Tuning Load drive on performance dynamometer

Configuring Emerson motor drive for best torque per amp

For the load side of the D&V dynamometer test stands, the Emerson motor drives use an internal operating point selection to choose the operating point at which the motor is run. The motor drive must be tuned in order achieve the highest torque per amp value. This document summarizes the tuning for the Emerson/Control Techniques Unidrive SP motor drives.

This tuning is not necessary on the DUT motor drive since operating points are selected manually.

Drive Tuning

Parameter	Description	Comments
3.10	Speed Controller Proportional Gain	Speed loop gains control the speed s of the load motor.In general, increas value of the Kp to increase stability. is too small the system will not mak enough adjustments in response to e Kp is too large the system will beco unstable and oscillate with large cha response to speed error.
3.11	Speed Controller Integral Gain	In general, decrease the value of Ki increase stability, at the expense of response.If Ki is too low, the system take too long to reach equilibrium.I too high the system will make chang quickly, resulting in a ringing behav overshoots and undershoots as the s stabilizes.
4.12	Current Demand Filter	Update rate of the PID loop
4.13	Current Controller Proportional Gain	If Kp is too small the system will no large enough adjustments in respons error.If Kp is too large the system w become unstable and oscillate with l

		changes in response to error.
4.14	Current Controller Integral Gain	If Ki is too low, the system will take long to reach equilibrium.If Ki is to the system will make changes quick resulting in a ringing behavior of overshoots and undershoots as the s stabilizes.
5.25	Stator Inductance	Set this value if you know it.
5.08	Rated Load RPM	Increasing or decreasing this value the operating point below base speed.Modify this value in small ste watch motor torque per amp (torque measured by torque cell / total current).Move this value in the dire that increases torque per amp until reach a plateau and start to decline.
5.09	Rated Voltage	Increasing rated voltage can allow a more headroom for the PID loops to operate
5.10	Rated Power Factor	The power factor controls the curre to induce the rotor field.Decreasing power factor puts more energy into rotor field.Make small changes in th power factor (1 percentage point) i direction of increasing torque per a the optimal division of torque produ current and rotor excitation current finding the power factor that produ maximum torque per amp.

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