

**Air & Liquid Cooled Brakes  
1.5 through 100 HP**

**MODEL AS-701 AIR-COOLED BRAKE  
Product Information**

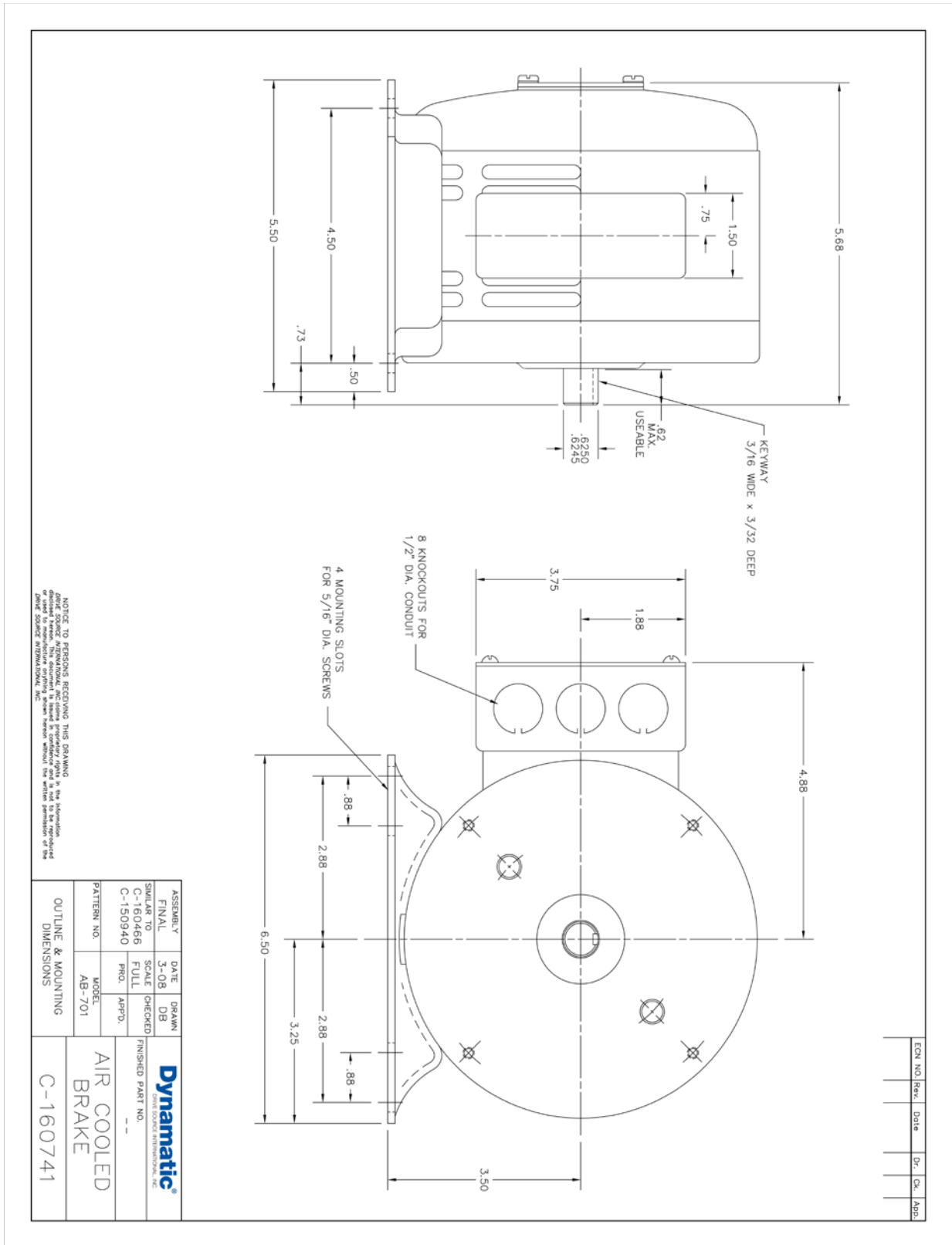


The Dynamatic® Model 701 brake consists of a 40V rated coil permanently fixed to the housing assembly with a drum mounted to the output shaft. The brake generates a retarding torque when voltage is applied to it. The Model 701 brake provides controlled deceleration to stop only; it does not provide a holding function. Its coil is rated 40 VDC. The unit has 2 horsepower capacity where controlled deceleration is required. The Model 701 may be purchased with a separate wall mounted controller, Type 15-80-109 or 15-80-110. A controller is required, but not included. A Drive/Controller Compatibility and Selection Chart can be found in the Product Catalog. Descriptions of controllers, modifications and operator stations can also be found in the Product Catalog.

Selection Table

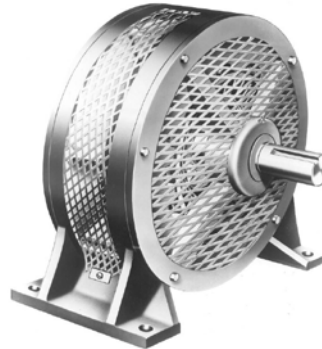
HP	Speed Range (RPM)	Brake Description	Model Number	
1.5	1800	Double Shaft Extension	AS-0701-0001	OBSOLETE
1.5	1800	Single Shaft Extension	AS-0701-0002	OBSOLETE
1.5	1800	Single Shaft Extension	000-160740-0090	Current Replacement

**Air & Liquid Cooled Brakes  
1.5 through 100 HP**



revised 4/12/2018

**Air & Liquid Cooled Brakes**  
**1.5 through 100 HP**  
**MODELS AS-703 THROUGH AS-708 AIR-COOLED BRAKES**  
**Brake Information**



**Description**

The Dynamatic® Air-Cooled, Adjustable Torque Brakes consist of a rotating member (rotor), keyed to a straight-through double extension shaft, and a stationary brake coil. The brake imposes controlled deceleration at variable speeds. There is no physical contact between rotating and stationary members. This results in smooth response, thereby eliminating shock loading and extending equipment life. These brakes may be equipped with an optional tachometer generator mounted externally to provide a feedback

signal to the brakes controller. The controller provides the DC excitation for the brake coil. The feedback signal from the tachometer generator is compared against a reference signal within the controller to provide accurate, smooth, controlled braking or constant speed throughout the period of excitation. Constant torque can be obtained with highly accurate torque adjustments. The controllers for the brakes are described starting on Page 72 of this catalog.

