



DIVERSIFIED ELECTRONICS

Motor Protection Starts Here

Whether you're protecting a single fan motor or an entire facility, ATC Diversified offers scalable, tiered solutions to fit every application. From basic voltage monitoring to cloud-connected diagnostics, we're your one source for total motor protection.

800.727.5646



ATCDiversified.com

Who Are We and How Can We Help You?

ATC Diversified Electronics designs and manufactures industrial motor protection and automation devices that are as durable as they are precise. For over 50 years, we've been trusted by OEMs and end users across many industries supporting maintenance operations and engineering. We deliver dependable control solutions that improve safety, increase productivity, and reduce downtime.

Our value lies in execution. We don't just engineer ideas—we build rugged, real-world solutions that perform under pressure, again and again. From basic motor monitors to cloud-connected diagnostics, every ATC device is crafted for accuracy, repeatability, and long service life.

What You Don't See Can Kill Your Motor

Most motor failures don't start with a surge—they start with silent threats: voltage imbalance, overheating, misalignment, and blocked airflow. A 3.5% voltage imbalance alone can spike motor temperature by 25%, and just a 10°C (50°F) rise above spec can cut motor life in half.

Add in moisture, dust, or bearing wear, and you're headed for costly downtime. Without protection, small problems become big failures—fast.



Beyond the Cost - Total Cost of Ownership

Motor failure isn't just about replacing parts and repair; it's about everything that grinds to a halt when the motor stops. A single fault can trigger production stoppages, system-wide delays, missed deadlines, and long waits for specialized repairs. Even more costly are the ripple effects—regulatory violations, environmental exposure, safety risks, and the potential for injury or loss of life.

These consequences don't always show up on a standard invoice, but they take a toll: idle teams, reduced throughput, dissatisfied customers, and damaged reputations. Every unprotected motor becomes a silent threat to operational stability.

The total cost of a motor goes far beyond its purchase price, installation costs, or even routine preventative maintenance. It's about anticipating the motor's eventual failure, taking steps to prevent it or prepare for it, and avoiding the hidden financial consequences that follow.

Protection is more than prevention; it's strategy. It's how you control not only the cost of the motor, but the full cost of everything that fails with it.



What Are You Protecting Against?

OVER VOLTAGE

An increase of applied voltage that rises above a level, set threshold, or setpoint that can be hazardous to electric circuits and motors and reduce expected equipment life span. This elevated voltage can be a short duration voltage spike often call a transient or a sustained longer duration voltage increase.

Motor Impact: Higher current draw, lower torque, overheating, and possible stator coil damage due to saturation.

Common Causes: Lightning strikes, sudden load changes, poor utility regulation, or incorrect transformer secondary taps.

Smart Solutions: Over-voltage relays, phase monitor relays, surge arrestors, voltage regulators, capacitor banks, and VFDs.

UNDER VOLTAGE

A decrease of applied voltage also known as a brown out, that drops below a level, set threshold, or setpoint that can be hazardous to electric circuits and motors and reduce expected equipment life span.

Motor Impact: Increased current draw, poor efficiency, overheating, early failure, and less starting torque.

Common Causes: High electrical demand, generator fluctuations, utility issues, or incorrect transformer secondary taps.

Smart Solutions: Under-voltage relays, Uninterruptible Power Supply systems (UPS), proper load management, voltage regulators, capacitor banks, and VFDs.

PHASE LOSS

A complete loss of voltage on one or more phases of a polyphase electric system, also known as single phasing.

Motor Impact: Overheating, vibration, power imbalance, reduced torque, and motor burnout.

Common Causes: Blown fuses, faulty wiring, broken connections, or short circuits.

Smart Solutions: Phase loss relays, voltage monitors, UPS systems, and VFDs.

PHASE SEQUENCE

Also known as phase rotation, is the order the voltage wave forms reach their peak in a polyphase system. For 3 phase systems, the peaks are 120 degrees apart. Typically, A-B-C or C-B-A phase sequence.

Motor Impact: Reverse operation, vibration, reduced performance, and insulation damage.

Common Causes: Maintenance errors, improper wiring, or transformer issues.

Smart Solutions: Pre-energization testing, motor rotation checks, phase sequence monitors, and VFD controls.

PHASE IMBALANCE

Phase imbalance occurs when the voltages across a polyphase system are not equal. Even minor deviations can lead to excess heat buildup, reduced efficiency due to poor power factor, and accelerated motor wear or failure.

Motor Impact: Vibration, increased losses, poor power factor, and early failure.

Common Causes: Uneven load distribution, harmonics, transformer faults, or neutral degradation.

Smart Solutions: Voltage unbalance relays, load balancing, capacitor banks, UPS systems, and VFDs.

