Mentor II vs Quantum III

We quite often get calls asking “When should I specify a Mentor II versus a Quantum III?” and “What are the differences anyway?” The Mentor II is certainly less expensive.” This application note will discuss the basic differences and offer some guidance into your selection.

First of all, the Mentor II is an excellent Drive system building block. The Mentor II is less expensive than Quantum III however the QIII includes:

- Semiconductor AC Line Fusing (plus DC Output fuse on Regens)
- Sequenced DC Output Armature contactor
- 115vac Input control logic for direct Start/Stop/Jog pushbutton interface
- ability to accept an AC Tach for Speed Feedback

These items tend to make the Quantum III the best choice for an End User retrofit success story. It enables the User to easily connect up his main power, motor leads, Start,Stop buttons and speed pot and away he goes. If the End User is simply replacing a Mentor I, then the Mentor II would be the logical and correct choice. One must keep in mind that the Mentor II is a drive system power section which may only be the starting point of a final drive solution—which may be beyond the scope of an End User. If the original drive is being replaced and there is existing AC Line fusing and AC input contactor then the Mentor II may prove to be an economical solution. This determination needs to be made by the one recommending the replacement.

In certain situations, the Mentor II could be a better system solution for one to create a panelized design. Those applications might include special low voltage/high current power sources for welders, desalinization processes, chemical electrolysis processes, battery chargers etc. The reason being, it is easier with the Mentor II to provide a separate low voltage 3 phase input to the SCR bridge which is outside the range of the Quantum III. For instance, it would be possible to create a variable DC supply from a 60vac 3 phase input (you would still need to supply the drive a low current supply single phase 230vac for the control circuitry). This could be done with a Quantum III also but it would require modification and would not be a standard Quantum any longer. In general, the Mentor II offers more flexibility for the System Design Engineer/Integrator but requires Engineering to finalize the overall design.

Single Drive Retrofits

In general, the Mentor II may not be the best choice for End User customer retrofits unless they are replacing a Mentor I perhaps – even then a Quantum III is usually easier to deal with really. Quantum III’s can handle AC or DC tachs, while Mentor II’s
accept DC tachs but not AC tachs (both accept encoder feedback). The Quantum III was specifically designed for End User/Distributor sales w/o needing engineering panel design work. Typically, the end cost (Engineering, drafting, panel layout, wiring, test, labors) will exceed the cost of the pre-engineered packaged Quantum III.

Mentor II’s are rated at 40°C while the Quantum III’s are rated at 55°C. This can become a factor when the drive is placed in an un-ventilated enclosure, running an Extruder in Las Vegas in July unless the temperature derate is accounted for. Mentor II derate is 1.5% per degree C.

**Low Horsepower Models (3-- 100 HP)**

Models up to 100HP (480vac) will be significantly smaller (requiring less panel space) than a similar Mentor II panelized configuration (because fuses, contactor, 115vac Interface all spread out around the space around the drive - the Quantum III has all this built-in within the same Mentor II only footprint (up to 100HP@480vac).
Low Horsepower Models (3-- 100 HP ) con’t

Quantum III's contain a built-in DB pole up thru 250HP (@ 480vac to accommodate Dynamic Braking readily). Another smaller issue but still worth mentioning, Mentor II’s have studs or bus bars for power connections which require the customer to make power connections to compression lugs (not all customers have these hydraulic tools however) whereas all Quantum III's use simple strip and insert cable lugs using common flat blade screwdriver or Allen wrench screwdown lugs as shown below.
Medium Horsepower Models (150-400 HP)

Quantum III's contain a built-in DB pole up thru 250HP (@ 480vac to accommodate Dynamic Braking readily). Another smaller issue but still worth mentioning, Mentor II's have studs or bus bars for power connections which require the customer to make power connections to compression lugs (not all customers have these hydraulic tools however) whereas all Quantum III's use simple strip and insert cable lugs using common Allen wrench screwdown lugs.
High Horsepower Models (500-1000 HP)

Mentor II’s have studs or bus bars for power connections which require the customer to make power connections to compression lugs (not all customers have these hydraulic tools) whereas all Quantum III’s use simple strip and insert cable lugs using common Allen wrench screwdowns lugs. On high HP models this is especially convenient, since the Mentor II only has an output bus bar. The QIII provides a power distribution plate from this bus bar with up to 6 such individual lugs on each A+ and A- and each line for ease of connecting 600mcm cables for example.
Summary

In general, the End User/Customer can take a Quantum III out of the box/crate, mount it, wire power and Start/Stop pushbuttons, speed pot and it’s ready to run. Quantum III’s are easier for the End User to set for his motors current rating (HP) - (no burden resistors to solder in or change).

Mentor II Drives are ready to mount. The rest would take a certain amount of Engineering to apply.

In addition, the Quantum III User’s Manual includes more detail and specific setup instructions with photographs for easy reference.

For additional assistance in proper

QIII model selection check out the link below:

CTAN199

also check out the following links:

QIII Catalog pages

QIII Rating Tables

MentorSoft is software for both Mentor II and Quantum III

MentorSoft

Questions ?? Ask the Author:

Author: Ray McGranor
        (716)-774-0093

e-mail: ray.mcgranor@emerson.com