

Solution Profile



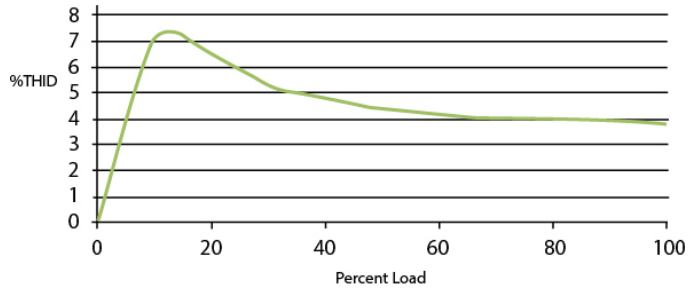
MTE Contactor Options

Why, When and Which MTE Contactors to Use with Your System

Matrix AP and Contactors

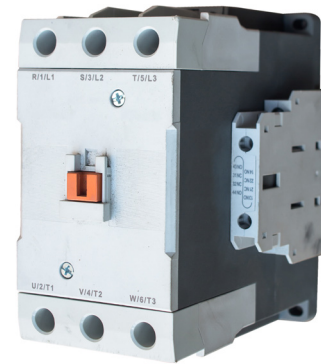
MTE's Matrix® AP Filter has the ability to provide powerful harmonic mitigation down to 30% load. Also, due to its **best-in-class low capacitance**, it's a product that's exceptionally generator friendly. This low capacitance provides superior THID performance at lower loads. However, there are times when using a contactor can provide additional benefits.

MTE Matrix AP % THID vs. % Load



Why Use Contactors?

- When a VFD is off, the contactor will bypass the capacitors, thus **preventing leading kVARs** from reaching the utility. This helps maintain a **better power factor** by removing capacitance at low loads, which creates a leading power factor. *(For more information, see Technical Bulletin #1: Power Factor 101.)* Utilities do not want kVARs on their systems because this is wasted energy that reduces grid efficiency. In addition, if the load becomes leading, it can create overexcitation of motors and generators which can damage equipment by losing synchronism between the alternator and the power source.
- At light loads, capacitors can add voltage to a system which can then damage motors. Using contactors, the capacitors are bypassed, thus eliminating added voltage which then helps **prevent motor damage**.
- In addition, using contactors to bypass capacitors will also divert harsh surges and transients, thereby **extending capacitor life**.
- VFDs typically have +/- 10% voltage range. When capacitors are engaged during startup, there can be a voltage boost above the 10% limit that will trip (shutdown) the drive. Contactors will remove the capacitors from the system and **prevent tripping**.



Example of a Contactor

When to Use Contactors

| Application | Recommendation |
|---|----------------|
| Motor running consistently with few on/off cycles | No |
| Backup generator in place | Yes |
| Peak shaving | Yes |
| Combined heating & power | Yes |
| High VFD on/off cycles | Yes |
| Previous start-up over-voltage problems | Yes |



Which Contactor Options to Use

- For easy plug-and-play options with minimal effort → [MTE Contactor Options 009 or 019](#)
- Important Question #1: Do you know if the signal is coming from a) the VFD signal point, or b) an external PLC to monitor loads?
 - ❖ If no → [Choose MTE Contactor Option 009.](#)
 - ❖ If yes → [Go to Question #2.](#)
- Important Question #2: What type of signal will control the contactor?
 - ❖ Relay → [MTE Contactor Options 012 or 013](#)
 - ❖ Digital 120V AC I/O → [MTE Contactor Option 002](#)
 - ❖ Digital 24V DC I/O → [MTE Contactor Option 022](#)

| Type | Auto Set | Capacitor Bypass | Filter Bypass | Includes Control Transformer | Open Panel / Enclosed | Retrofit Compatible† | Comments |
|-----------|----------|------------------|---------------|------------------------------|-----------------------|----------------------|---|
| 002 / 022 | | X | | | Open, Enclosed | X | Customer sets by programming drive to send signal to contactor at desired set point; based on current, speed, or voltage. Customer to provide power to contactor. |
| 009 | X | X | | X | Enclosed | | Pickup at 35%, drop off at 20% - senses current from wires feeding the drive. Factory set, no additional calculations required. |
| 019* | | X | | | Open, Enclosed | X | Programmable multiple pickups and drop offs available. Perfect for facilities using generator and utility power. |
| 012 | | X | | X | Enclosed | X | Customer sets the pick-up and drop-off points. |
| 013 | | X | X | X | Enclosed | | 2 contactors: 1 for capacitors, 1 for filter; customer sets pick-up and drop-off points; if filter is bypassed - capacitors are bypassed; use when drive does not have a bypass that can be incorporated into the system. |

* 019 option will be available in 2023 as an orderable standard unit.

† Consult MTE's Application Engineering Department prior to ordering.

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