COYOTE ELECTRONICS, INC.

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Fort Worth, Texas 76117
817.485.3336
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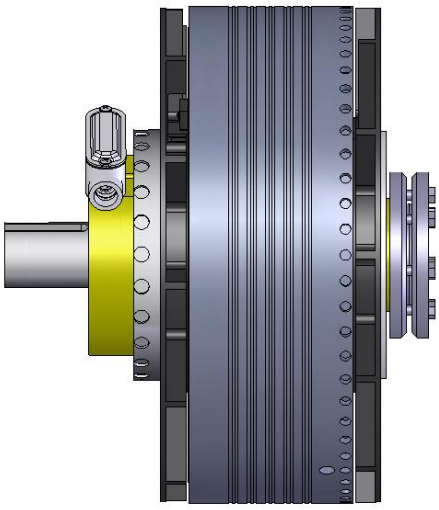
**V1.1d**

# Pro-PAYBACK®

# Magnetic-Coupled Variable Speed Direct Drive

*"The preferred choice in direct-coupled drive technology."*



## Installation, Operation & Maintenance Instructions

## TABLE OF CONTENTS

# IMPORTANT

## *ONLY QUALIFIED PERSONNEL SHOULD PERFORM INSTALLATION AND SERVICE OF THIS PRODUCT.*

This PAYBACK® variable speed drive has been certified by Coyote Electronics, Inc. to be constructed with the highest quality components, has been operated under load, and has passed Q.C. and in-house testing. Observe all applicable national and local electrical codes and safety precautions for rotating equipment, including those stated below.

- **READ ALL INSTALLATION INSTRUCTIONS THOROUGHLY BEFORE BEGINNING INSTALLATION OF THE DRIVE.**
- **OBSERVE ALL SAFETY PRECAUTIONS FOR THIS VARIABLE SPEED DRIVE AS YOU WOULD FOR ALL MOTORS AND OTHER ROTATING EQUIPMENT.**
- **CAUTION! WHEN INSTALLING OR REMOVING THE PAYBACK DRIVE, BE AWARE OF THE DRIVE'S WEIGHT (REFER TO THE SECTION TITLED "TECHNICAL DATA – PRO PAYBACK® DIRECT COUPLED DRIVES" IN THIS MANUAL TO DETERMINE THE WEIGHT OF THE SPECIFIC DRIVE MODEL). USE PROPER LIFTING EQUIPMENT AND PROCEDURES TO AVOID INJURY.**
- **IF THIS UNIT IS TO BE USED OUTDOORS, THE PROTECTIVE COVER SHOULD ALSO BE RAIN PROOF. THE COVER SHOULD BE CONSTRUCTED TO PROTECT BOTH THE DRIVE *AND* MOTOR.**
- **IF YOU HAVE ANY QUESTIONS CONCERNING THE INSTALLATION, OPERATION OR SAFETY PRECAUTIONS CONCERNING THIS PRODUCT, CALL THE FACTORY BEFORE USING THE PRODUCT.**

**817.485.3336 or Toll Free: 888.557.7873**

**DRIVE SIZES IN THIS MANUAL ARE GENERALLY APPLICABLE FOR VARIABLE TORQUE LOADS.**

**FOR SIZING CONSTANT TORQUE LOADS, IT IS STRONGLY ADVISABLE TO CONTACT FACTORY FOR ASSISTANCE TO ENSURE SATISFACTORY OPERATION OF THE DRIVE.**

**TO AID IN PROPER SIZING OF YOUR DRIVE, IT IS RECOMMENDED THAT YOU COMPLETE AND FAX THE SITE SURVEY FORM AT THE END OF THIS MANUAL.**

## CAUTION

**TO PREVENT INJURY, ALWAYS BE SURE PROTECTIVE COVER IS INSTALLED BEFORE STARTING MOTOR.**

# FORWARD

This reference manual provides the necessary user information for the referenced product(s) manufactured or distributed by Coyote Electronics, Inc. for the user to install and operate the product properly.



Reference Manual V1.1d – DOC# OM-000-009-00-RD MANUAL, PPB REFERENCE, ENGLISH

## "PRO" PAYBACK® DIRECT-COUPLED DRIVE

**Front view:**

Coyote
"Pro" PAYBACK®
direct-coupled
variable speed drive.

The obvious choice
for all of your
direct coupled,
variable speed
applications
where simplicity,
reliability,
efficiency and
fast payback are of
primary importance.

**Side view:**

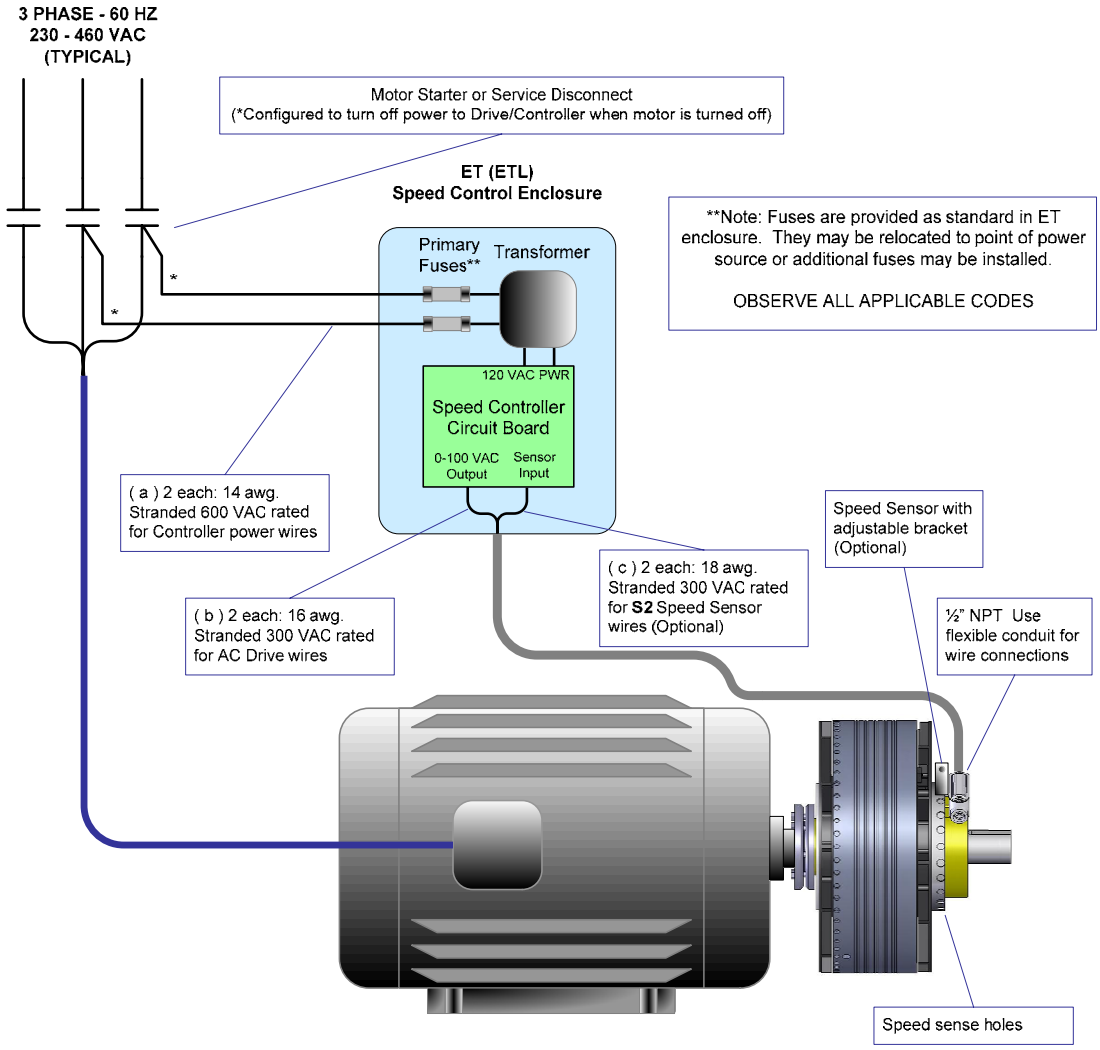
Coyote "Pro" PAYBACK®
direct coupled drive featuring
keyless shrink-disc motor shaft
connection shown on left and
patented Brushless Inductive
Rotary Power Coupling on right.

The internal surface of the drum
is lined with pure copper
assuring you of the absolute
maximum efficiency obtainable.

The "Pro" PAYBACK® is
designed for direct coupled
applications only and is not
intended for sheave adaptation.
For standard pulley type
applications requiring v-belts,
see specification data on the
"Easy" PAYBACK® models with
integral v-belt sheaves.

