shaft assembly (8). Smear a small amount of rubber grease on to main shaft of piston shaft assembly (8).
 4. Place spring (7) onto piston shaft assembly (8), insert seal sleeve assembly (5) onto piston shaft assembly (8) and push down.
 5. Fit piston head back-plate (3) onto piston shaft assembly (8). Apply rubber grease to o'ring (4) and insert onto piston head (3).
 6. Apply a small amount of Loctite 243 or similar thread locker to threaded hole of piston head (3) and screw onto the piston shaft assembly (8).
 7. By gripping the machined flats of the piston head (3) in a vice, tighten the piston head (3) onto the piston shaft assembly (8), using the machined flats on the piston shaft assembly (8), apply a 5/8 AF open end spanner to tighten.
- The valve sub-assembly is now ready for the valve body (1)
8. Apply rubber grease to the bores of the valve body (1). Invert and place on a bench with the threaded inlet port facing down.
 9. Insert valve sub-assembly and firmly push down so the retaining grooves on seal sleeve assembly (5) line up with the retaining screw (2) holes.
 10. Apply a small amount of Loctite 515 or similar flange sealant to retaining screw (2) into the valve body (1). Do not over tighten retaining screw (2) as it could distort the seal sleeve assembly (5).
 11. Apply rubber grease to o'ring (10) and slip on to end cap (11).
 12. Assemble end cap (11) onto valve body (1) and insert bevelled circlip (12).
 13. Finally assemble o'ring (14) onto valve body (1).

The AR1000 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 and services 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. A period of 6 months is warranted for all service work. 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.

