RANDOLPH AUSTIN COMPANY

www.RandolphAustin.com

Operations Manual

Pump Series: **500**

Model #500-362, 500-352, & 500-332

- 500 Pump Head
- Variflow Peristaltic Pump
- ¼ Hp, 130 VDC, Parallel shaft geared motors
- Reversible, 4-20 mA input, Local / Remote

Randolph Austin Company
2119 FM 1626
Manchaca, Texas 78652
(512) 282-1590

Table of Contents

Randolph Austin Company

Peristaltic Pumps

WHY CHOOSE A PERISTALTIC PUMP?

Peristaltic pumps work by using a flexible tubing inside a raceway, which is alternately compressed by a set of rotating rollers. This flexing action insulates the materials being transferred from the moving parts of the pump. The advantages are important when transferring sterile solutions, abrasives, inks or any other fluid, which would ordinarily contaminate or destroy the internal components of a pump. Because of the action of the Randolph pump, it is an excellent choice for shear sensitive fluids and applications where fluid metering is necessary.

PERFORMANCE PARAMETERS

Several factors such as viscosity, pressure, speed, pump configuration, and tubing selection, influence the flow rate of a Randolph pump. These factors must be considered to determine the selection of a pump.

Fluids with increased viscocity will result in reduced flow rates. Careful consideration needs to be made to the distance and height of the pump relative to fluids being pumped, especially if they are viscous. The further the pump is from the source, the greater the flow loss.

The discharge pressure capabilities of the Randolph pump will vary with the type and size of tubing selected as well as the operating conditions of the pump. Excessive discharge pressure may rupture tubing or reduce the effective tubing life.

Tubing selection must consider the fluid compatibility, temperature, and pressure, which the pumping application will see. It is recommended that the tubing be immersed in the fluid to be pumped for a minimum of 24 hours as a method of determining chemical compatibly. However, there is no guarantee that tubing which passes a "soak" test will perform in the same manner inside the pump. The soak test, while providing valuable information, does not replicate the dynamic situation inside the pump.

WHY YOU SHOULD CHOOSE A RANDOLPH PERISTALTIC PUMP

Randolph pumps are manufactured to exacting tolerances with high quality materials. The rugged construction of the Randolph pump makes it an ideal choice for applications where trouble free performance is necessary.

With over forty years' experience, in peristaltic pumps, Randolph Austin Company has a proven track record of value and service to our customers.

STANDARD CONSTRUCTION

Randolph pumpheads are available in a variety of material constructions. Models 250, 500, 610, and 750 are machined from aluminum housings and use stainless steel internal components for corrosion and wear resistance. The model 880 pump is machined from an aluminum casting, and uses plated steel components for its impeller plate and shaft.

STAINLESS STEEL MODELS

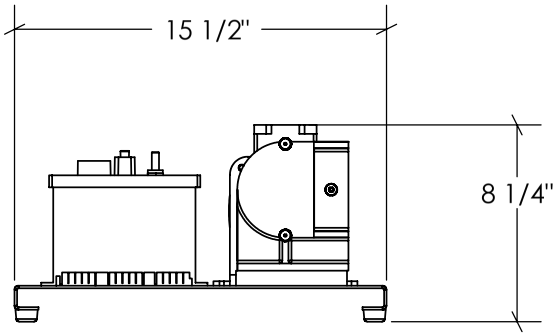
Randolph Austin Company offers the 615 and 755 model pumps in a 316 stainless steel housing. This material is well suited for washdown applications. Model 615 and 755 pumps have the same performance characteristics as the standard model 610 and 750 pumps respectively.

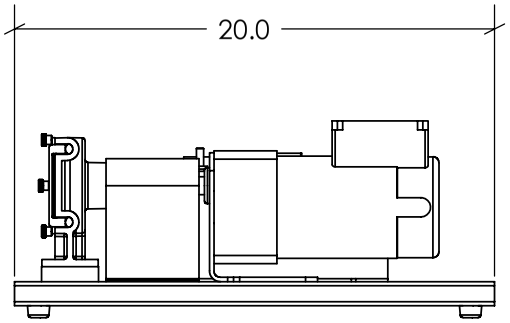
PLASTIC PUMP HEADS.