## SYSTEM WIRING LAYOUT – "PRO" PAYBACK® DIRECT COUPLED DRIVE

The drive mounted junction box allows for cable support and a convenient wire termination point for the two ac wire connections from the drive to the controller. It also provides support for the optional **S2** two-wire speed sensor and sensor bracket.




1. Use flexible seal-tite steel conduit for running the wires from the junction box to the speed controller enclosure. Keep all High Voltage Power Wires separate from any Control or Signal wires. Observe all applicable electrical & safety codes, and all local code requirements. For OUTDOOR applications, use the enclosure manufacturers' recommended conduit fittings deemed suitable for such situations.
2. Use UL/CSA Listed stranded wire only! **Recommended wire sizes:**
    a. 14 awg. Stranded @ 600 VAC rating for the two single phase line input power wires to the ET controller control transformer (primary fuses).
    b. 16 awg. Stranded @ 300 VAC rating for the two AC wires from the controller to the drive that will be joined in the drive's junction box.
    c. 18 awg. Stranded @ 300 VAC rating for the two **S2** speed sensor wires, if used.

# INSTALLATION -"PRO" PAYBACK® DIRECT COUPLED DRIVE

## Drive (read "Safety First" section on the next page before working on equipment)

1. **IMPORTANT!** Be sure that the motor shaft conforms to the NEMA standard tolerances. (If the motor shaft is undersized, non-uniform in diameter across the length, or has excessive run-out, this can be problematic to the performance, installation or removal of the drive). **See "Motor Shaft Tolerance Table" in this manual.**
2. Inspect the inside bore of the drive and the motor shaft to be sure they are clean and smooth. Remove any scratches or burrs with sandpaper if necessary so that all surfaces are smooth.
3. Once both surfaces are very clean, spray white lithium grease on both the inside of the drive bore and onto the entire motor shaft. (The objective here is to provide a light film onto the mating surfaces. This will help prevent galling or scratching the motor shaft when positioning the drive on the motor shaft). Carefully wipe off any excess grease on the motor shaft area where the shrink disc will be tightening the drive hub to the motor shaft.
4. Place the shrink-disk on the drive hub with the bolts facing towards the motor. **(NEVER TIGHTEN THE SHRINK-DISC LOCKING BOLTS BEFORE MOUNTING ON THE MOTOR, SINCE THE HUB BORE OF THE DRIVE CAN BE PERMANENTLY CONTRACTED, THUS PREVENTING THE DRIVE FROM FITTING PROPERLY ON THE MOTOR SHAFT).**
5. Lift the drive via the eyebolt and align the Hub Location Mark (Orange Dot) with the center of the motor's shaft keyway slot. Guide the drive onto the motor shaft while keeping the hub mark in alignment with the keyway slot to insure best balance. With the drive properly prepared, the drive should slide onto the shaft smoothly.

   **DO NOT FORCE THE DRIVE ON THE MOTOR SHAFT AND NEVER HAMMER ON THE DRIVE OR ALUMINUM FAN.**
6. If the fit seems tight or if there is difficulty sliding the drive on the motor shaft, repeat steps 2 through 5.
7. Mount the drive all of the way on the motor shaft, as close to the motor face as possible for optimal balance and to minimize overhung load. With the shrink-disc positioned all the way onto the drive hub, tighten the shrink-disc bolts per the following instructions:
   A. Alternately hand-tighten the shrink-disc locking bolts, making sure that the two collars of the shrink-disc are maintained in an even (parallel) position.
   B. Now tighten all of the bolts one after another with an open-end metric wrench in sequence by approximately ½ turns even if at the beginning some of the bolts require very little effort. Use an 8MM wrench for drive frame sizes Pup and Jr, a 10MM wrench for drive frame sizes 1, 2, 3 & 4, a 13MM for drive frame sizes 5, 6 & 7, and a 17MM wrench for drive frame sizes 8 & 9.
   C. Continue tightening until all of the bolts on the shrink-disc are tight. Since in this application, use of a torque wrench is not practical, Coyote recommends that all shrink-disc bolts be tightened very thoroughly before starting the motor. This is always required to prevent any possibility of slippage between the motor shaft and the drive hub, which could cause galling of the shaft or hub, making removal of the drive from the motor shaft difficult.
8. Precisely align the installed drive and motor with the driven equipment's shaft or coupling.
9. Measure and cut the flex-conduit so that it can be properly attached to the electrical junction box of the drive. The flexible conduit may be routed and secured to the drive junction box from any direction as long as it does not interfere or come in contact with any of the drive system's rotating parts.
10. Remove the drive junction box cover. Connect the flex conduit to the drive junction box. Be sure the flex-conduit is secure, to prevent any rotation of the drive junction box and at the same time, not causing undue pressure on the rotary power coupling bearing.
11. Pull the two 16 AWG power wires and the shielded 2 conductor cable for the speed sensor (if used), through the flex conduit. Connect the two 16 AWG wires to the rotary power coupling. Connect the speed sensor wires. Refer to the appropriate electrical connection diagram and calibration procedures for your application. Replace the drive junction box cover.
12. Guards should be made to clear the drive by 3 to 4 inches allowing for adequate air flow. Additionally, all guards should be constructed with a solid top to prevent any debris or foreign objects from falling onto the drive, which could cause accidental lockup of, or damage to the drive.

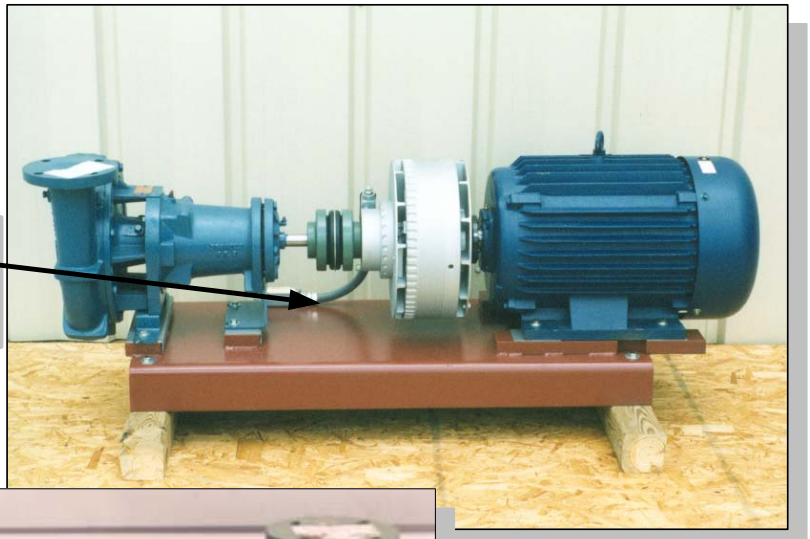
## SAFETY FIRST

**WHEN SERVICING, INSTALLING, OR REMOVING THE DRIVE:**

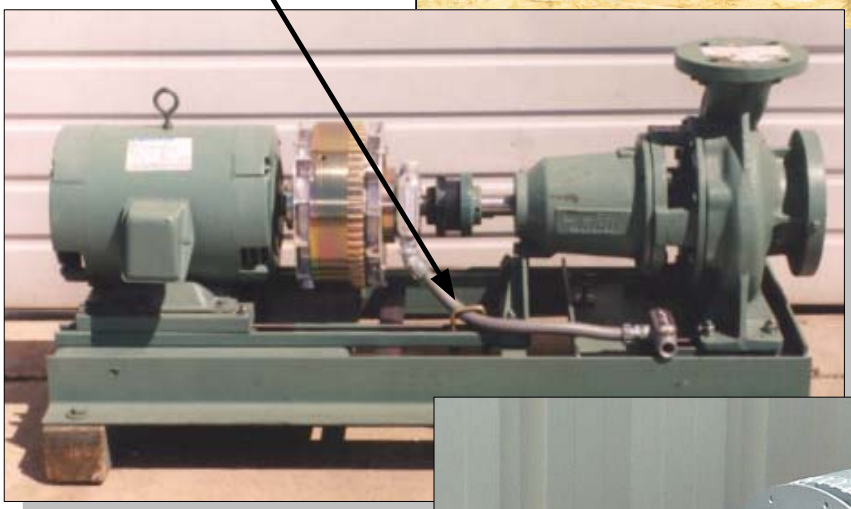
- **ALL SERVICE SHOULD BE PERFORMED BY QUALIFIED PERSONNEL.**
- **ALWAYS TURN OFF (LOCKOUT/TAG-OUT) ALL POWER TO THE MOTOR AND CONTROLS.**
- **BE AWARE OF THE DRIVE'S WEIGHT AND USE PROPER LIFTING EQUIPMENT AND PROCEDURES TO AVOID INJURY. (REFER TO THE SECTION TITLED "TECHNICAL DATA – PRO PAYBACK® DIRECT COUPLED DRIVES" IN THIS MANUAL TO DETERMINE THE WEIGHT OF THE SPECIFIC DRIVE MODEL).**
- **OBSERVE ALL SAFETY PRECAUTIONS FOR THIS VARIABLE SPEED DRIVE AS YOU WOULD FOR ALL MOTORS AND OTHER ROTATING EQUIPMENT.**

