

## Power Quality Solutions for Warehousing and Logistics



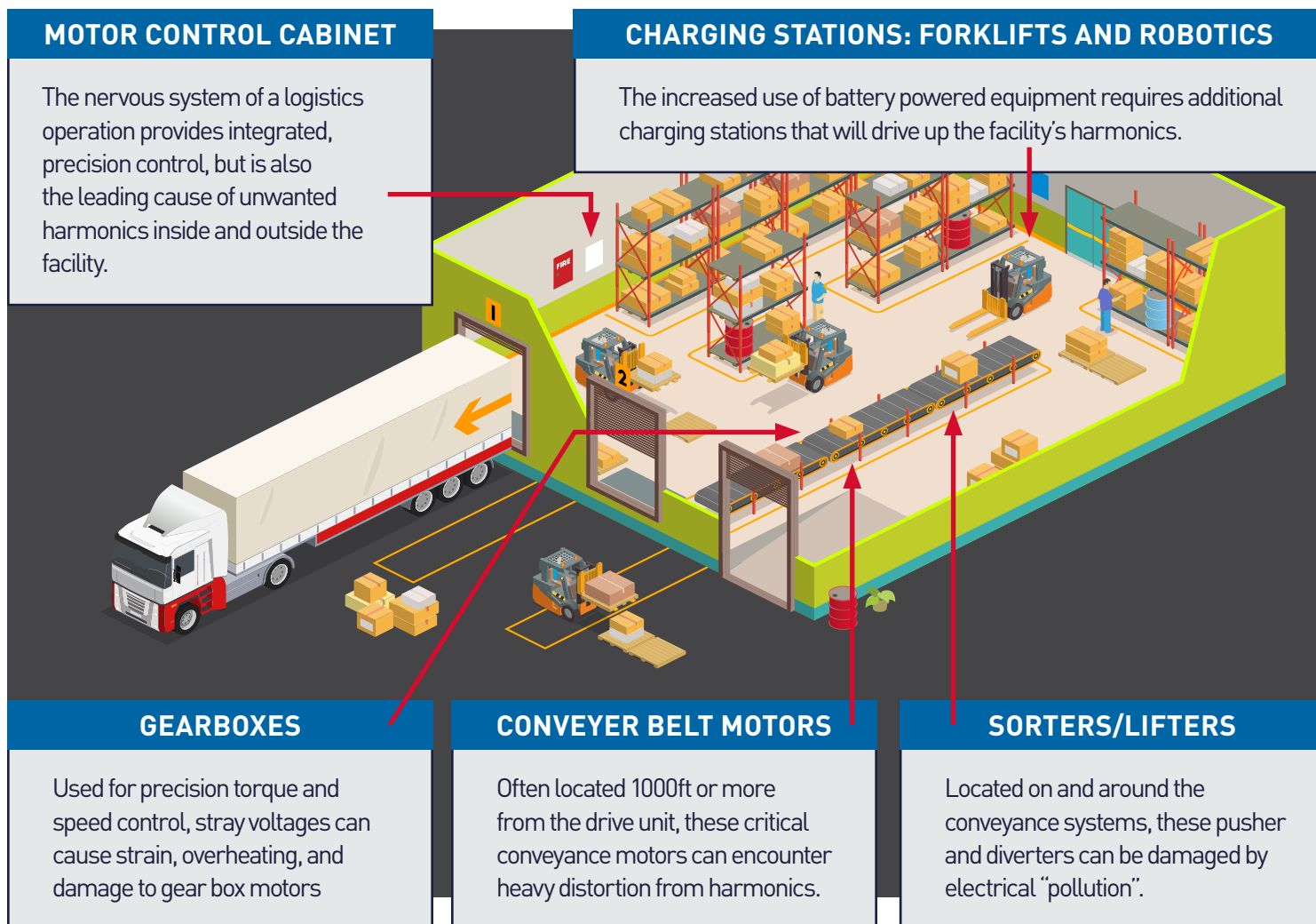
# Warehousing and Logistics

Today's socio-economic climate has drastically changed consumer behavior, and with it, the retail landscape. E-commerce transactions are skyrocketing, from 14% of all retail transactions in 2019, to over 20% by 2023. This growth puts an imperative on warehousing and logistics operations to improve service levels, uptime, and profits.

Variable frequency drives (VFDs) play an integral role in the speed, efficiency, and overall performance of today's distribution, warehousing, and logistics centers. Often found in conveyor systems, gearboxes, and sorting systems, VFDs unfortunately cause electrical harmonic distortion, which can **damage electric motors** over time and **threaten production** throughout the facilities. Expanded usage of rechargeable systems, such as battery-powered forklifts and warehouse robots, can also lead to an increase in **polluted power** and **stray electrical signals**.