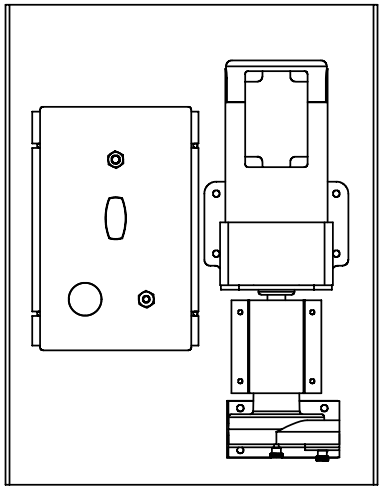
The 300 and 400 series pumps housings are made from polycarbonate. These pumps offer the O.E.M. cost effective, quality units to incorporate into their design. The 300 series pump is designed to mount directly of motor and can be configured in a variety of forms. The 400 series pump is a panel mount pump with a standard three-impeller roller yoke and hinged side cover. The 400 series is the newest pump in the Randolph Austin catalog.

Post Office Box 988 - 2119 F.M. 1626 - Manchaca, TX 78652
Fax (512) 280-0678 - Tel (512) 282-1590 - (800) 531-5263

ZONE	REV.	REVISIONS DESCRIPTION	DATE	APPROVED







Pump Model #	Motor	Speed Range
500-332	03-0014, 130 VDC	3 – 125 rpm
500-352	03-0015, 130 VDC	6 – 250 rpm
500-362	03-0016, 130 VDC	12 – 500 rpm

NEXT ASSY	USED ON
APPLICATION	

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/64
ANGULAR: MACH ± 1
TWO PLACE DECIMAL ± .01
THREE PLACE DECIMAL ± .005

MATERIAL --

FINISH --

DO NOT SCALE DRAWING

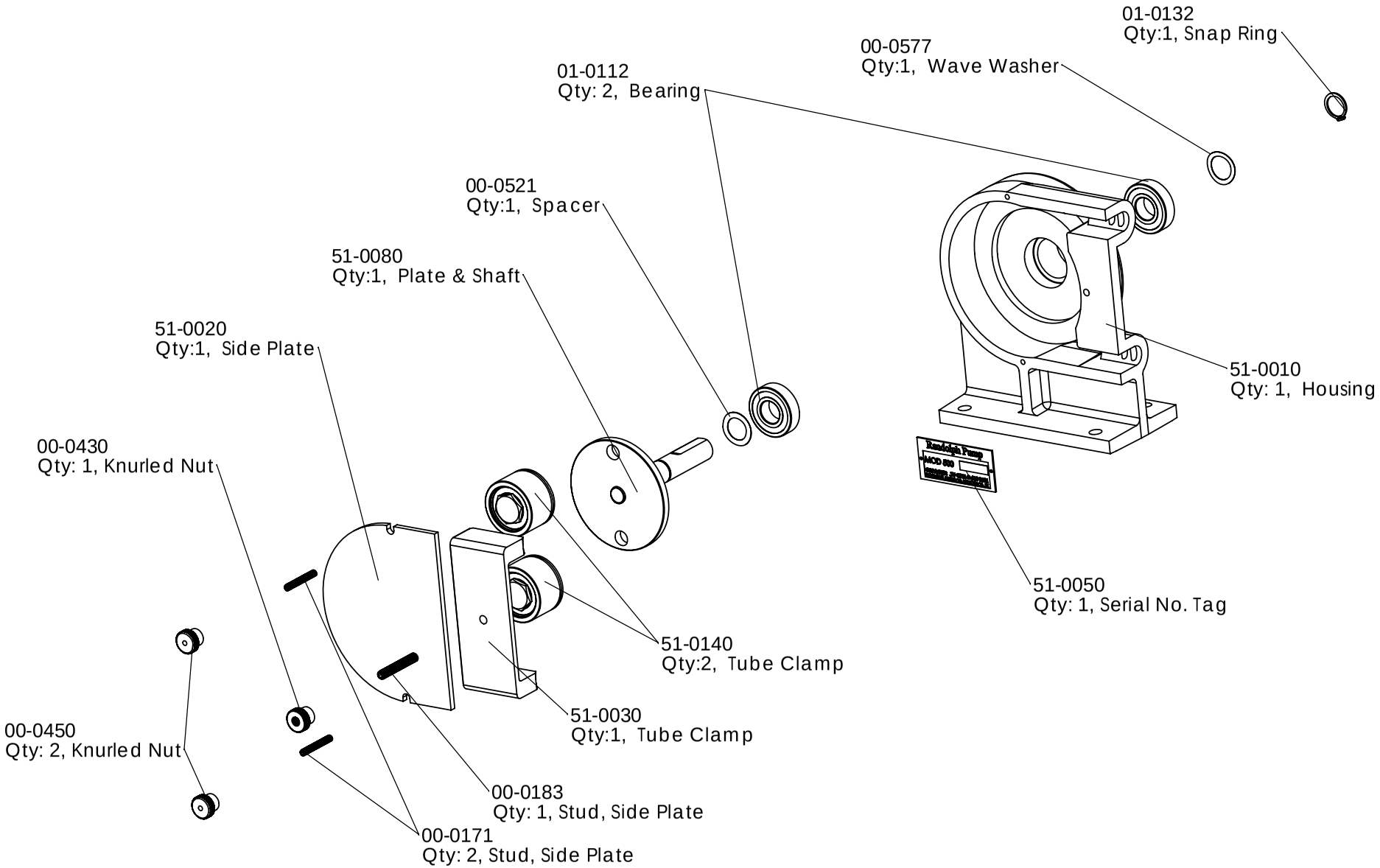
	NAME	DATE
DRAWN		
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