Features	Customer Benefits
Simple design - Brake consists of a rotor and shaft, stationary brake coil and a separate controller.	Easy to understand, install, operate and maintain.
Fewer wearing parts - All Brakes have only two bearings.	Minimum downtime and maximum production from initial start-up.
Low control power.	Full control of maximum load is accomplished with low excitation power.
Flexible use.	Couple brake shaft directly or with belts.
Greaseable ball bearings.	With a regular maintenance program, extended bearing life can be expected.
Smooth, controlled braking for any type of load.	Provides an ideal means of accurately controlling crane hoists.
High cooling efficiency.	Results in high horsepower capacities from small physical size brakes.
one-year warranty on mechanical brakes and one year warranty on electronic controllers.	Brakes are built to give long, reliable, low cost life in diverse applications.

revised 4/12/2018

**Air & Liquid Cooled Brakes  
1.5 through 100 HP**

**Specifications for Models AS-703 Through AS-708 Air-Cooled Brakes**

<b>Brake</b>	HP and RPM Class F insulation Epoxy protection on coil Stationary coil Coil voltages  Alternator AC tachometer generator Blower cooling one-year warranty	See selection table - Page 61 Standard Optional Standard 45, 90 VDC - Standard; 110, 220 VDC - Optional Optional Optional Optional Standard
<b>Controllers (Sold Separately)</b>	Model 3000, 4000, 4050, Mark III (Solid State) Model EC-2000 (Digital)  Closed loop speed control Speed regulation Input power Enclosure Panel mount, open construction  Output voltage, current to brake coil One-year warranty	Can be used with AS-703 through AS-708 Can be used with AS-703 through AS-705 (45 or 90 VDC), AS-706 through AS-707 (90 VDC only) Optional 0.5% Standard, 0.1% Optional (EC-2000 only) Line transformer - Standard NEMA 1 - Standard, NEMA 12 - Optional; NEMA 13 for 4000 & 4050 - Standard Optional As specified Standard
<b>Environmental Ratings</b>	Storage temperature Operating temperature Maximum operating temperature Altitude	-20° to 65° C (-4° to 149° F) Standard 0° to 40° C (32° to 104° F) Standard 65° C (150° F) Optional 1000 m (3300 Ft.) Standard
<b>Codes and Standards</b>	Mechanical NEMA, as applicable Mechanical CSA Controllers CSA	Standard Approved Approved
<b>Reliability Testing</b>	Mechanical 100% dynamometer tested Controllers Pre-tested components Computer test and pre-calibrated PCB's	Standard  Standard Standard

**Air & Liquid Cooled Brakes  
1.5 through 100 HP**

**MODELS WC-620 THROUGH WC-640 LIQUID-COOLED BRAKES  
Brake Information**



**Description**

The Dynamatic® Liquid-Cooled, Adjustable Torque Brakes consist of a rotating member (rotor), keyed to a straight-through double extension shaft, a stationary brake coil and an automatic water piping flow-through cooling system. The brake imposes controlled deceleration at variable speeds. There is no physical contact between rotating and stationary members. This results in smooth response, thereby eliminating shock loading and extending equipment life. These brakes are equipped with a tachometer generator mounted internally to provide a feedback

signal to the brakes controller. The controller provides the DC excitation for the brake coil. The feedback signal from the tachometer generator is compared against a reference signal within the controller to provide accurate, smooth, controlled braking or constant speed throughout the period of excitation. Constant torque can be obtained with highly accurate torque adjustments. The controllers for the brakes are described starting on Page 72 of this catalog.

Features	Customer Benefits
Simple design - Brake consists of a rotor and shaft, stationary brake coil, automatic water piping system and a separate controller.	Easy to understand, install, operate and maintain.
Fewer wearing parts - All adjustable torque brakes have only two bearings.	Minimum downtime and maximum production from initial start-up.
Completely enclosed, liquid-cooled.	Provides a consistent, high quality product under changing load and environmental conditions.
Low control power.	Full control of maximum load is accomplished with low excitation power.
Flexible use.	Couple brake shaft directly or with belts.
Greaseable ball bearings.	With a regular maintenance program, extended bearing life can be expected.
High cooling efficiency.	Results in high horsepower capacities from small physical size brakes.
one-year warranty on mechanical brakes and one year warranty on electronic controllers.	Brakes are built to give long reliable, low cost life in diverse applications.

revised 4/12/2018

**Air & Liquid Cooled Brakes  
1.5 through 100 HP**

**Specifications for Models WC-620 Through WC-640 Liquid-Cooled Brakes**

<b>Brake</b>	HP and RPM Class F insulation Stationary coil Coil voltages AC tachometer generator Cooling one-year warranty	See selection table - Page 61 Standard Standard 45 and 90 VDC - Standard Optional 100% automatic water-cooled Standard
<b>Controllers (Sold Separately)</b>	Model 3000, 4000, 4050, Mark III (Solid State) Model EC-2000 (Digital) Closed loop speed control Speed regulation Input power Enclosure Panel mount, open construction  Output voltage, current to brake coil One-year warranty	Can be used with WC-620 through WC-640 Can be used with WC-620 through WC-640 Optional 0.5% Standard, 0.1% Optional Line transformer - Standard NEMA 1 - Standard; NEMA 12 - Optional; NEMA 13 for 4000 & 4050 - Standard Optional As specified Standard
<b>Environmental Ratings</b>	Storage temperature Operating temperature Maximum operating temperature Altitude	-20° to 65° C (-4° to 149° F) Standard 0° to 40° C (32° to 104° F) Standard 65° C (150° F) Optional 1000 m (3300 ft.) Standard
<b>Codes and Standards</b>	Mechanical NEMA, as applicable Mechanical CSA Controllers CSA	Standard Approved Approved
<b>Reliability Testing</b>	Mechanical 100% dynamometer tested Controllers Pre-tested components Computer test and pre-calibrated PCB's	Standard  Standard Standard