Simply put, downtime is not an option within these facilities as regional distribution, warehousing, and logistics centers often process over 30,000 pieces per hour, for 20 contiguous hours. MTE's industry-leading power quality solutions are built to help operations avoid profit-killing downtime by filtering the harmonic distortion caused by VFDs, which can lead to breakdown.

## Modern warehouse and logistics centers have increased complexity and harmonic issues



## Power Quality Challenges for Warehousing and Logistics



### Delayed delivery

Malfunctioning conveyers or sorters can constrain capacity, especially during peak hours, causing delivery delays and bottlenecks.



### Unplanned Downtime

Motor and gearbox failures can result in several hours of maintenance and idled workers, and potential safety concerns.



### Utility Compliance

IEEE-519 compliance is critical for industries to remain in accordance with local regulations.



### Maintenance Staffing

Availability of specialized personnel during peak hours can be challenging, further extending downtime costs.



### Damaged Shipments

Sudden stops or failures in sorting or conveyance can cause damage to valuable shipments resulting in additional recuperation costs.



### E-commerce Growth

Increasing demand is placing more focus on ownership costs, and additional burden on equipment uptime and expected overall lifetimes.

## LINE SIDE POWER QUALITY

### CHALLENGE

VFDs can generate harmonic loads throughout the system and violate utility regulations, while the harmonics created by charging stations can damage the transformers at the facility.

### MTE LINE SIDE SOLUTIONS

FEATURES	BENEFITS
• Harmonic Mitigation	• IEEE-519 utility compliance
• Cost and Space Saving Solution	• Smaller footprints over standard solutions equal cost savings
• Integrated Reactor Design	• VFD protected from damage/failure due to transient utility voltage

## LOAD SIDE POWER QUALITY

### CHALLENGE

VFD usage causes harmful, unwanted harmonics resulting in premature motor failure, transformer damage, nuisance tripping, and overheating.

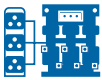
### MTE LOAD SIDE SOLUTIONS

FEATURES	BENEFITS
• Voltage Distortion Mitigation	• Motors and cable protected from damage/failure due to VFD PWM signal
• Stray Voltage/Current Attenuation	• Motor bearings protected from premature failure • Eliminates the need for expensive VFD cables and eliminates cross-talk
• Compact Design	• Optimized form factor compatible with standard motor control cabinets



## LINE SIDE SOLUTIONS

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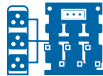


### Matrix® AP

- Meets IEEE-519 requirements
- Adapts to load changes
  - » IEEE-519 compliant down to 50% load
- Improves system efficiency and reliability
- Extends service life of electrical equipment

HF

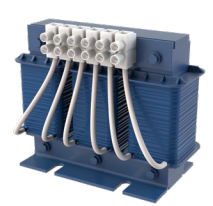
NEW!



### Matrix® E-Series

- Helps support IEEE-519 compliance
- 8% THID at full load, 12% THID at 40% load
  - » w/  $\geq 6\%$  impedance (DC choke/reactor)
- 12% THID at full load, 17% THID at 40% load
  - » w/out DC choke/reactor
- Modular design for easy panel integration

RZ



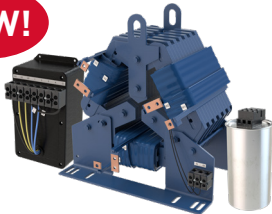
### RLW/RL Reactors

- Protects against surges and transients
- Reduces
  - » Nuisance over-voltage tripping
  - » Harmonic distortion (30-35%)

## LOAD SIDE SOLUTIONS

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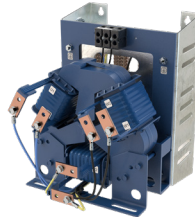
NEW!



### SineWave Nexus®

- Only comprehensive motor protection solution on the market
  - » 5-year motor bearing warranty
- Eliminates common mode and differential mode noise
- Pricy "VFD" cable and insulated bearings not required
- Extends the life of non-inverter and inverter duty motors
- **Microdrive Nexus also available**
  - » Sized optimized to easily integrate into motor control cabinet

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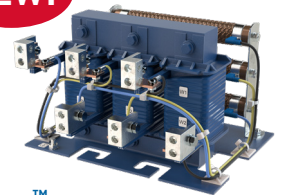


### dV Sentry®

- Reduces dangerous peak voltages and eliminates reflective waves
- Reduce peak common mode voltage by over 50%
- Combines a dV/dt filter and common mode choke into one compact solution

MP

NEW!



### dV E-Series™

- Peak voltage protection and rise time reduction extends the life of motor and cables
- Small footprint and easy terminations make for smooth installation
- Lighter, more efficient, and run cooler than other dV/dt filters
- Optimal dV/dt solution for leads less than 1,000 ft

MTE Corporation  
(800) 455-4MTE • (262) 253-8200



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