Randolph Austin Co

500 Variflow - General Layout

SIZE	DWG. NO.	REV.
A	500-36X	
SCALE:1:1	WEIGHT:	SHEET 1 OF 1



NEXT ASSY	USED ON
APPLICATION	

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/64
ANGULAR: MACH ± 1°
TWO PLACE DECIMAL ± .010
THREE PLACE DECIMAL ± .005

MATERIAL --

FINISH --

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN		
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

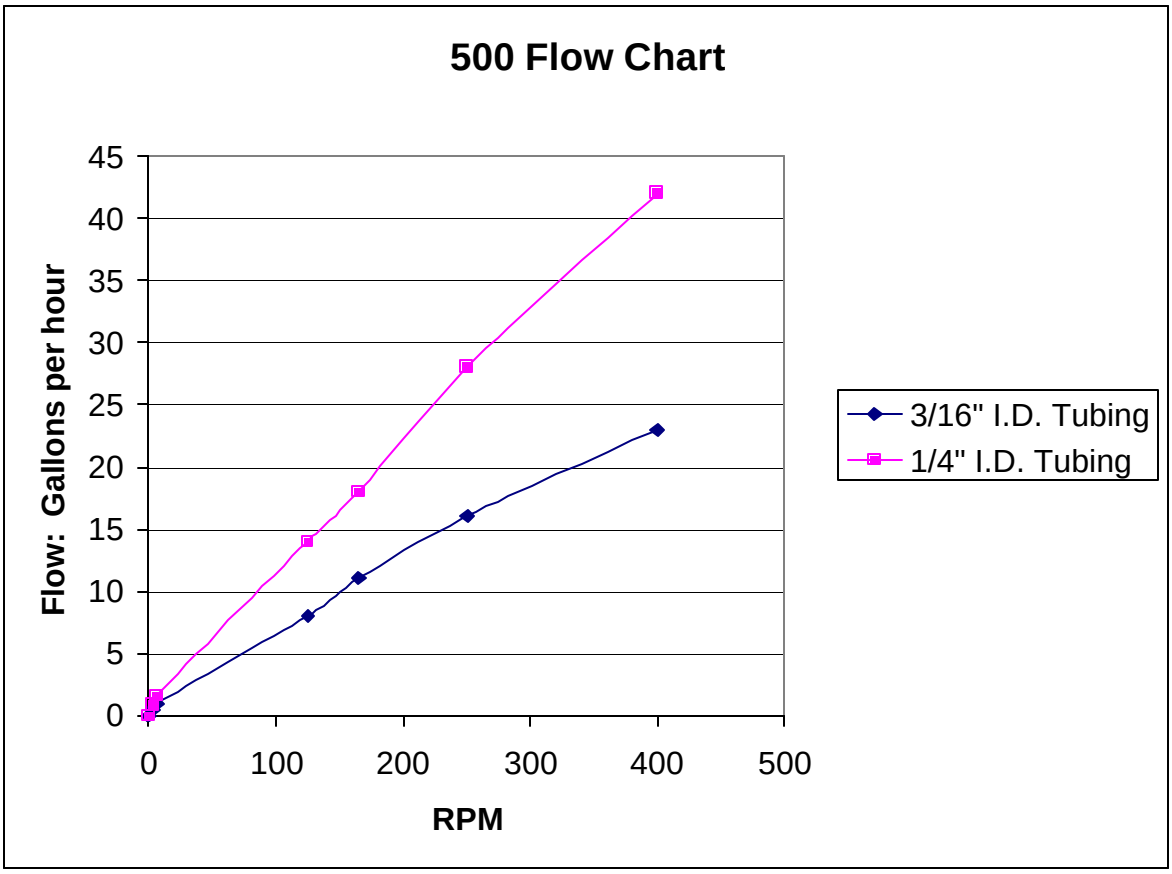
Randolph Austin Company

Model 500-PHO
Xp - View
Revised Pump Housing - 2008

SIZE	DWG. NO	REV.
A	500-PHO-XP (rev)	