**Air & Liquid Cooled Brakes  
1.5 through 100 HP**

**Ordering Information**

The air-cooled brake includes a double shaft extension for belted or direct-coupled service. The brake does not normally have a tachometer generator for a speed signal. The generator is offered as a modification. Refer to the engineering data in this section to select the correct size brake and controller. A 45 or 90-volt controller is required (sold separately), to energize the brakes coil.

**Selection Table - Air-Cooled**

<b>Input Speed (RPM)</b>	<b>Model Number</b>
1800	AS-703-01
4400	AS-703-02
1800	AS-704-01
4400	AS-704-02
1200	AS-705-01
2000	AS-705-02
1200	AS-706-01
2000	AS-706-02
900	AS-707-01
1800	AS-707-02
900	AS-708-01
1800	AS-708-02

The liquid-cooled brake includes a double shaft extension for belted or direct coupled service and an automatic water piping system to maintain correct operating temperature and conserve cooling water. The brake has an internal tachometer generator for a speed signal. Refer to the engineering data in this section in order to select the correct size brakes. A 45-volt controller is required (sold separately) to energize the brakes coil.

**Selection Table - Liquid-Cooled**

<b>Input Speed (RPM)</b>	<b>Model Number</b>
1800	WC-620-02
5000	WC-620-03
1800	WC-630-02
4400	WC-630-03
1800	WC-640-02
4400	WC-640-03

revised 4/12/2018

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**Air & Liquid Cooled Brakes  
1.5 through 100 HP**

**Modifications**

**Generator, G-2** - An externally mounted generator is supplied for speed control. Controller requires Speed Control option.

Part Number - Mounted - 88470-1100

Part Number - Loose - 88470-0100

**For the following modifications, please consult factory:**

**Alternator, Shaft Mounted** - The alternator is sized to limit the fall speed of the load to 40% of base speed at rated torque. Consult the factory for belt driven alternator pricing.

**Blower, External** - A blower is externally mounted to the brake which increases the thermal horsepower rating at low speeds; use 1200 RPM Dissipation rating. Specify blower-mounting location.

**Coil, Encapsulated Brake** - Encapsulated brake coils are wound with epoxy varnish and glass tape, then totally encapsulated with epoxy for protection against corrosive chemicals, washdown and outdoor service.

**Coil Voltage, Brake** - The standard coil voltage for air-cooled and water-cooled brakes is 45 or 90 VDC. Other voltages are available. Controller size is dependent on coil voltage and current.

**Protection, No. 1** - Includes an encapsulated generator winding, epoxy filled coil, external epoxy paint, special shaft seals and sealed junction box.

**Shaft, Single Extension** - The standard air-cooled and water-cooled brake has a double shaft extension. The factory will remove the shaft on one side for locations where the extra shaft extension would be inappropriate.

**Switch, Brake Thermal** - To safeguard the brake from excessive internal temperature a thermal switch is placed in the air stream. This switch has a NC contact. When ordered with a Mark III controller the switch will be connected in the stop circuit.



**Air & Liquid Cooled Brakes  
1.5 through 100 HP**

**Air-Cooled Brake Engineering Data**

Description	Brake Rpm	Model AS					
		703	704	705	706	707	708
45 VDC Cold Ohms Hot Amps 90 VDC Cold Ohms Hot Amps <span style="font-size: 2em; vertical-align: middle;">}</span> Coil Data	-						
	-	10.0	5.0	4.0	2.0	1.9	.95
	-	3.5	7.0	7.3	14.5	15.5	31.0
	-	39.6	19.8	15.6	7.8	8.8	4.04
	-	1.75	3.5	4.4	8.8	7.2	14.54
Horsepower, continuous dissipation	3600	10.0	20.0	-	-	-	-
	1800	7.5	15.0	20.5	36.0	65.2	100.0
	1200	5.0	10.0	14.8	24.0	45.7	75.0
	900	3.5	7.5	11.1	18.0	34.3	56.0
Inertia (Lb. Ft. <sup>2</sup> )	-	.75	1.48	7.1	14.4	49.0	89.0
Overhung Load, maximum (Lbs.)	3600	360.0	410.0	-	-	-	-
	1800	460.0	525.0	570.0	640.0	1700	1810
	1200	530.0	605.0	655.0	705.0	2000	2130
	900	585.0	660.0	720.0	825.0	2200	2360
Torque, maximum (Lb. Ft.)	1800	53.0	110.0	210.0	420.0	870	1740
	1200	49.0	99.0	204.0	410.0	870	1740
	900	43.0	90.0	195.0	388.0	870	1740
Weight, approximate (Lbs.)	-	130	197	276	448	1025	2200

**Recommended Brake Sizes:**

Hook Type Crane Hoist Service

Model application is based on motor speed torque formula adjusted to 85% mechanical efficiency of gearbox and sheaves.