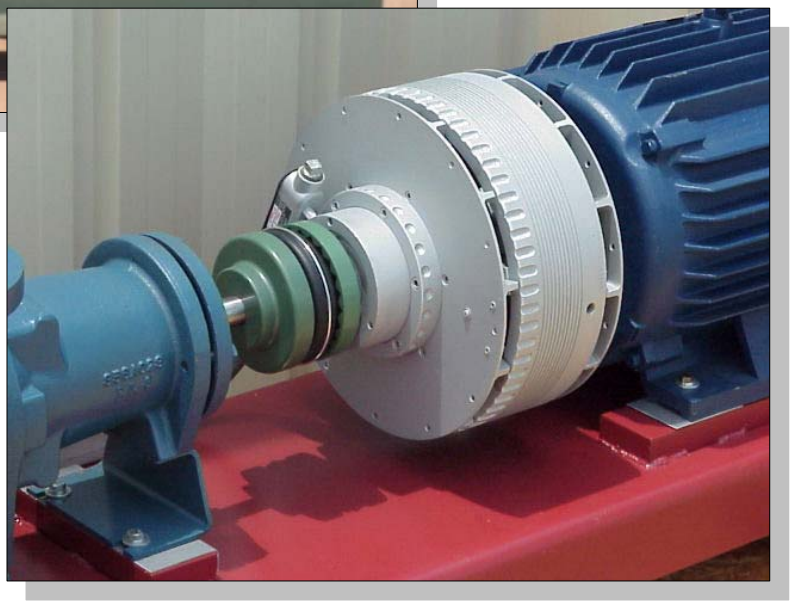
# IMPORTANT

**USE FLEXIBLE CONDUIT FOR ALL CONNECTIONS TO THE DRIVE'S JUNCTION BOX.**



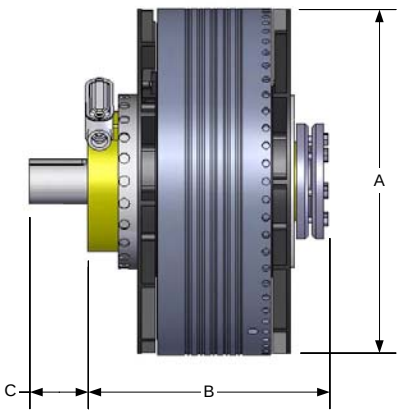
SECURE FLEX-CONDUIT TO PREVENT ROTATION OF THE WIRE JUNCTION BOX





## TECHNICAL DATA – "PRO" PAYBACK® DIRECT COUPLED DRIVES

| AC Motor Data (4 Pole, 60 Hz, 1750 RPM) | | | | Pro-PAYBACK® Direct-Coupled and ***BRUSHLESS*** Shaft-Mounted Variable Speed Drive. ***PAYBACK***® RELIABILITY…"PURE & SIMPLE" ™ | |
|---|---|---|---|---|---|
| **MOTOR HP** | MOTOR FRAME ODP (TEFC) | MOTOR SHAFT DIAMETER | PAYBACK® Drive Model | Output Speed Range (RPM) | Output Shaft Diameter (Standard Sizes) |
| **3** | 182T | 1.125 | PRO-1 | 0-1700 | 1.125 |
| **5** | 184T | | | 0-1600 | |
| **7.5** | 213T | 1.375 | PRO-2 | 0-1700 | 1.375 |
| **10** | 215T | | | 0-1600 | |
| **15** | 254T | 1.625 | PRO-3 | 0-1700 | 1.625 |
| **20** | 256T | | | 0-1600 | |
| **25** | 284T | 1.875 | PRO-4 | 0-1700 | 1.875 |
| **30** | 286T | | | 0-1650 | |
| **40** | 324T | 2.125 | PRO-5 | 0-1700 | 2.125 |
| **50** | 326T | | | 0-1650 | |
| **60** | 364T | 2.375 | PRO-6 | 0-1700 | 2.375 |
| **75** | 365T | | | 0-1650 | |
| **100** | 404T (405T) | 2.875 (**3.375) | PRO-7 | 0-1700 | 2.875 (**3.375) |
| **125** | 405T (444T**) | | | 0-1650 | |
| **150** | 444T | 3.375 | PRO-8 | 0-1650 | 3.375 |
| | (445T) | | | | |
| **200** | 445T | 3.375 | PRO-9 | 0-1650 | 3.375 |
| | (447T) | | | | |



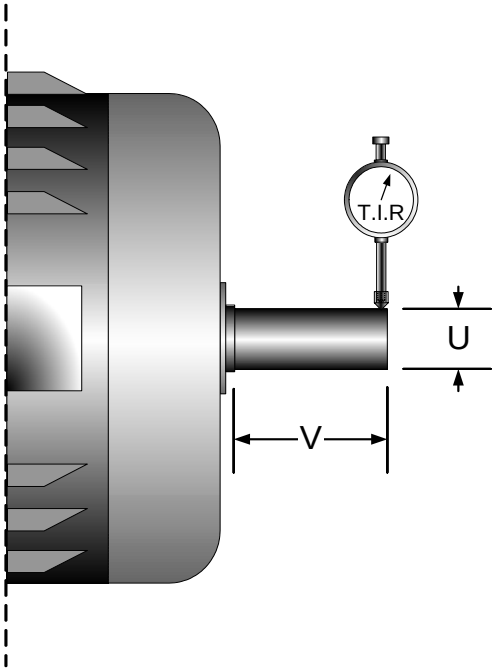

| DATA SUBJECT TO CHANGE WITHOUT NOTICE. | | | | |
|---|---|---|---|---|
| **Model Size** | **A** | **B** | **C** (Standard)** | **Weight (lbs.)** |
| Pro-1 | 9.00 | 7.50 | 1.75 | 52 |
| Pro-2 | 10.50 | 8.00 | 2.00 | 74 |
| Pro-3 | 12.30 | 9.00 | 2.25 | 118 |
| Pro-4 | 14.00 | 10.00 | 2.50 | 181 |
| Pro-5 | 16.30 | 11.00 | 2.75 | 299 |
| Pro-6 | 17.30 | 12.00 | 3.00 | 360 |
| Pro-7 | 21.00 | 13.00 | 3.00 | 589 |
| Pro-8 | 24.00 | 14.00 | 3.50 | 750 |
| Pro-9 | 26.00 | 15.00 | 3.50 | 989 |

*** For non-standard shaft lengths, consult factory.*

## MOTOR SHAFT TOLERANCE TABLE (NEMA T)

Coyote's PAYBACK® variable speed drives are designed to be used with any typical 4-pole, 50 or 60HZ NEMA T frame motor. Cast iron motors are recommended for all Pro PAYBACK® Direct Coupled drive applications.

Before installing the drive however, always verify that the motor meets the standard shaft diameter and T.I.R. (total indicator reading) tolerances of (MG1-4.9.7) in the chart below.




**ALL DIMENSIONS IN INCHES**

| **MOTOR FRAME** | **SHAFT LENGTH** (Typical) **V** | **SHAFT DIAMETER** TOLERANCE **U** | **T.I.R.** (Total Indicator Reading) Shaft Runout Tolerance |
|---|---|---|---|
| 182T/184T | 2.750 | 1.1250<br>1.1245 | (.002)<br>+-.0010 |
| 213T/215T | 3.375 | 1.3750<br>1.3745 | (.002)<br>+-.0010 |
| 254T/256T | 4.000 | 1.6250<br>1.6240 | (.002)<br>+-.0010 |
| 284T/286T | 4.625 | 1.8750<br>1.8740 | (.003)<br>+-.0015 |
| 324T/326T | 5.250 | 2.1250<br>2.1240 | (.003)<br>+-.0015 |
| 364T/365T | 5.875 | 2.3750<br>2.3740 | (.003)<br>+-.0015 |
| 404T/405T | 7.250 | 2.8750<br>2.8740 | (.003)<br>+-.0015 |
| 444T/445T/447T | 8.500 | 3.3750<br>3.3740 | (.003)<br>+-.0015 |

***NOTE:*** For new applications, drive may be purchased complete with new cast iron motor.

# ORDERING INFORMATION – "PRO" PAYBACK® DIRECT COUPLED DRIVES

***IMPORTANT: Always verify motor frame and shaft sizes.***

## Pro PAYBACK® Drive Selection (based on motor speed of 1750 rpm)

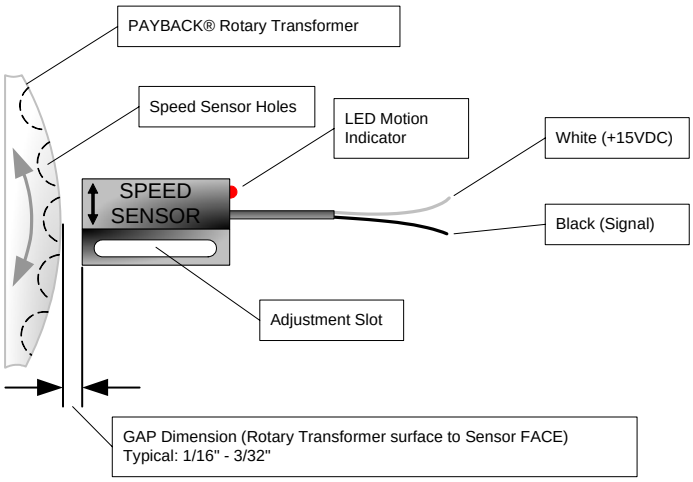
To select the correct size drive, simply locate the horsepower and frame size of you're AC motor in the "Technical Data" chart on the previous page.