SCALE:1:5 | WEIGHT: | SHEET 1 OF 1

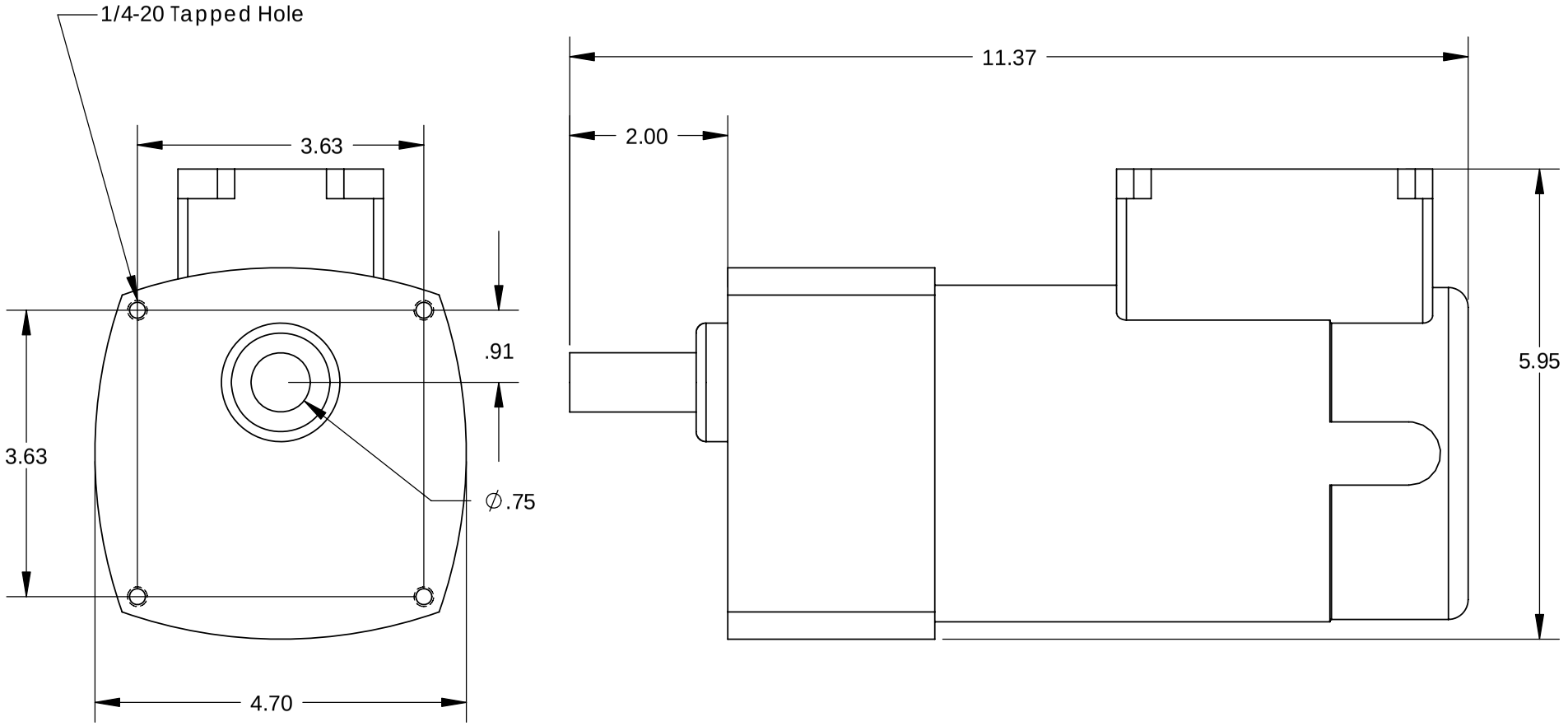
500 Series Pumps – Flow Curve



Flow curve established with water and a minimum lifting distance. Flow will be affected by fluid viscocity and lift distance.