Motor HP	Brake Model Recommended for Synchronous Speeds of			
	1800 RPM	1200 RPM	900 RPM	720 RPM
15	704	704	705	705
20	704	705	705	705
25	704	705	705	706
30	704	705	705	706
40	705	705	706	707
50	705	706	706	707
60	705	706	707	707
75	706	706	707	707
100	706	707	707	707
125	707	707	707	708
150	707	707	707	708
200	707	707	708	708

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**Air & Liquid Cooled Brakes  
1.5 through 100 HP**

**Liquid-Cooled Brake Engineering Data**

Model WC	Torque (Lbs. Ft.) at					Speed RPM			Therm. Cap.	Wk <sup>2</sup> Lb. Ft. <sup>2</sup>
	100 RPM	200 RPM	500 RPM	900 RPM	PEAK	Max. RPM ❶	Normal Max. RPM	Therm. Limit Speed		
620	60	80	105	125	130	5000	1800	1600	40	8.5
630	150	200	210	215	225	4400	1800	1400	60	14
640	250	330	390	380	400	4400	1800	1310	100	30

Model WC	Coolant Size Supply Line ❷	Approximate Ship Weight (Lbs.)	Output End Overhung Load (Lbs.) At RPM Of ❸			
			900	1200	1800	3600
620	1/2"	316	495	440	390	310
630	1/2"	392	960	870	755	600
640	3/4"	575	965	880	765	600

- ❶ This is the extended speed range.
- ❷ Thermal HP absorption capacity is shown in this column. When selecting a brake for an application, check the maximum required absorption with this formula: HP = RPM x Torque divided by 5250. Then compare the value given in the above table with the maximum HP to be absorbed at any point in the operating range of the brake.
- ❸ This column shows the diameter of the coolant supply line in inches.
- ❹ These figures are maximum allowable at the center of a standard shaft keyway and in a downward direction for standard units.

**Brake Controller Sizing:**

These sizes apply only to Dynamatic® Model Mark III Controllers. Controller information starts on Page 70

Coil Voltage	Model AS						Model WC		
	703	704	705	706	707	708	620	630	640
45 VDC	Size 1	Size 2	Size 2	Size 3	Size 3	NA	Size 1	Size 1	Size 2
90 VDC	Size 5	Size 5	Size 5	Size 6	Size 6	Size 7	Size 5	Size 5	Size 5
110 VDC*	Size 1	Size 1	Size 1	Size 1	Size 1	Size 1	Size 1	Size 1	Size 1
220 VDC*	Size 1	Size 1	Size 1	Size 1	Size 1	Size 1	Size 1	Size 1	Size 1

\*Consult Factory for pricing 110 VDC and 220 VDC coil voltage requirements.

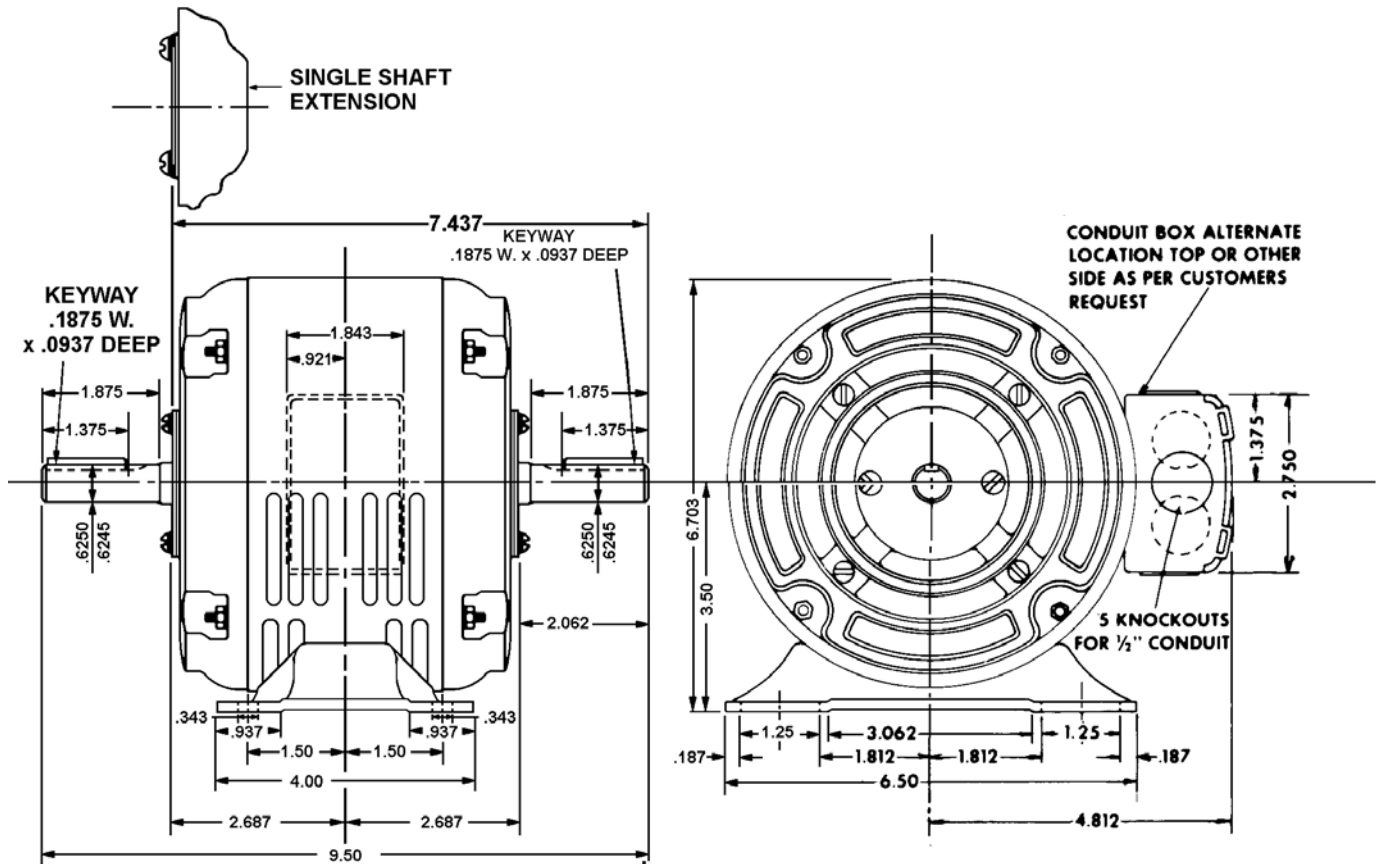
These sizes apply only to Dynamatic® EC-2000 Controllers. Controller information starts on Page 70