> *EXAMPLE: A 50 HP motor with a 326T frame would require a Pro-5 PAYBACK® Drive.*

If your particular requirements are not listed, please contact the factory.

## SPEED SENSOR ORIENTATION & INSTALLATION – "PRO" PAYBACK®

To be installed by trained, qualified service personnel only. Always observe all safety precautions regarding rotating machinery and all applicable electrical codes.




**1:** The Coyote 2-wire Speed Sensor MUST BE ORIENTED as shown above with respect to the direction of travel of the rotating speed sensor holes to be detected on the rotary transformer.

*Mounting the sensor in any plane other than as shown above will cause erratic operation.*

**2:** Always adjust the gap between the surface and sensor face to the maximum safe operating distance, typically 1/16 – 3/32 inch.

**Note**: *Setting the gap too close may damage the sensor.*

## MANUAL LOCKUP INSTRUCTIONS

***For Emergency Full-Speed By-Pass***

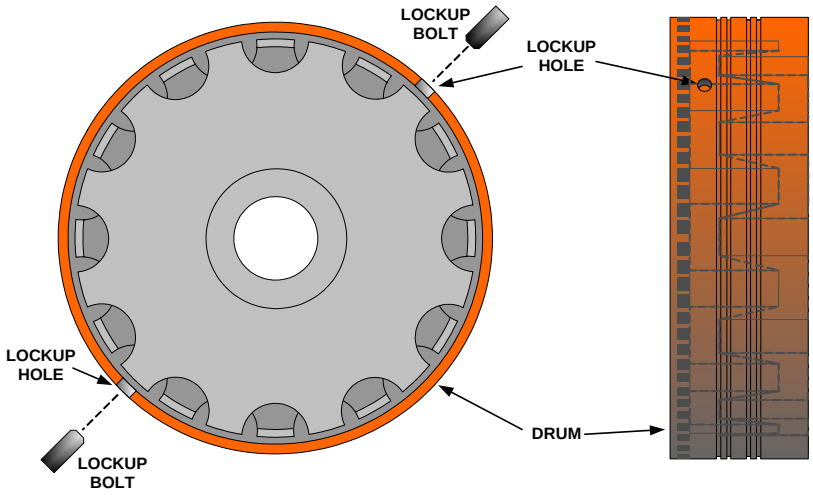
### WARNING

**BEFORE BEGINNING THE MANUAL LOCKUP PROCEDURE, ALWAYS REMOVE POWER FROM BOTH THE CONTROL AND MOTOR WHEN INSTALLING OR REMOVING LOCKUP BOLTS, AND/OR WHEN SERVICING THE DRIVE. ALWAYS LOCK OUT THE POWER TO THE MOTOR TO PREVENT ACCIDENTAL STARTUP WHILE PERFORMING THIS PROCEDURE.**

**1.** Select the appropriate size lockup bolt for your drive from the chart below.

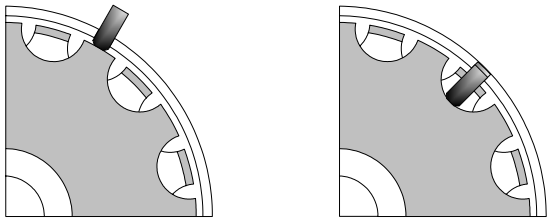
| DRIVE MODEL SIZE | (QTY EA) LOCKUP BOLT SIZE |
|---|---|
| SIZE 1, 2, 3 | (2 EA) 3/8 x 3/4L x 16TPI |
| SIZE 4, 5, 6 | (2 EA) 1/2 x 1L x 13TPI |
| SIZE 7, 8, 9 | (4 EA) 3/4 x 1-1/2L x 10TPI |

**2.** Locate the threaded lockup holes on opposite sides of the drum's circumference.




**3.** Screw the lockup bolts into the holes and **ALTERNATELY HAND TIGHTEN** until they each make contact with the finger peaks of the inner portion of the drive as shown below.

**IMPORTANT: If your drive incorporates the speed sensor option, be sure that the lockup bolts do not interfere or come in contact with the speed sensor. The speed sensor can be temporarily pivoted out of the way and securely repositioned on the support arm to assure adequate clearance from the rotating lockup bolts. After the lockup bolts are removed, the speed sensor gap can be properly re-adjusted. Follow the "Speed Sensor Orientation and Installation" instructions in this manual.**



CORRECT ALIGNMENT

INCORRECT ALIGNMENT

**4.** **NOW TIGHTEN LOCKUP BOLTS SECURELY** with a wrench, and then you may restore power to the motor. The drive will now run at motor speed.

# START UP PROCEDURE - "PRO" PAYBACK® DIRECT COUPLED DRIVE

**"Pro-PAYBACK®" Magnetic Coupled Variable Speed Drives with "ET" series Speed Controls**

Before starting, check and make sure the two emergency bypass lock-up bolts located on the outside diameter of the drive's drum have been removed from the drive. **See manual lockup instructions.**

The controls may or may not be installed on the equipment when it arrives at the job site. Please read the following instructions and verify that all of the following steps are completed for the initial field set up.

## "ET" Control Enclosure Installation:

Mount the "ET" PAYBACK® control enclosure in close proximity to the motor starter or motor service disconnect (whichever is the final device feeding power to the motor). Optionally, at customer preference, the controller can also be remotely mounted a distance away from the equipment. The controller typically is to be connected to two of the high voltage power wires going to the motor to insure that when the motor is switched off, all power to the controller and drive is also turned off. (The purpose for the transformer in the "ET" controller enclosure is to conveniently provide isolated, 115 VAC single phase power to the controller circuitry when the motor is running.)

The panel with associated components may be easily removed from the enclosure by removing the four panel mounting screws and unplugging TB1 and TB2 plug terminals from the speed controller circuit board. This will allow you to drill the necessary holes for the wires to be connected from the power source, drive and control signal without damage to the controller components. (See appropriate controller connection diagram for terminal connections.) Be sure to comply with all local electrical codes and observe safe wiring practices.

The minimum wire requirements are as follows:

> The two high voltage power wires that will connect to the line input fuse block assembly in the control enclosure should be at least 14 gauge/stranded/600 volt insulation rating. See also: PAYBACK® Drive System Wiring Layout Diagram and all relevant electrical drawings.

## Attention Electrician/Installer, Before Applying Power:

1. Turn OFF ALL POWER to the "ET" enclosure.
2. Turn the "Man-Off-Auto" switch on the front enclosure cover to the "OFF" position.
3. Open the "ET" control enclosure and check the control transformer primary jumpers in the "ET" enclosure to verify that they are correct for your specific line voltage. Re-jumper correctly, if required.
4. UN-PLUG the TB1 power plug to the speed controller circuit board.
5. Turn the motor on briefly to verify correct rotation of the motor. Correct motor phase wiring if necessary.
6. Using an AC voltmeter, check across the unplugged TB1 plug, terminals 1 and 8 to verify that there is 115 VAC when the POWER IS TURNED ON to the control transformer. (The Speed controller circuit voltage input power requirement is 115 VAC +/- 10% typ.)
7. If you DO NOT read 115 VAC across terminals 1 and 8 of the TB1 plug, then repeat steps 1 – 6. If you DO read 115 VAC across terminals 1 and 8 of the TB1 Plug, turn power OFF and then re-install plug TB1 to the controller board.

The PAYBACK® drive system is now ready for manual operation. The system is now ready for check out under remote control conditions. Refer to relevant calibration procedures and complete the WARRANTY registration form.

