

Technical Note # TD-16-011

Torque measurement of the TWT1105 winding table

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Abstract

The TWT1105 Winding Table is to be utilized for the winding of the QXFP Magnet Coils.

This note summarizes the results of the measurement of the allowable torque of the winding table known as TWT1105. The test was performed on June 16, 2016.

1 Introduction

Rotating Tables are typically used to wind coils for both conventional and super-conductive magnets.

The table listed under the Tooling Database with the ID: TWT1105 (see figure 1) is a 48" rotary table with a 70:1 reduction gear in which the main worm is capable of torque in excess of 440 ft*lb.

440 ft*lb torque is just greater than the nominal torque required to wind the QXFP Magnet Coils.

*Required : 55 lb at about 90" i.e. $55 * 7.5 \text{ ft} = 412.5 \text{ ft} * \text{lb}$*

The Table is powered by a Reliance 1/2 HP Electric Motor part number: T56S1004A (with a 0430A brush) 1,750 rpm 1/2 Hp permanent magnet 90V DC motor coupled to a 1:25 reduction ratio gearbox.

The motor allows 5.2 A of maximum continuous current.
The motor drive is a Reliance Electric MINPAK PLUS M/N 14C30 DC Motor Drive for a 3/4 HP 90VDC @ 7.5A (continuously).

Figure 5 shows the tags of the equipment in use.



Figure 1: The TWT1105 winding table

2 Test

The mandrel attached (bolted) to the tabletop and it is connected to a tensioner with variable torque set-point through a rope, in figure 2 is pictured the testing set-up.

Prior to the test the HA # 1007 has been issued, signed and filed by TD/MS.

The motor current load is measured through a current clamp with an accuracy of about 0.1 A (see figure 4).

With proper scaling we applied the nominal torque of 440 ft*lb, with the



Figure 2: Measuring TWT1105 winding table Torque Set-Up

drive speed set to about 80% and measured about 3.8 A. After increasing the torque to about 550 ft*lb (i.e. with 25% overload for margin purpose) the measured current was about 4.5 A.

We also measured the current drawn respectively at 150%, 175% and 200% of the load with the results shown in table in Figure 3

In order to start the table at such high torque the speed selector of the drive is required to be above $\approx 70\%$ of its maximum speed (or at about 7-8 out of 10 in its dial).

Torque (ft-lb)	Load %	Current
440	100	3.8
550	125	4.5
660	150	5.6
770	175	6.3
880	200	8.1

Figure 3: Measured Data

3 Conclusion

The 48" ROTAB Winding Table (Tooling Maintenance Tag TWT1105) presently located in IB3A-Floor is suitable to wind QXFP Magnet Coils.



Figure 4: Current Measuring

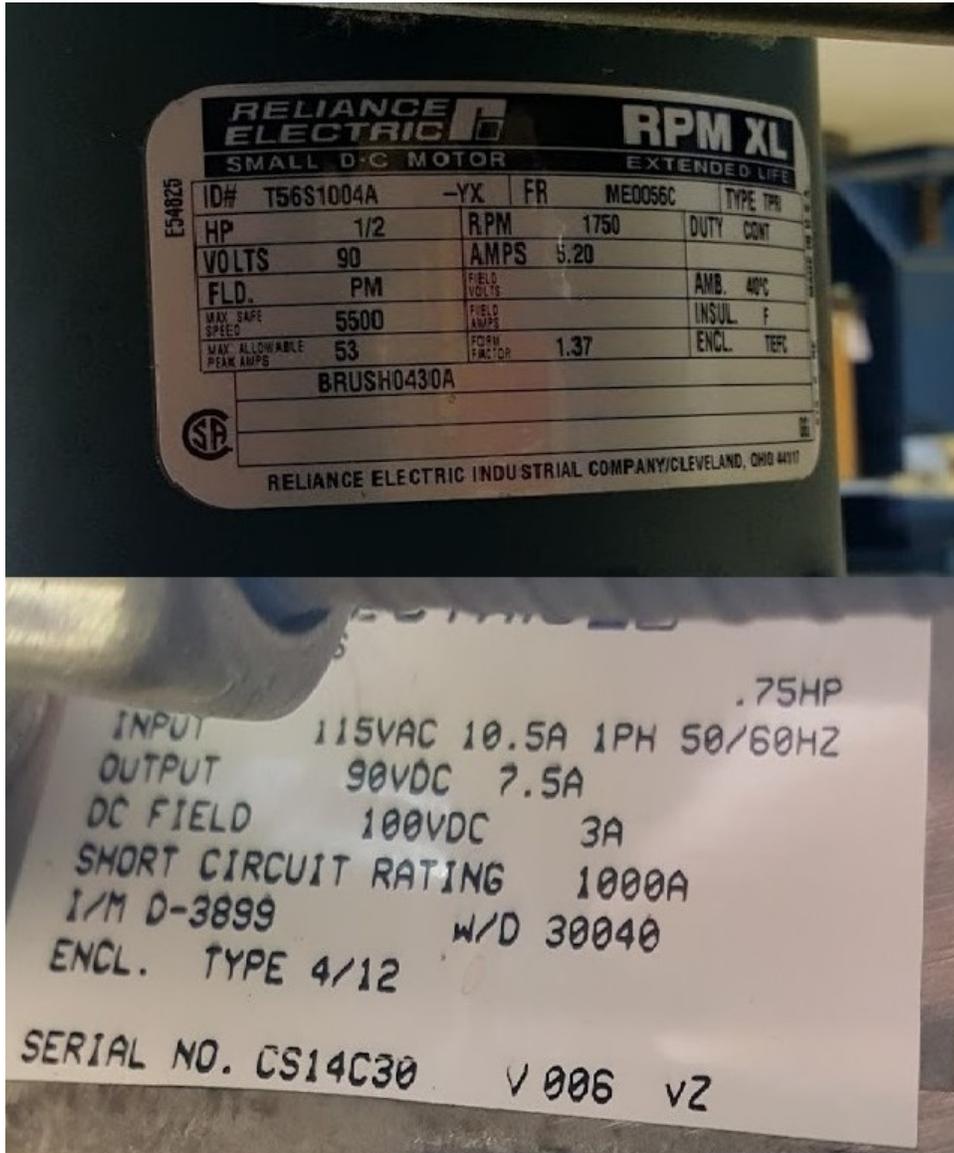


Figure 5: Tags of the Motor and of the Motor Drive