Coil Voltage	Model AS						Model WC		
	703	704	705	706	707	708*	620	630	640
45 VDC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
90 VDC	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes

\*EC-2000 Special High Power

**Air & Liquid Cooled Brakes  
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**Outline Dimensions – AS-701**



C-150940

Specifications	Input RPM			
	900	1200	1800	3600
Maximum torque (Lb. Ft.)	5.0	5.5	6.5	--
Maximum HP (continuous)	0.75	1.0	1.5	2.0
Overhung Load (Lbs.)	175	160	140	110

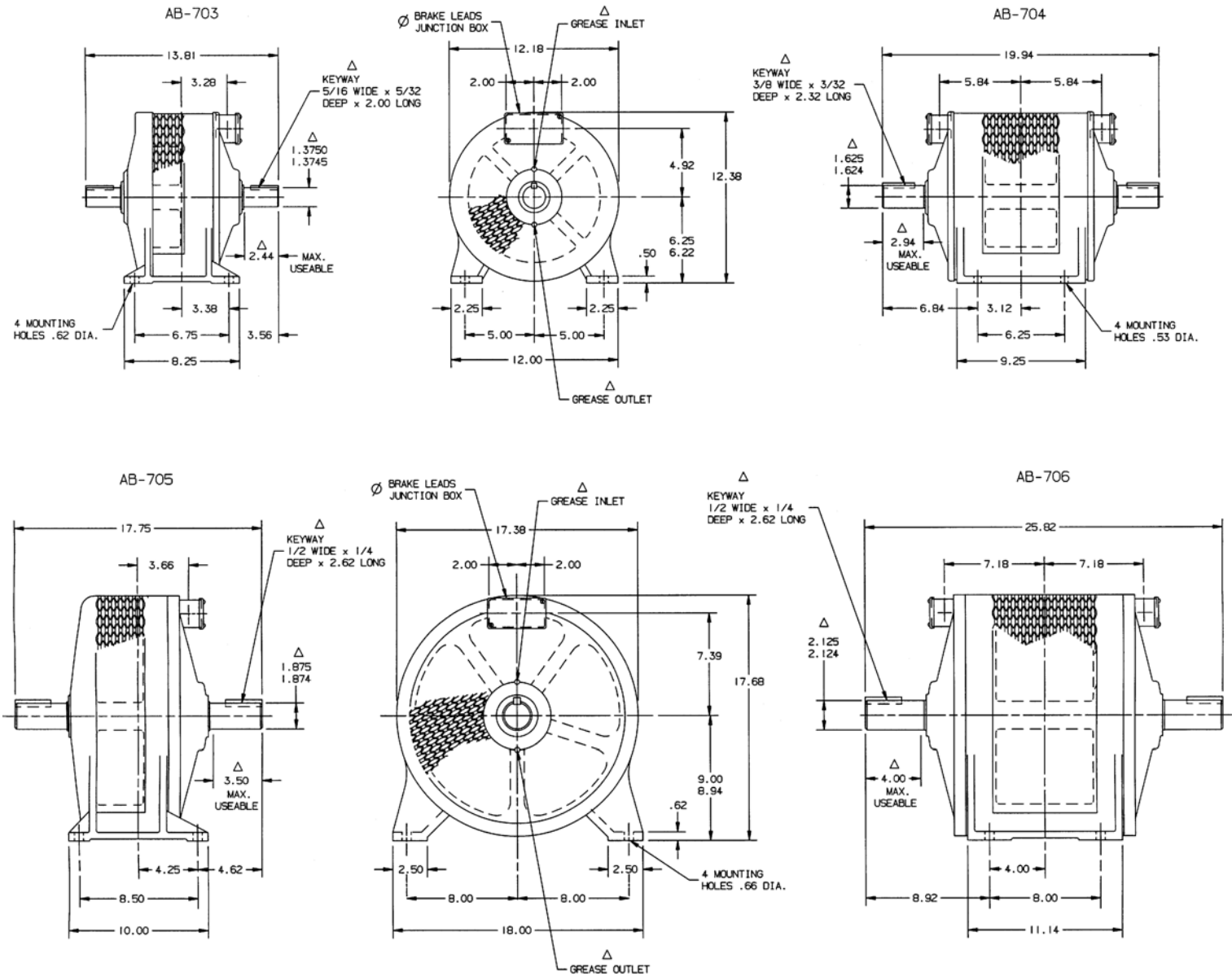
Approximate Net Weight: 50 lbs.