Overall Dimensions for Geared DC motors

		REVISIONS		
ZONE	REV.	DESCRIPTION	DATE	APPROVED



Motor #	Description
03-0011	130 VDC, 1/4 hp, 1.8 A, 1-42 rpm
03-0012	130 VDC, 1/4 hp, 1.8 A, 2-83 rpm
03-0013	130 VDC, 1/4 hp, 1.8 A, 4-165 rpm
03-0015	130 VDC, 1/4 hp, 1.8 A, 6-250 rpm
03-0016	130 VDC, 1/4 hp, 1.8 A, 12-500 rpm

NEXT ASSY	USED ON
APPLICATION	

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/64
ANGULAR: MACH ± 1
TWO PLACE DECIMAL ± .01
THREE PLACE DECIMAL ± .005

MATERIAL --

FINISH --

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN		
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

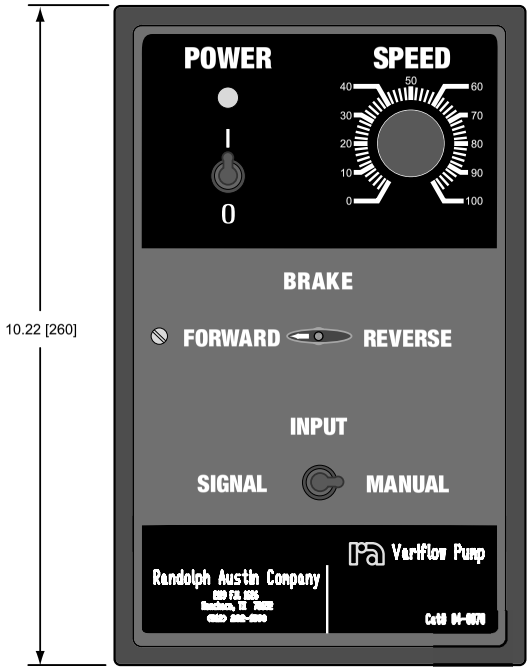
COMMENTS:

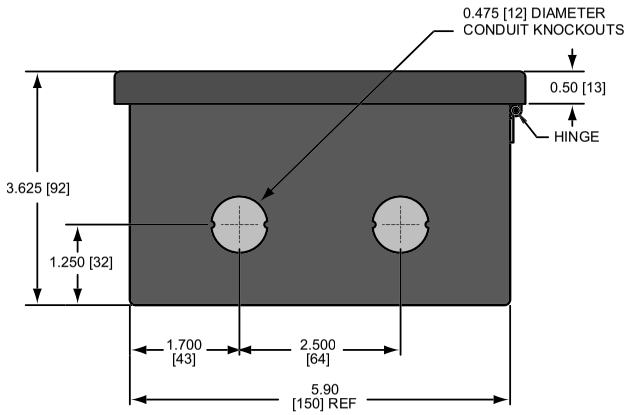
Randolph Austin Co

DC VARIABLE SPEED MOTOR
PM, 130 VDC, Parallel Shaft

SIZE	DWG. NO.	REV.
A	03-001X	
SCALE:1:4	WEIGHT:	SHEET 1 OF 1

Randolph Austin Company **PN483** Pulse-Width Modulated, Adjustable Speed Drive for DC Brush Motors





ALL DIMENSIONS IN INCHES [MILLIMETERS]

Randolph Austin Company
2119 F. M. 1626, Manchaca, Texas 78652; Phone: (512) 282-1590

Document Number 250-0350, Revision 0; Printed in the U.S.A. – June 2002

MOUNTING

The PN483 case has 0.475 inch (12 mm) conduit holes at the bottom of the case. The units may be vertically wall mounted or horizontally bench mounted using the four 0.19 inch (5 mm) slotted holes on the attached heatsink.

1. Install the mounting screws.
2. For access to the terminal strip, turn the slotted screw on the front cover counterclockwise until it is free from the case. The right side of the cover is hinged to the case. Pull the slotted screw to open the case.
3. Carefully remove the conduit knockouts by tapping them into the case and twisting them off with pliers.
4. Install the conduit hardware through the 0.88 inch (22 mm) knockout holes. Connect external wiring to the terminal block (TB501).
5. Grasp the slotted screw and tilt the front cover back into place. Avoid pinching any wires between the front cover and the case.
6. Turn the slotted screw clockwise until tight to secure the front cover.
7. Set the POWER switch to the OFF position before applying the AC line voltage.

MOTOR CONNECTIONS

The PN483 supplies motor voltage from A1 and A2 terminals. It is assumed that when A1 is positive with respect to A2, the motor will rotate clockwise (CW) while looking at the output shaft protruding from the front of the motor. If this is opposite of the desired rotation, reverse the wiring of A1 and A2.

POWER INPUT CONNECTIONS

Connect the AC line power leads to TB501 terminals L1 and L2 as shown in the wiring diagram.