## SIGNAL FOLLOWING MODE SETUP PROCEDURE – "PRO" PAYBACK®

**The following adjustments apply to AC1/AC2 SIGNAL FOLLOWING applications only!**

**For Stand-Alone PRESSURE SET POINT adjustment procedure: See "AC1/AC2 Pressure Set Point Mode Setup Procedure".**

Your **AC1/AC2** controller has been pre-calibrated for your convenience and some of the settings may be factory sealed to prevent accidental adjustments in the field. Some minor adjustments may be necessary to accommodate your particular application**. VERY IMPORTANT!** We recommend that you monitor the motor current with a clamp-on amp meter while making these adjustments.

**IN ALL CORRECTLY SIZED APPLICATIONS, YOU SHOULD ALWAYS BE ABLE TO OPERATE THROUGHOUT THE ENTIRE SPEED RANGE WITHOUT EXCEEDING THE MAXIMUM FULL LOAD AMPS OF THE MOTOR. THIS ALSO APPLIES WHEN IN FULL SPEED LOCKUP MODE.**

*Note that the circuit board potentiometers are the 20-turn type allowing for precise control settings.*

**I. MANUAL MODE ADJUSTMENTS (Be sure to monitor motor current as described above)**

1. Turn the 3-way selector switch to the **MANUAL** position.
2. Set the operator speed control knob full counterclockwise (minimum on dial).
3. Adjust the **MIN pot** on the AC1/AC2 circuit board **for desired minimum speed**.

   (USUALLY FACTORY PRESET FOR ZERO OUTPUT, with LED indicator ON.)
4. Now slowly turn the operator speed control knob up to full clockwise (maximum on dial).
5. Adjust the **MAX pot** on the AC1/AC2 circuit board **for maximum desired speed**. OBSERVE actual RPM reading on the meter, if supplied.

   **To avoid dead band at the top end of the speed range DO NOT OVER-ADJUST THIS SETTING.**

   Note: The LCD speed meter has been factory pre-calibrated. When a speed meter is not supplied, we recommend using a hand held optical tachometer to monitor the output speed of the drive.

   *The drive may now be manually operated throughout the entire speed range with the actual speed indicated by the speed meter.*
6. It may be necessary to repeat steps 2 through 5 to fine-tune the final adjustments.
7. For smooth acceleration (Soft-Start) during initial startup, turn the **ACCEL pot** clockwise to lengthen the ramp of acceleration.

   Note: The **DECEL pot** has been factory set for minimum (full counter clockwise).

**II. AUTO MODE ADJUSTMENTS (Be sure to monitor motor current as described above)**

1. Turn the 3-way selector switch to the AUTO position.
2. With the external input signal at minimum, i.e.: 4ma for 4-20ma input, adjust for desired **minimum** speed with the **ZERO pot** on the AC1/AC2 circuit board.
3. With the external input signal at maximum, i.e.: 20ma for 4-20ma input, adjust for desired **maximum** speed with the **SPAN pot** on the AC1/AC2 circuit board.

   **To avoid dead band at the top end of the speed range DO NOT OVER-ADJUST THIS SETTING.**

   *Check to make sure minimum adjustment is still correct. Fine tune until desired span is reached.*

IF FOR ANY REASON, YOUR DRIVE FAILS TO OPERATE PROPERLY AFTER YOU HAVE PERFORMED THE ABOVE PROCEDURES, PLEASE CALL THE FACTORY FOR FURTHER INSTRUCTIONS AT **817.485.3336**.

## PRESSURE SET POINT MODE SETUP PROCEDURE – "PRO" PAYBACK®

**The following adjustments apply to AC1/AC2 PRESSURE SET POINT applications only!**

**For SIGNAL FOLLOWING adjustment procedure: See "AC1/AC2 Signal Following Mode Setup Procedure".**

Your **AC1/AC2** controller has been pre-calibrated for your convenience and some of the settings may be factory sealed to prevent accidental adjustments in the field. Some minor adjustments may be necessary to accommodate your particular application**. VERY IMPORTANT!** We recommend that you monitor the motor current with a clamp-on amp meter while making these adjustments.

**IN ALL CORRECTLY SIZED APPLICATIONS, YOU SHOULD ALWAYS BE ABLE TO OPERATE THROUGHOUT THE ENTIRE SPEED RANGE WITHOUT EXCEEDING THE MAXIMUM FULL LOAD AMPS OF THE MOTOR. THIS ALSO APPLIES WHEN IN FULL SPEED LOCKUP MODE.**

*Note that the circuit board potentiometers are the 20-turn type allowing for precise control settings.*

**I. MANUAL MODE ADJUSTMENTS (Be sure to monitor motor current as described above)**

1. Turn the 3-way selector switch to the **MANUAL** position.
2. Set the operator speed control knob full counterclockwise (minimum on dial).
3. Adjust the **MIN pot** on the AC1/AC2 circuit board **for desired minimum speed**.

   (USUALLY FACTORY PRESET FOR ZERO OUTPUT, with LED indicator ON.)
4. Now slowly turn the operator speed control knob up to full clockwise (maximum on dial).
5. Adjust the **MAX pot** on the AC1/AC2 circuit board **for maximum desired speed**. OBSERVE actual RPM reading on the meter, if supplied.

   **To avoid dead band at the top end of the speed range DO NOT OVER-ADJUST THIS SETTING.**

   Note: The LCD speed meter has been factory pre-calibrated. When a speed meter is not supplied, we recommend using a hand held optical tachometer to monitor the output speed of the drive.

   *The drive may now be manually operated throughout the entire speed range with the actual speed indicated by the speed meter.*
6. It may be necessary to repeat steps 2 through 5 to fine-tune the final adjustments.
7. For smooth acceleration (Soft-Start) during initial startup, turn the **ACCEL pot** clockwise to lengthen the ramp of acceleration.

   Note: The **DECEL pot** has been factory set for minimum (full counter clockwise).

**II. AUTO MODE ADJUSTMENTS (Be sure to monitor motor current as described above)**

*PRESSURE SENSOR SIGNAL USED AS A SET POINT SPEED CONTROL*

1. Turn the 3-way selector switch to the **AUTO** position.
2. Adjust for the desired pressure set point via the **ZERO** pot, located on the AC1/AC2 board.

   Note that the **SPAN** potentiometer which is also located on the AC1/AC2 circuit board is factory set, typically 4 to 5 turns from maximum clockwise allowing for higher gain conditioning of the pressure transmitter input signal for proper set point mode operation.

**III. 2WP PRESSURE SENSOR/TRANSMITTER**

*Your 2WP Pressure Sensor/Transmitter has been factory calibrated to specifications determined at the time the drive system was ordered. NO FIELD ADJUSTMENTS ARE REQUIRED.

IF FOR ANY REASON, YOUR DRIVE FAILS TO OPERATE PROPERLY AFTER YOU HAVE PERFORMED THE ABOVE PROCEDURES, PLEASE CALL THE FACTORY FOR FURTHER INSTRUCTIONS AT **817.485.3336**.

## WARRANTY REGISTRATION FORM – "PRO" PAYBACK®

**FOR FACTORY WARRANTY TO BE VALID, INSTALLER MUST COMPLETE THIS FORM.**

**Please make copies of this blank form. Fill out the required data for each system.**

**FAX COMPLETED FORM to Coyote Electronics, Inc. 817-427-4395 or 817-485-9437**

INSTALLATION DATE _____ PERFORMED BY _____

PHONE _____ FAX _____

JOB/SITE NAME _____

ADDRESS _____

_____

APPLICATION / TYPE OF EQUIPMENT (Be specific) _____

EQUIPMENT DESIGNATION, UNIT #, I.D. # _____

PAYBACK DRIVE MODEL # _____ DRIVE SERIAL # _____

### MOTOR NAMEPLATE DATA

HP/KW _____ RPM _____ FRAME # _____

☐ ODP ☐ TEFC ☐ OTHER _____

☐ 50HZ ☐ 60HZ ☐ 1-PHASE ☐ 3-PHASE

FULL LOAD AMPS _____ @ AC VOLTS _____

**RECORD ALL DATA WITH SYSTEM OPERATING AT MAXIMUM (100% FULL LOAD / RPM CONDITION) VERIFY THAT THE CONTROLLER VOLTAGE TO THE DRIVE IS SET TO MAXIMUM (APPROXIMATELY 100VAC)**