DIMENSIONS ARE IN INCHES

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**Air & Liquid Cooled Brakes  
1.5 through 100 HP**

**Outline Dimensions – AS-703 through AS-706**



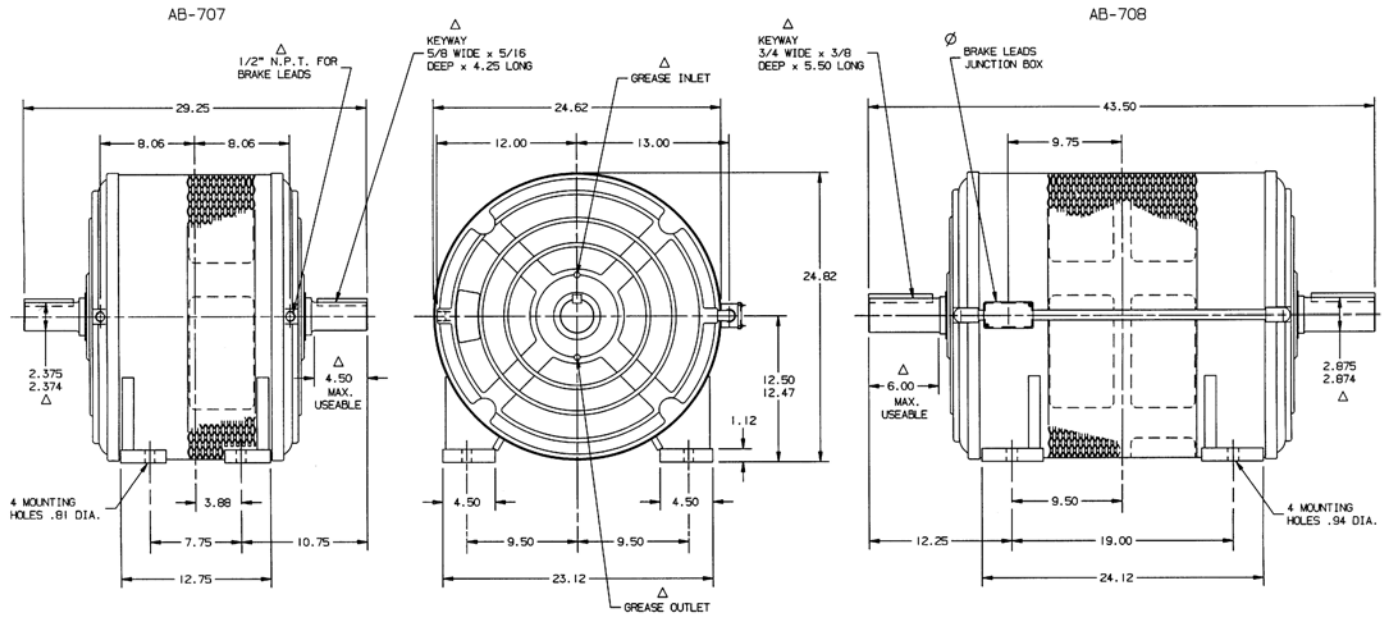
C-32088

**Models AS-703 Through AS-706 Air-Cooled Brakes**

All models are furnished with 2 waterproof junction boxes. Customer must drill openings where desired.

**Air & Liquid Cooled Brakes  
1.5 through 100 HP**

**Outline Dimensions – AS-707 & AS-708**



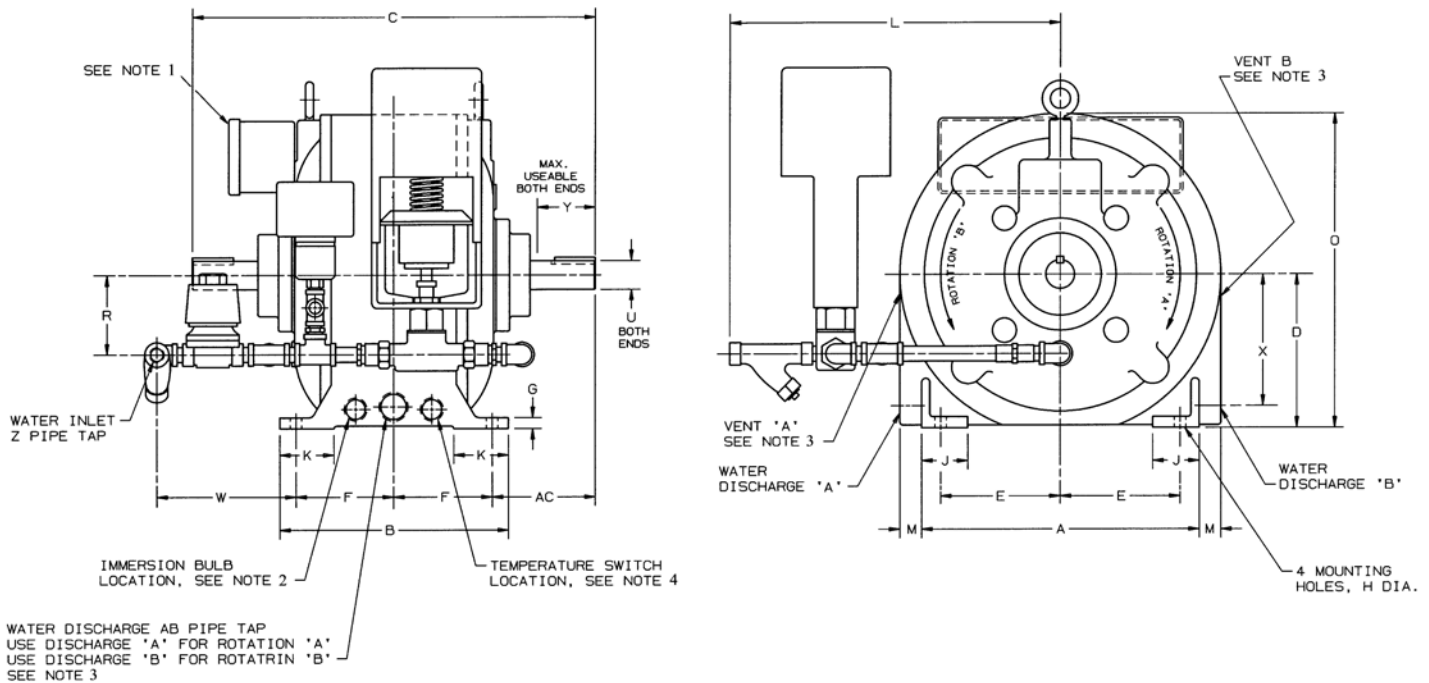
C32088, C-79946

**Models AS-707 & AS-708 Air-Cooled Brakes**

All models are furnished with 2 waterproof junction boxes. Customer must drill openings where desired.