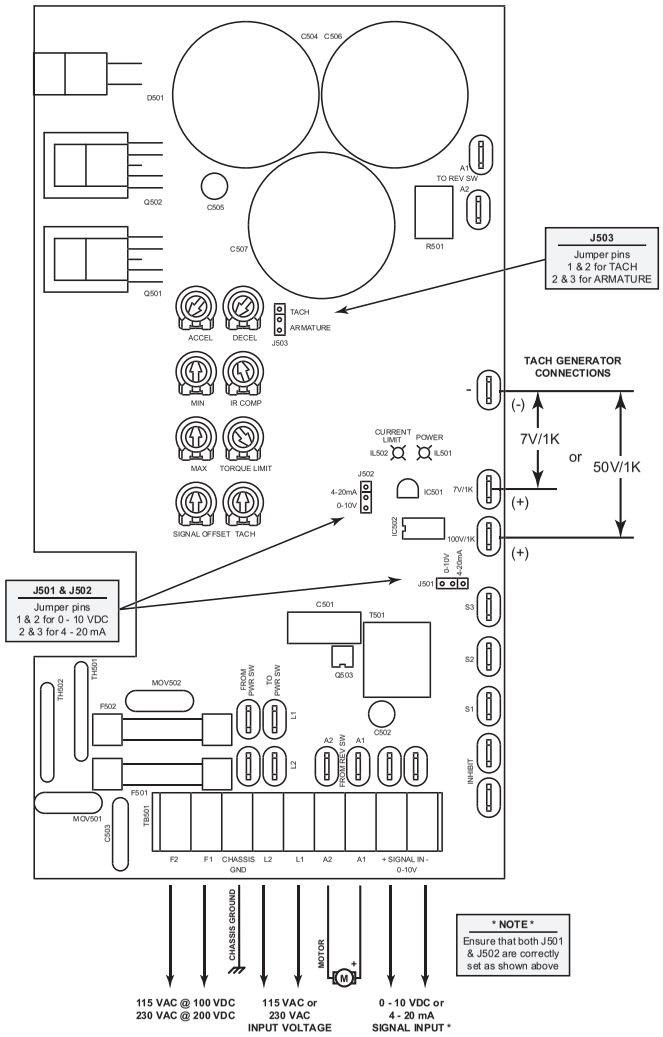
VOLTAGE or CURRENT FOLLOWER

The PN483 can be configured to follow a grounded (non-isolated) voltage or current signal. To configure the drive to follow a voltage or current signal, connect the signal leads to the + Signal In and - Signal In terminals on TB501. Jumper pins 1 & 2 for on J501 & J502 for 0 - 10 VDC signal input. Jumper pins 2 & 3 on J501 & J502 for 4 - 20 mA.

TACH GENERATOR (TACH)

Calibrate the TACH setting only when a tachogenerator is used. The TACH setting, like the IR COMP setting determines the degree to which motor speed is held constant. To calibrate the TACH trimpot:

1. Connect the tachogenerator to the 7V/1K or 50V/1K and (-) terminals. The polarity is positive (+) to 7V/1K or 50V/1K terminal and negative (-) to the (-) terminal.
2. Set the bottom jumpers on J503 for armature feedback.
3. Set the speed adjust potentiometer to full CW. Measure the armature voltage across A1 and A2 using a voltmeter.



4. Set the speed adjust potentiometer to 0 (zero speed).
5. Set the top jumpers on J503 for tachogenerator feedback.
6. Set the IR COMP trimpot to approximately 11 o'clock.
7. Set the TACH trimpot to full CW.
8. Set the speed adjust potentiometer to full CW.
9. Adjust the TACH trimpot until the armature voltage is the same value as the voltage measured in step 3.

Check that the tachogenerator is properly calibrated. The motor should run at the same speed when J503 is set to either armatuer or tachogenerator feedback.

Summary – Physical Properties of Randolph Austin Extruded Tubing

Physical Tubing Properties – Cilran ™

Specific Gravity	0.90
Tensile Strength(psi)	928
Ultimate Elongation (%)	374
Hardness(Shore 'A' Scale +/- 2)	55
Normal Working Temperature (F)	(-40° to 190°)
Tensile set @ 100%	11.9%
100% Modulus (psi)	20
Compression set(%)	103
Tear Strength(lbs per inch)	386

Cilran ™ is made from a thermoplastic elastomer which possesses exceptional chemical resistance to acids and bases. Cilran ™ has low gas permeability, good flex fatigue resistance and meets USP Class VI specifications. Ideal for use in many laboratory applications, it may be used in place of silicone for some applications. Cilran ™ is translucent white in color and available in lengths up to 500 feet.