### ACTUAL MEASURED DATA @ FULL LOAD RPM

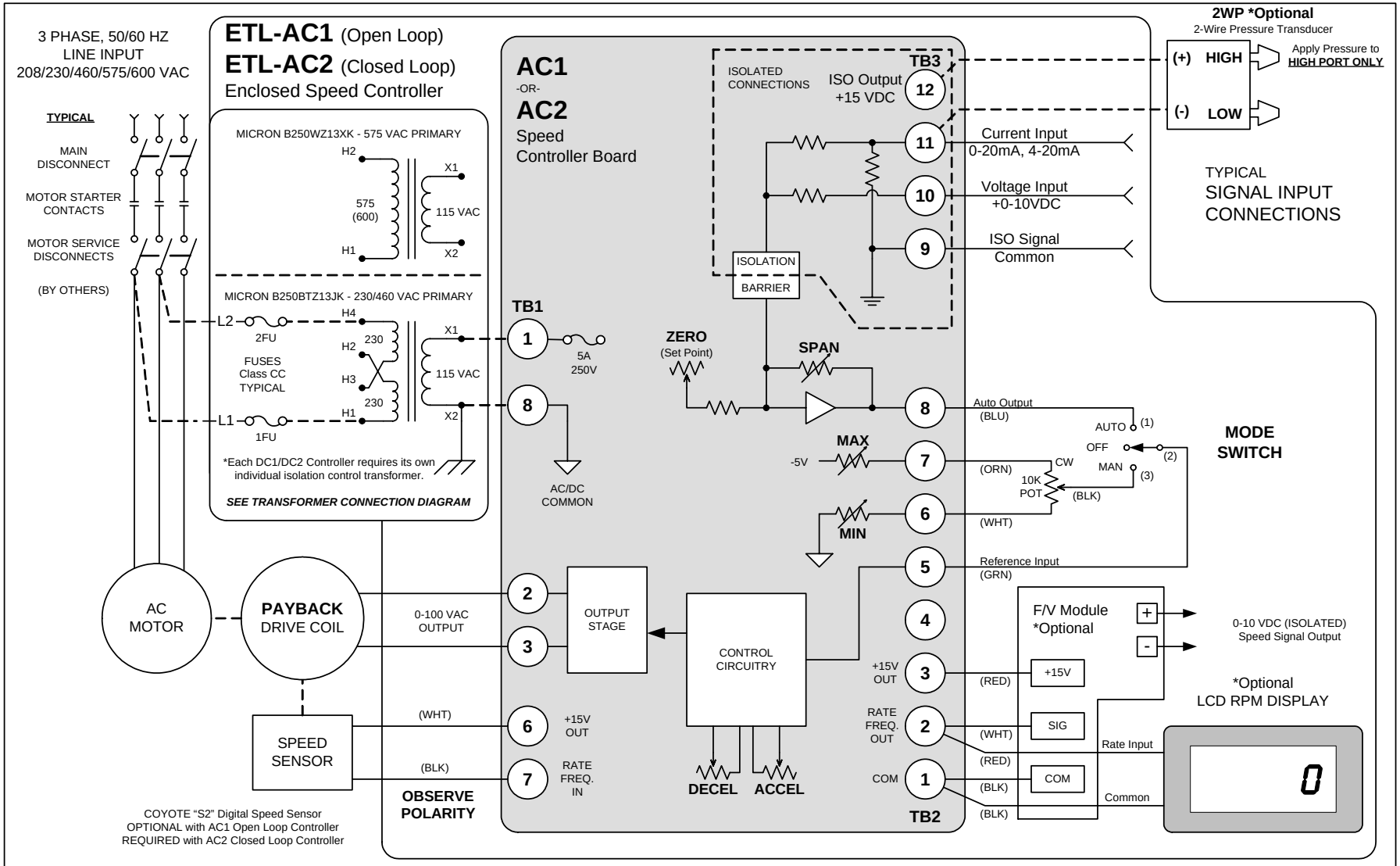
LINE AC VOLTS _____ MOTOR AC AMPS _____

MOTOR RPM _____ DRIVE OUTPUT/LOAD RPM _____

@ CONTROLLER AC VOLTAGE OUTPUT TO PAYBACK DRIVE COIL _____ VAC

WARNING: The installation and use of Coyote Electronics, Inc.'s products should be in accordance with the provisions of the U.S. National Electrical Code and/or other local codes or industry standards that are pertinent to the particular end use. Installation or use not in accordance with these codes and standards could be hazardous to personnel and/or equipment.

**Coyote Electronics, Inc. • 4701 Old Denton Road • Fort Worth, TX. 76117 • Phone: 817-485-3336**




## NOTES

*The control power transformer is configured to assure that single phase 115 VAC power to the controller is available ONLY when the motor is running.

**EACH AC1 or AC2 CONTROLLER MUST BE CONNECTED TO ITS OWN INDIVIDUAL POWER ISOLATION TRANSFORMER FOR PROPER OPERATION.**

DO NOT CONNECT ADDITIONAL CONTROLLERS TO THE SAME TRANSFORMER. KEEP ALL HIGH VOLTAGE WIRES SEPARATE FROM OTHER WIRES.

**

**DO NOT RUN POWER WIRES AND SIGNAL WIRES IN THE SAME CONDUIT...KEEP SEPARATE. OBSERVE ALL ELECTRICAL AND SAFETY CODES.**

**AC1/AC2 variable speed controller with isolated input conditioning circuitry that accepts and follows a standard voltage or current signal, or optionally, the signal from a Coyote 2WP (Two-wire pressure transducer) for stand alone applications to maintain a constant static pressure set point.**
**See applicable: SIGNAL FOLLOWING or PRESSURE SET POINT MODE calibration instructions**
**Designed and manufactured in the U.S.A.**

COYOTE ELECTRONICS, INC.
4701 Old Denton Road
Fort Worth, Texas 76117
www.payback.com
Phone: 817.485.3336
Fax: 817.485.9437