**Air & Liquid Cooled Brakes  
1.5 through 100 HP**

**Outline Dimensions – WC-620 through WC-640**



**C-66404**

**Models WC-620 Through WC-640 Liquid-Cooled Brakes**

Model WC	A	B	C	D <sup>⑤</sup>	E	F	G	H	J	K	L	M	O	R
620	12.75	10.50	18.50	7.00	5.50	4.50	.50	.54	2.25	2.50	15.18	1.00	14.38	3.62
630	14.50	12.00	19.00	8.00	6.25	5.00	.62	.68	2.12	2.75	15.18	.75	16.00	4.18
640	18.00	14.00	24.00	9.00	7.50	6.00	.75	.82	3.00	3.12	18.82	.00	18.00	4.62

Model WC	W	X	Z	Shaft Extension			AB	AC
				U <sup>⑥</sup>	Y <sup>⑦</sup>	KEY		
620	5.50	6.00	.38	1.3125	2.68	.32 SQ. X 1.88 LG.	1.00	4.75
630	4.62	6.75	.38	1.5000	2.82	.38 SQ. X 2.00 LG.	1.50	4.50
640	3.82	7.50	.75	1.625	3.50	.38 SQ. X 2.50 LG.	1.50	6.00

- ① Brake field, generator field (when required), temperature switch, pressure switch and solenoid valve leads junction box.
- ② Pipe tap immersion bulb; must be mounted in water discharge side of brake.
- ③ Water discharge AB pipe tap: For rotation "A" cover vent "A"; for rotation "B" cover vent "B".
- ④ Temperature switch location; must be mounted in water discharge side of brake.
- ⑤ D dimension will never be exceeded. When exact dimension is needed shims up to .03 may be required for Models WC-620 and WC-630. Shims up to .06 may be required for Model WC-640.
- ⑥ U Shaft diameter tolerance: +.0000/-.0005 for Models WC-620 and WC-630; +.000/-0.001 for Model WC-640; same for both ends.
- ⑦ Y dimension is maximum usable shaft length.

**Ajusto-Spede<sup>®</sup> Controllers**

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## DSI - STANDARD TERMS AND CONDITIONS OF SALE

### 1. PRICE BOOKS

Price books are intended only as sources of general information. They are not to be construed as quotations or as representations that products described therein are available, or will be made available for immediate delivery.

### 2. QUOTATIONS

Seller may make quotations verbally or in writing. Verbal quotations shall expire automatically unless Seller receives Buyer's purchase order number on the day the quotation is made. Written quotations shall expire automatically unless Seller receives Buyer's written purchase order within 15 days after the date appearing on the quotation. No quotation is to operate as an offer to sell but only as a description of products. Accordingly, even prior to its expiration date, any quotation is subject to change by Seller at any time upon verbal or written notice to Buyer. All quotations are deemed to incorporate Seller's Standard Terms and Conditions of Sale.

### 3. ACCEPTANCE OF PURCHASE ORDERS.

Notwithstanding any contrary language contained in Buyer's purchase order, each purchase order shall be subject to acceptance by an authorized employee of Seller's plant, and each purchase and sale transaction shall be governed exclusively by these Standard Terms and Conditions of Sale. Seller reserves the right at any time before delivery and payment to correct clerical, stenographic or other errors in quotations, purchase orders or acknowledgments.

### 4. PRICE POLICY

Regardless of prices set forth in quotations, acknowledgments or elsewhere, Buyer shall pay a purchase price as follows:

- (a) For the following products: Fractional Horsepower Adjusto-Spede®, AC Motors, renewal parts and service, Buyer shall pay Seller's published prices in effect on the date when shipment is made or service performed.
- (b) For all other products, Buyer shall pay a purchase price equal to the smaller of: (a) Seller's published prices in effect on the date when shipment is made or (b) the prices set forth in Seller's acknowledgment increased by 1% for each month or fraction thereof that elapses between the date when the acknowledgment is mailed from Seller's factory to Buyer (designated as the "Issue Date" on the acknowledgment) and the date when shipment is made or the date for which shipment was originally scheduled (as stated on the acknowledgment) by Seller, whichever occurs sooner. However, in the event that shipment is originally scheduled to occur in excess of 12 months after Issue Date, Buyer shall pay Seller's published prices in effect on the date when shipment is made; and in any case where shipment is delayed beyond Seller's originally scheduled date for shipment by Buyer's actions or at Buyer's request,

Buyer shall pay escalation charges based on the revised delivery schedule.

### 5. MINIMUM BILLING

The minimum billing for each purchase order shall be \$100.00 net.

### 6. TAXES

Any and all sales, use, personal property or other excise taxes which the Seller may be required to pay or collect, including first destination taxes, will be added to each invoice and shall be payable by Buyer on the same terms as the purchase price unless the Buyer has furnished the Seller a tax exemption certificate acceptable to the taxing authority.

### 7. PAYMENT TERMS

Payment terms shall be net 30 days except for International orders, which will be cash in advance. However, on orders of \$100,000.00 or more and having delivery schedule 6 months or longer from date of order, the payment terms shall be as specified by Seller at time of quotation.

### 8. SHIPPING TERMS

Except as otherwise agreed, Seller shall be entitled to select carrier and make delivery in more than one shipment, in which event Buyer shall pay separately for each partial shipment.

All shipments shall be made F.O.B. point of shipment. Seller shall prepay freight (UPS shipments only), which shall be billed to Buyer as a separate item on the product invoice at Seller's standard rates applicable to the destination, or at Buyer's option, shipment shall be made freight collect. All truck shipments shall be made freight collect, unless otherwise agreed.

