Using Accu-Coder™ Encoders with Measuring Wheels

ENCODER PRODUCTS COMPANY

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One of the most common applications utilizing an Accu-Coder™ involves mounting either one or two measuring wheels on the shaft to obtain linear motion feedback. The Cube series is extremely well suited for applications such as these because of the wide spaced bearings, offering better shaft support, and also due to the fact that dual shafted units are available.

By putting a measuring wheel on each shaft of a dual shafted Accu-Coder™, twice the amount of traction at the same bearing loading results. This enhances the accuracy of the counting, because if one wheel slips, or is on a portion of material that is missing, the other wheel will take up the slack. The only drawback to this, is that the material being measured must be wider than the distance between the two wheels.

A few of pointers to consider when using measuring wheels are as follows:

1. Do not try to attempt to obtain greater than .010" resolution with a measuring wheel. It may be possible to do this on paper, but in the real world, tolerances are involved. Please keep in mind that the wheel material will expand and contract with temperature variations. Also keep in mind that the wheels do wear down with usage. Accurate alignment must be used to attempt this fine resolution, as any mis-alignment will cause the wheel to skid. This may not be apparent to the eye, but if your measurements are not coming out as expected, this is one of the most often causes.

2. Be sure that you have selected the proper type of wheel. Encoder Products Company offers wheels that are bare knurled aluminum, soft non-marking rubber, 80 and 90 durometer urethane, and with replaceable rubber inserts (O-rings). All the wheels are made of aluminum alloy. The actual selection of the various materials is determined by the type of material that is to be measured. The rubber type offers the best traction in most applications, but it can be short lived with some materials. The 80 urethane is somewhat harder than the rubber and usually lasts longer. The 90 urethane is the hardest of the coated wheels. It provides the longest life under most circumferences at the cost of less traction. The harder the wheel surface, the less traction the wheel provides.

3. Use some sort of flexible mounting to support the Accu-Coder™ and measuring wheel. This is a basic requirement for any application such as this. Allowance must be made for materials of varying thickness passing over or under the wheel. If the Accu-Coder™ is mounted firmly and material that is too thick should pass through, something has to give. If the material is soft enough, it will be squashed and spoiled product usually is the result. If the product does not squash, something else has to give. This will usually be the shaft either bending or breaking off. This will also destroy the bearings in a short time. Most often, just the weight of the Accu-Coder™ along with the wheel(s), connecting cable, mount, etc. is sufficient to provide optimum tracking friction. If it doesn't, weights or springs can be CAREFULLY added until proper tracking is achieved. However, always use the very minimum force necessary to accomplish the job.

4. Do not attempt to run the wheel too fast. The wheels are good for around 3600 to 4000 RPM, which translates into 3600 to 4000 linear feet of travel per minute. At these elevated speeds, counting accuracy is often compromised. This is because if the wheel is moving that fast and the slightest thing upsets it, the ensuing bounce period will account for many lost counts. Also, again remember that the bearing life of the Accu-Coder™ is adversely affected by higher rotational speeds combined with excessive amounts of radial and axial shaft loading. If the wheel(s) are not in perfect tracking alignment with the material being measured, an axial force is impressed on the shaft and bearings. This axial force, combined with high rotational speeds will cause premature wear of the precision ball bearings. Also if the material being measured is "weak" like paper, any slightest upset to the wheel(s) while running at high speeds can cause the material to be ripped or damaged in some way.

5. Encoder Products Company offers a couple good solutions to the application of measuring wheels. We offer two mounting brackets, one a single pivot type and the other is a dual pivot type. The single pivot type (EPC STOCK CODE 140039) pivots in a vertical direction and provides a very simple way to install the Accu-Coder™ along with either one or two wheels. The dual pivot bracket

(EPC STOCK CODE 140040) also pivots vertically, but it also pivots on its longitudinal axis. This allows the wheel(s) to track properly if the material surface is rough or uneven. Please note that these two mounting brackets are designed for the standard Cube Series Accu-Coder™ housing. They can be adapted to the model 702 Accu-Coder™ if the Flange mounting option along with the EPC STOCK CODE 175557 ADAPTOR is used. The Industrial Cube housing can be used if the mounting holes are enlarged in the brackets to allow for the larger mounting hardware size of the larger housing.

6. The measuring wheels that Encoder Products Company maintains in stock are of two general sizes, both 12 inch circumference and 1/3 meter size. Please remember that measuring wheels are NOT specified as the diameter! They are always specified in CIRCUMFERENCE, which is simply the diameter multiplied by 3.14. Two different bores, or shaft, sizes are also maintained in stock. These are 1/4 inch and also 3/8 inch. These two sizes complement the most common shaft sizes of Accu-Coder™ encoders that we produce. Most applications involving measuring wheels have slowly been adapting to the 3/8 inch size, because of the greater strength of the shaft and bearings of the Accu-Coder™.

By remembering these pointers and not trying to obtain something that is not achievable in an Accu-Coder™/ Measuring Wheel application, satisfactory operation is the result. And the setup should last for a long period of time without any attention, other than cleaning off the parts when they need it and checking the alignment occasionally.

If you have additional questions please contact EPC Customer Service at 800-366-5412 or email sales@encoder.com.

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