Physical Tubing Properties – Prothane II ™

Specific Gravity	1.18
Tensile Strength(psi)	2434
Ultimate Elongation (%)	870
Hardness(Shore 'A' Scale +/- 2)	68 A
Normal Working Temperature (F)	
Tensile set @ 100%	7.2%
100% Modulus (psi)	380
Compression set(%)	19
Tear Strength(lbs per inch)	274
Color	Aqua-Blue

PROTHANE II ™ is a transparent, aqua blue, polyester polyurethane tubing that exhibits excellent abrasion resistance, has good low temperature properties and is resistant to ozone and oxidation. PROTHANE II ™ exhibits an excellent resilience to continuous flexing and impacting experienced in peristaltic pumps. Along with these exceptional features PROTHANE II ™exhibits good hydrolic stability, good oil and fuel resistance and high tensile and tear strength. PROTHANEII ™ is resistant to diesel fuel, kerosene, motor oil, mild solvents, aromatic hydrocarbons, gasoline, and concentrated acid and alkaline solutions. The tubing should be tested with the chosen fluid in all cases

Summary – Physical Properties of Randolph Austin Extruded Tubing

Physical Tubing Properties – ED-Plex ™

Specific Gravity	0.98
Tensile Strength(psi)	928
Ultimate Elongation (%)	374
Hardness(Shore 'A' Scale +/- 2)	65
Normal Working Temperature (F)	(-40° to 190°)
Tensile set @ 100%	11.9%
100% Modulus (psi)	386
Compression set(%)	20
Tear Strength(lbs per inch)	103

E-D Plex ™ is a multi-purpose tubing that is ideally suited for applications which range from transferring paint, ink, acids and bases. Some oil and hydrocarbons will work with E-D Plex ™, but should be tested before use. Combining the environmental resistance of EPDM with the chemical resistance of chloropreme, E-D Plex ™ possesses similar elastomeric performance found in more expensive vulcanized rubber, while still maintaining high flex fatigue resistance.. E-D Plex ™ has been proven very successful in peristaltic pump applications where continuous flexing is required.

Physical Tubing Properties – Vytex ™

Specific Gravity	1.18
Tensile Strength(psi)	1936
Ultimate Elongation (%)	465
Hardness(Shore 'A' Scale +/- 2)	60
Normal Working Temperature (F)	(-34° to 165°)
Tensile set @ 100%	97%
100% Modulus (psi)	484
Compression set(%)	N/A
Tear Strength PPI	115

Vytex ™ is a clear flexible polyvinyl tubing ideal for general purpose usage in applications with dilute aqueous solutions (both acids and alkali's) and for food and beverage usage. Strong acid solutions may be used with Vytex ™ for short intervals, but should be flushed with water after use. The smooth surface allows for easy flushing and cleanup for food and beverage applications. Vytex ™ is a durable, high flex tubing with a Shore "A" durometer of 60 allowing a long life expectancy for continuous flexing where peristaltic pumps are used. Available in lengths up to 500 feet.

Summary – Physical Properties of Randolph Austin Extruded Tubing

Physcial Properties – Povinal ™

Specific Gravity	1.01
Tensile Strength(psi)	928
Ultimate Elongation (%)	374
Hardness(Shore 'A' Scale +/- 2)	65
Normal Working Temperature (F)	(15° to 125°)
Tensile set @ 100%	11.9%
100% Modulus (psi)	386
Compression set(%)	20
Tear Strength(lbs per inch)	103

Povinal ™ is a polyvinyl alcohol based tubing which is excellent for use in applications with aliphatic, aromatic and chlorinated hydrocarbon solvents. Povinal ™ has good flex fatigue resistance and is suitable for many industrial applications. It may be used as a substitute for fluroelastomer polymers in some applications. Not recommended for use with water or solutions containing concentrations of water. Available in lengths up to 500 feet. Pump tubing is teal in color. Transfer tubing is amber.

HOW TUBING IS INSERTED IN THE PUMP

1. Turn power off. Open the cover plate and tube clamp. Remove existing tubing by manually turning rollers while gently tugging on the tubing.
2. Clean any debris from pump race way and tube clamp with a clean rag or paper towel. A light detergent spray can be used as well. Avoid the use of solvents such as acetone as they will have an adverse effect on the paint.
3. Thread tubing back into pump. Start at the top of the pump and manually move the rollers so that they start occluding the tubing. Care should be taken to avoid pinching fingers with rollers. Align the tubing so that is in the center of the raceway.
4. Add lubricant. Close pump cover. Tighten tubing clamp to ensure the tubing is not fed through the pump.