### 9. PACKAGING

At no additional charge, all products shall be packaged for domestic shipment in accordance with Seller's standard specifications. Additional charge shall be made if Buyer specifies special domestic packaging, packaging in accordance with government or military standards, overseas packaging or other special packaging. Refer to Seller's plant, nearest sales office or representative for further information.

### 10. TITLE AND RISK OF LOSS

Risk of loss in transit shall be borne entirely by Buyer at all times after the products are delivered to the carrier for shipment. However, title to the products and right to stop delivery in transit shall remain with Seller until Seller receives payment in full.

### 11. DELAYS OR DEFAULT IN DELIVERY

Seller shall have no liability to Buyer, and Buyer shall not be entitled to cancel any purchase order, for Seller's delay or default in delivery due to strikes, secondary boycotts, riots,



wars, accidents, fires, floods, explosions, vandalism, government embargoes, priorities or regulations, shortages of labor, fuel, materials, supplies, power or transportation facilities, or other similar or dissimilar causes beyond Seller's reasonable control. Under no circumstances shall Seller have any liability for penalties or consequential damages of any kind resulting in whole or in part from Seller's delay in delivering, or failure to deliver, any products ordered by Buyer.

#### **12. CHANGES TO ORDERS IN PROCESS**

There shall be a charge for any and all changes in specification after an order is in process, based on the status of the order at the time the change is made. The additional charge shall be a minimum of \$50 net per item when engineering has not been started or is not required and a minimum of \$100 net per item when re-engineering is required. The additional charge shall be in addition to any change in the price of the product resulting from the change in specification. The order "Issue Date" will be moved forward to the date of the change and shipment will be rescheduled in accordance with the then current lead times. Buyer shall pay escalation charges based on the new "Issue Date" and scheduled shipping date as defined in paragraph B.

#### **13. CANCELLATION**

After Seller accepts Buyer's purchase order by faxing Seller's written acknowledgment, Buyer's cancellation of any order or portion thereof may be accomplished only upon (i) Seller's receipt of written cancellation notice at Seller's plant (cancellation notice by telephone will be deemed only as authorization for Seller temporarily to suspend performance on Buyer's order pending written confirmation of cancellation) and ii) Buyer's payment of the following cancellation charges:

Notwithstanding anything to the contrary contained herein, the minimum cancellation charges for products shall be 50% per line item or 50% per complete order.

With respect to all costs and expenses described above, Seller shall provide such substantiating documentation as Buyer may reasonably request, and Seller's computations, thus documented, and shall be conclusive and binding between the parties. With respect to all canceled products, materials and supplies described above, Seller shall, upon payment of the applicable cancellation charges, make such disposition as Buyer may specify in writing within 30 calendar days after Seller notifies Buyer of the applicable cancellation charges. Buyer's failure to so specify within said 30-day period shall constitute Buyer's authorization for Seller to make such disposition as Seller chooses with no further obligation to Buyer.

#### **14. PATENT INFRINGEMENT**

With respect to all products manufactured to Buyer's design, Buyer shall indemnify and hold Seller harmless from and against any and all loss, cost, expense, claims, demands, suits and judgments resulting from actual or alleged patent infringements. With respect to all other products sold by Seller, Seller shall defend any suit or proceeding brought against Buyer on a claim that such a product, or any part thereof when employed in the manner intended by Seller, infringes any U.S. patent, provided that Seller is notified promptly in writing and given all necessary information, assistance and authority to defend same. Seller shall pay all damages and costs awarded against Buyer as a result thereof. If the court finds such an infringement, and the use

of any product, in the manner intended by Seller is enjoined, Seller shall at its sole expense, at Buyer's option (a) procure for Buyer the right to continue using said product, (b) replace said product with a non-infringing product, (c) modify said product so that it becomes non-infringing or (d) remove said product and refund its purchase price and transportation and installation costs. Seller shall have no further liability for actual or alleged patent infringement except as provided herein.

#### **15. PRODUCT WARRANTY AND DISCLAIMER**

Seller warrants to Buyer, subject to the limitations, conditions and disclaimers stated herein, that all new products manufactured by Seller shall be free from defect in material and workmanship and shall deliver their rated output as indicated on the nameplates for a period of one (1) year from the date of shipment to the Buyer. Buyer must notify Seller in writing of defect or failure to deliver rated output within the applicable warranty period and give Seller the opportunity to determine that the defect or failure exists. Buyer shall, at Buyer's expense, make each allegedly defective product available for Seller's inspection at Buyer's place of business or, at Seller's option, return each such product to Sellers plant or service center as designated by Seller, freight both ways to be paid by Buyer. No products shall be returned to Seller's plant or service center except in accordance with Seller's prior written instructions. Determination of any defect is made at Seller's sole discretion and Seller's decision is final. To remedy any defect, the Seller may at its option, repair, rebuild or replace the defective component or complete product, using new or re-manufactured components or complete product. In any case the repaired, rebuilt or replaced product shall be warranted hereunder for the then non-expired portion of the original warranty period. Seller's sole obligation to Buyer, and Buyer's sole remedy against Seller, for any breach of this warranty shall be Seller's obligation to repair or replace the product as provided herein or, at Seller's option, to repay, upon return of the defective product, the price paid for such product by Buyer.

Any tampering, misuse, mis-application, and/or improper installation of the product by Buyer or Buyer's representatives may void warranty. Additionally, any service/repair work performed by any personnel not pre-authorized by Seller to perform the service/repair work will void warranty. Products sold by Seller, but not manufactured by Seller, shall be warranted as to defects in material and workmanship consistent with the warranty policy of the original manufacturer of the products. In no event shall Seller have any liability for incidental or consequential damages of any kind resulting from a breach of this warranty. THIS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY FOR MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

#### **16. RETURNS**

No products shall be returned to Seller, whether for inspection, repair, replacement or any other reason, without prior written consent from Seller's plant, sales office or representative

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