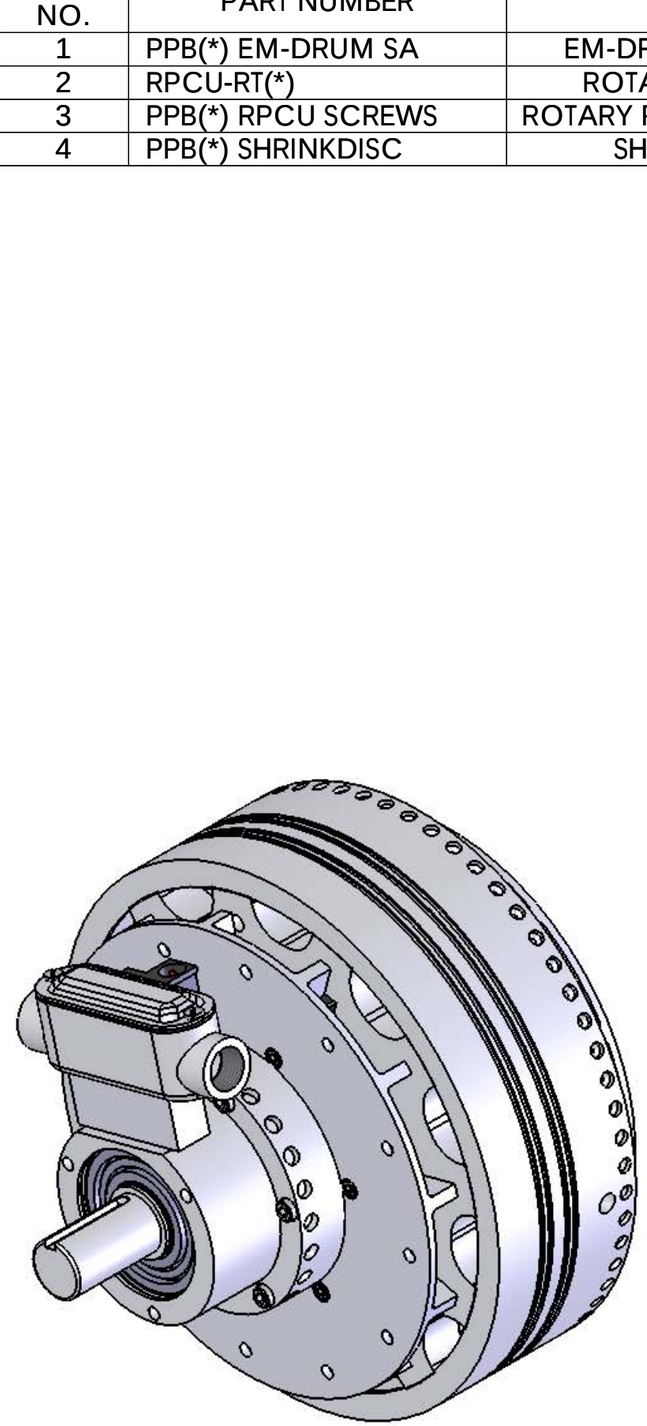
# ETL-AC1/AC2 UNIVERSAL

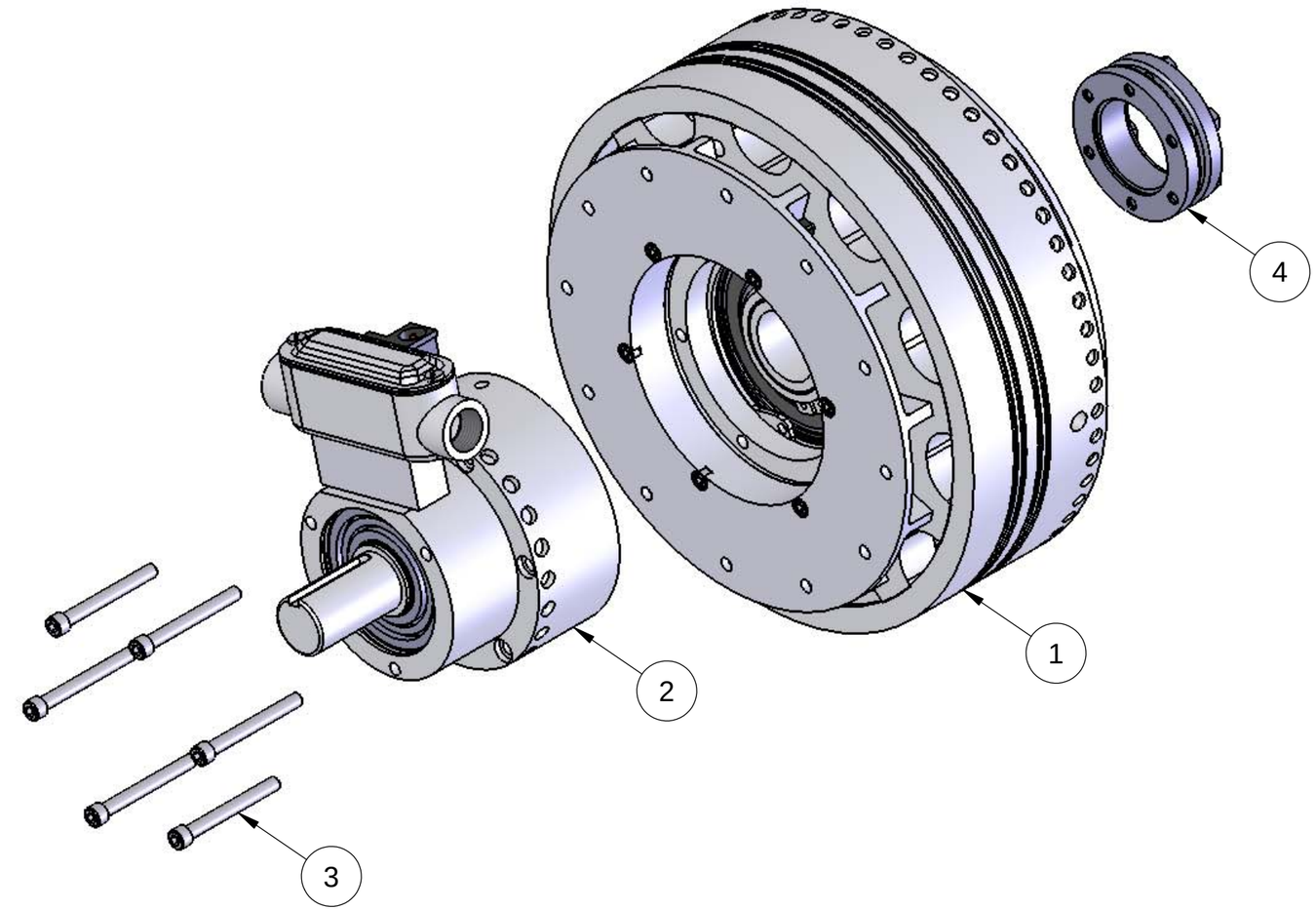
AC1/AC2 Speed Controller with 115 VAC control transformer and optional LCD display, F/V Feedback & Pressure Sensor

| SIZE | FSCM NO | DWG NO | REV |
|---|---|---|---|
| A | | BD-000-010-10 | B |

| SCALE | NONE | | SHEET | 1 OF 1 |
|---|---|---|---|---|

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | PPB(*) EM-DRUM SA | EM-DRUM SUB-ASSEMBLY, PRO | 1 |
| 2 | RPCU-RT(*) | ROTARY POWER COUPLING | 1 |
| 3 | PPB(*) RPCU SCREWS | ROTARY POWER COUPLING SCREWS | 6 |
| 4 | PPB(*) SHRINKDISC | SHRINK DISC ASSEMBLY | 1 |








| | | |
|---|---|---|
| | | UNLESS OTHERWISE SPECIFIED: |
| | | DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±<br>ANGULAR: MACH ± BEND ±<br>TWO PLACE DECIMAL ±<br>THREE PLACE DECIMAL ± |
| | | INTERPRET GEOMETRIC TOLERANCING PER: |
| | | MATERIAL<br>SEE BOM |
| NEXT ASSY | USED ON | FINISH<br>N/A |
| APPLICATION | | DO NOT SCALE DRAWING |

| | NAME | DATE |
|---|---|---|
| DRAWN | HBROOKS | 03/27/06 |
| CHECKED | | |
| ENG APPR. | | |
| MFG APPR. | | |
| Q.A. | | |

COMMENTS:

COYOTE ELECTRONICS, INC.
4701 Old Denton Road
Fort Worth, Texas 76117
Phone: 817.485.3336
Fax: 817.485.9437

TITLE:

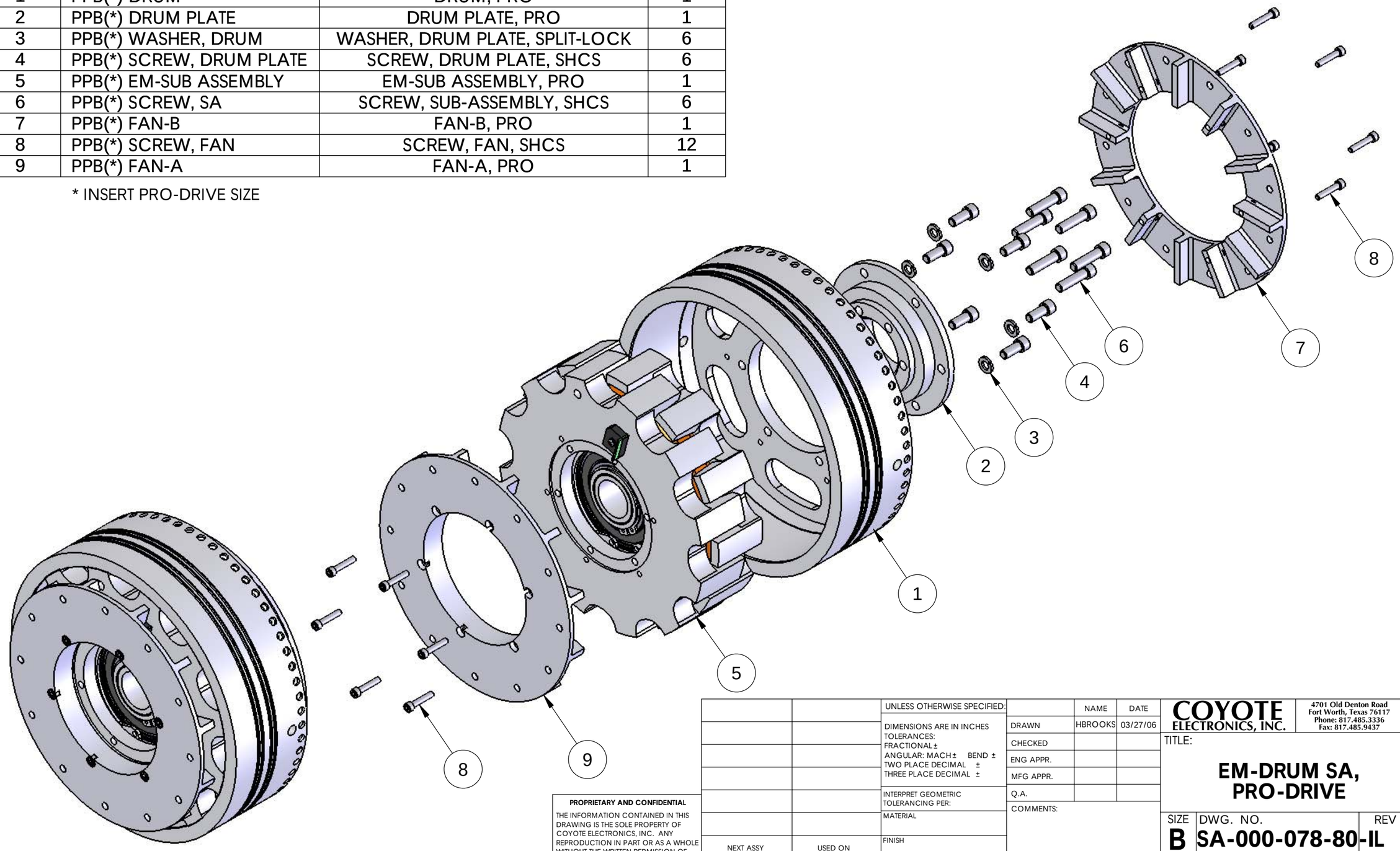
# PRO DRIVE AD, PRO

| SIZE | DWG. NO. | REV |
|---|---|---|
| B | AD-000-032-80-IL | |

SCALE:N/A | WEIGHT: | SHEET 1 OF 1

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | PPB(*) DRUM | DRUM, PRO | 1 |
| 2 | PPB(*) DRUM PLATE | DRUM PLATE, PRO | 1 |
| 3 | PPB(*) WASHER, DRUM | WASHER, DRUM PLATE, SPLIT-LOCK | 6 |
| 4 | PPB(*) SCREW, DRUM PLATE | SCREW, DRUM PLATE, SHCS | 6 |
| 5 | PPB(*) EM-SUB ASSEMBLY | EM-SUB ASSEMBLY, PRO | 1 |
| 6 | PPB(*) SCREW, SA | SCREW, SUB-ASSEMBLY, SHCS | 6 |
| 7 | PPB(*) FAN-B | FAN-B, PRO | 1 |
| 8 | PPB(*) SCREW, FAN | SCREW, FAN, SHCS | 12 |
| 9 | PPB(*) FAN-A | FAN-A, PRO | 1 |

* INSERT PRO-DRIVE SIZE






| | | |
|---|---|---|
| | | UNLESS OTHERWISE SPECIFIED: |
| | | DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±<br>ANGULAR: MACH ± BEND ±<br>TWO PLACE DECIMAL ±<br>THREE PLACE DECIMAL ± |
| | | INTERPRET GEOMETRIC TOLERANCING PER: |
| | | MATERIAL |
| NEXT ASSY | USED ON | FINISH |
| APPLICATION | | DO NOT SCALE DRAWING |

| | NAME | DATE |
|---|---|---|
| DRAWN | HBROOKS | 03/27/06 |
| CHECKED | | |
| ENG APPR. | | |
| MFG APPR. | | |
| Q.A. | | |

COMMENTS:

COYOTE ELECTRONICS, INC.
4701 Old Denton Road
Fort Worth, Texas 76117
Phone: 817.485.3336
Fax: 817.485.9437

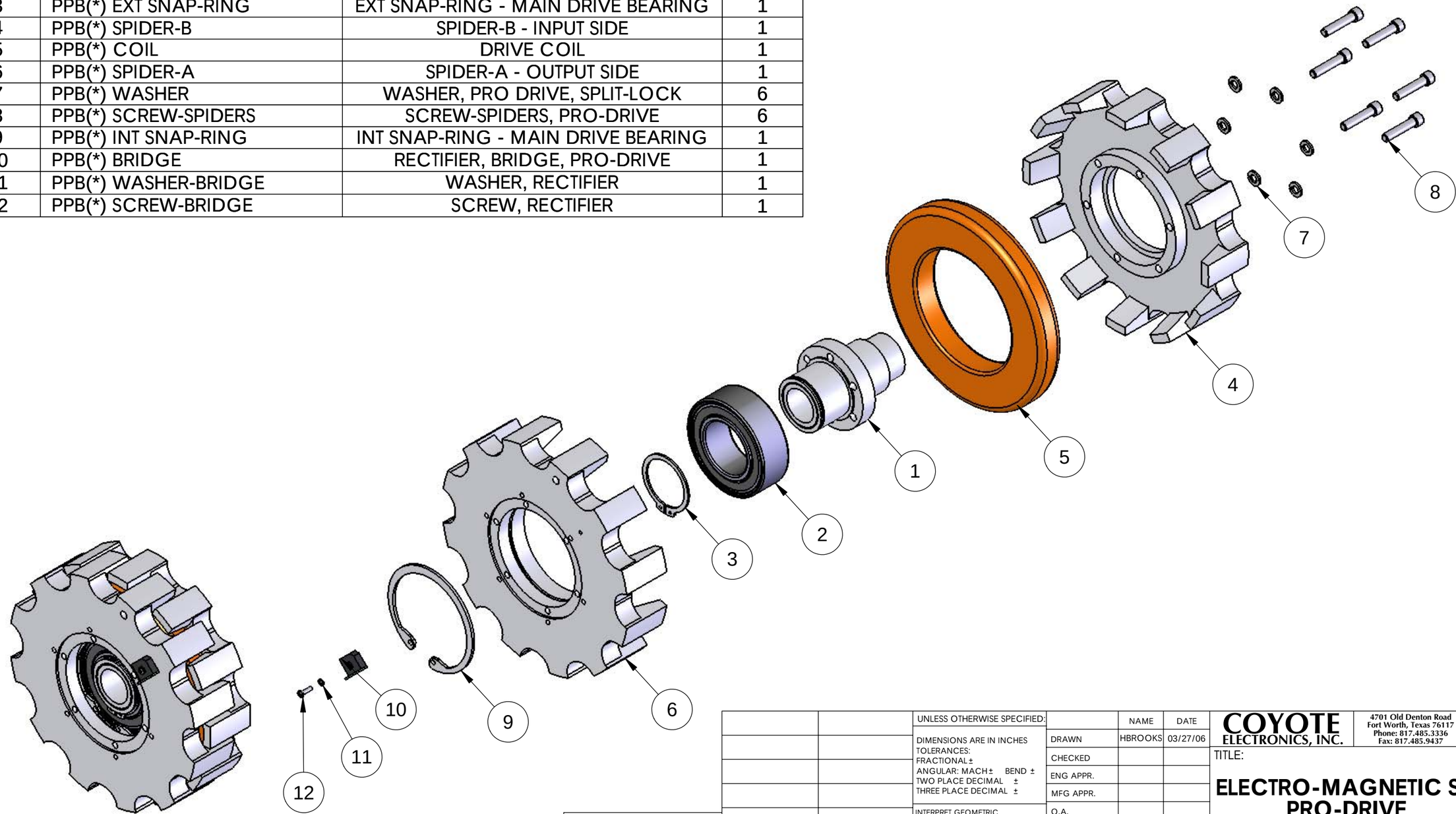
TITLE:

# EM-DRUM SA, PRO-DRIVE

| SIZE | DWG. NO. | REV |
|---|---|---|
| B | SA-000-078-80-IL | |

SCALE: 1:3 | WEIGHT: | SHEET 1 OF 1

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | PPB(*) HUB (SPECIFY BORE SIZE) | MAIN SUPPORT HUB | 1 |
| 2 | PPB(*) BEARING | MAIN DRIVE BEARING | 1 |
| 3 | PPB(*) EXT SNAP-RING | EXT SNAP-RING - MAIN DRIVE BEARING | 1 |
| 4 | PPB(*) SPIDER-B | SPIDER-B - INPUT SIDE | 1 |
| 5 | PPB(*) COIL | DRIVE COIL | 1 |
| 6 | PPB(*) SPIDER-A | SPIDER-A - OUTPUT SIDE | 1 |
| 7 | PPB(*) WASHER | WASHER, PRO DRIVE, SPLIT-LOCK | 6 |
| 8 | PPB(*) SCREW-SPIDERS | SCREW-SPIDERS, PRO-DRIVE | 6 |
| 9 | PPB(*) INT SNAP-RING | INT SNAP-RING - MAIN DRIVE BEARING | 1 |
| 10 | PPB(*) BRIDGE | RECTIFIER, BRIDGE, PRO-DRIVE | 1 |
| 11 | PPB(*) WASHER-BRIDGE | WASHER, RECTIFIER | 1 |
| 12 | PPB(*) SCREW-BRIDGE | SCREW, RECTIFIER | 1 |






| | |
|---|---|
| NEXT ASSY | USED ON |
| APPLICATION | |

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL

FINISH

DO NOT SCALE DRAWING

| | NAME | DATE |
|---|---|---|
| DRAWN | HBROOKS | 03/27/06 |
| CHECKED | | |
| ENG APPR. | | |
| MFG APPR. | | |
| Q.A. | | |

COMMENTS:

COYOTE ELECTRONICS, INC.
4701 Old Denton Road
Fort Worth, Texas 76117
Phone: 817.485.3336
Fax: 817.485.9437

TITLE:

# ELECTRO-MAGNETIC SA
# PRO-DRIVE

| SIZE | DWG. NO. | REV |
|---|---|---|
| B | SA-000-077-80-IL | |

SCALE: 1:3.5 | WEIGHT: | SHEET 1 OF 1