Pump Series	**Tubing Size**
250	.062” (1/16”) ID X .187” (3/16”) OD
250	.125” (1/8”) ID X .250” (1/4”) OD
300	.250” (1/4”) ID X .437” (7/16”) OD
400	.250” (1/4”) ID X .437” (7/16”) OD
500	.187” (3/16”) ID X .375” (3/8”) OD
500	.250” (1/4”) ID X .437” (7/16”) OD
610,615,620, & 630	.375” (3/8”) ID X .625” (5/8”) OD
610,615,620, & 630	.500” (1/2”) ID x .750” (3/4”) OD
750	.625” (5/8”) ID X .937” (15/16”) OD
750	.750” (3/4”) ID X 1.062” (1 1/16”) OD
780	.750” (3/4”) ID X 1.062” (1 1/16”) OD
880	.750” (3/4”) ID X 1.25” (1 1/4”) OD
880	1.00” (1.00”) X 1.50” (1 ½”) OD

MATERIAL SAFETY DATA SHEET

Randolph Austin Company - 2119 F.M. 1626 – Manchaca, TX 78652

PRODUCT NAME: Tube Lube **Date: Nov-02-2001**
PRODUCT CODE: N/A

SECTION I

HAZARDOUS INGREDIENTS

Ingredient	Percent	TLV
None (at this time)		

SECTION II

HEALTH HAZARDS

Threshold Limit Value: N/E
Effect of Overexposure

Eyes: Prolonged exposure may cause eye irritation.
Skin: Prolonged exposure may cause skin irritation
Inhalation: UNK
Ingestion: Harmful if swallowed in sufficient quantities.

First Aid

Eyes: Flush with plenty of water for 15 minutes while lifting eyelids to insure entire eye surface is washed.
Skin: Wash with soap and water
Inhalation: UNK
Ingestion: Consult physician.
Other Information: None

SECTION III

SPECIAL PROTECTION INFORMATION

Respiratory Protection: No special respiratory protection is required under normal situations. During the generation of large quantities of oil mist, use a MSHA/NIOSH approved respirator.
Ventilation Requirement: No special ventilation is required
Protective Clothing:

Eyes: Normal Protection against foreign substances – safety goggles.
Skin: Chemical resistant gloves should be used
Additional Protective Measures: Eye Wash Station and safety shower should be provided

SECTION IV

FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method): 540 ° F (c.c.)
Flammable Limits (% Volume in Air): N/A
Upper: N/A **Lower:** N/A

Extinguishing Media: Water – Fog, Foam, Carbon Dioxide and Dry Chemical
Special Fire Fighting Procedures: Standard fireman's body protection. Self-contained breathing apparatus must be used to protect from products of combustion.
Unusual Fire and Explosion Hazards: Keep away from heat, sparks and open flame

MATERIAL SAFETY DATA SHEET

Randolph Austin Company - 2119 F.M. 1626 – Manchaca, TX 78652

SECTION V

PHYSICAL DATA

Boiling Point: N/A
Specific Gravity (Water =1): 0.959
Vapor Pressure (MM HG): UNK
Evaporation Rate: N/A
Solubility in Water: UNK
Vapor Density (Air =1): N/A
pH: UNK
Weight per Gallon: 7.95 lbs
Percent Volatile by Volume: N/A

Appearance and Odor: Light Yellow, Oily, No Apparent Odor

SECTION VI

REACTIVITY DATA

Stability: Stable
Incompatibility: N/A
Conditions to Avoid: Keep from contact with oxidizing materials.
Hazardous Decomposition Products: Product of incomplete combustion can include CO, CO_2 and dense smoke.
Hazardous Polymerization: Will not occur.

SECTION VII

SPILL AND LEAK PROCEDURES

Steps to be taken if material is released or spilled: Soak up spill with sand, earth or sawdust. Flush with detergent and water.
Waste Disposal Method: Dispose of in accordance with Federal, State and local regulations

SECTION VIII

D.O.T. SHIPPING INFORMATION

Proper Shipping Name: None
Hazard Class: None
ID Number: None
Label Requirements: None
Other Information: None

SECTION IX

ADDITIONAL INFORMATION

This information may be of importance to you:
Precautions to be taken in handling and storing: Store in closed containers, protect from moisture and foreign matter. Keep away from heat and excessively warm areas.
Other precautions: Do not transfer to unmarked containers.
Conditions to Avoid: Keep from contact with oxidizing materials

N/A = Not Applicable N/D = Not Determined N/E= Not Established UNK = Unknown

Date Issued: 03/07/1986 Date revised: 11/01/2001