FREQUENCY SHIFT

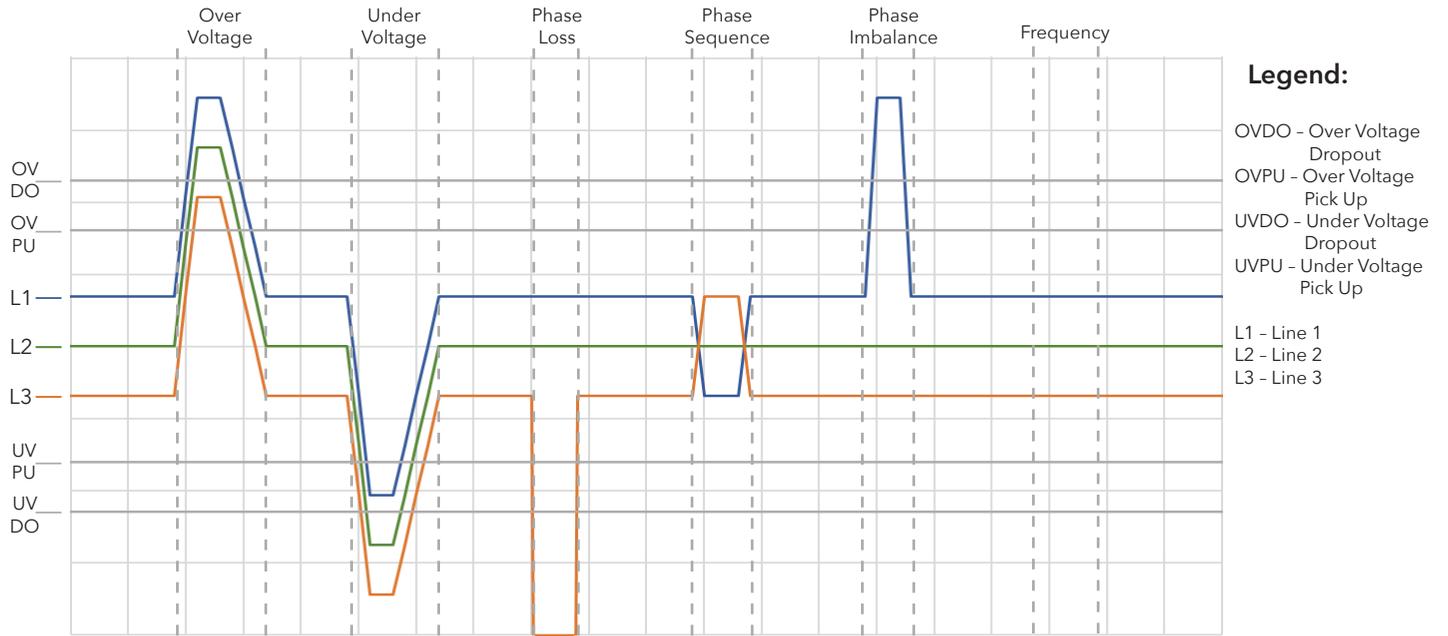
Increase/decrease of motor rotational speed, decreased torque, increased core losses/magnetic saturation, poor power factor, reduced efficiency, increased current, increased temperature, increased vibration, bearing failure and stator winding failure.

Motor Impact: Speed fluctuations, overheating, reduced torque, bearing stress, and efficiency loss.

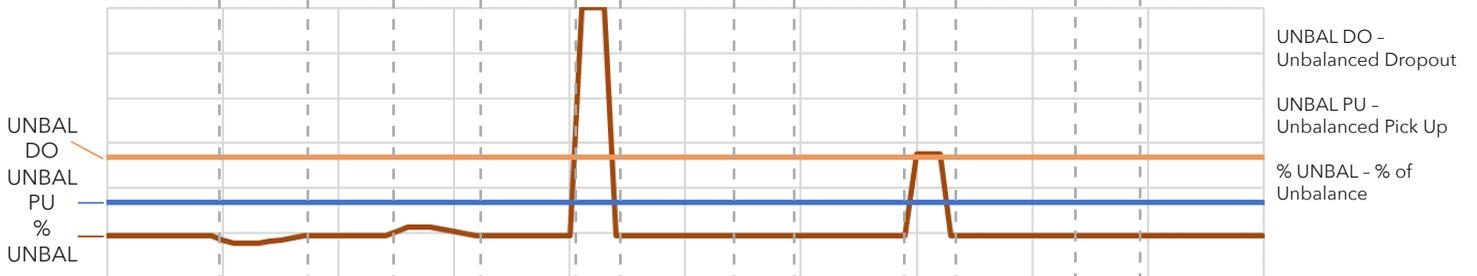
Common Causes: Generator instability, renewable energy sources, poor grounding, or load surges.

Smart Solutions: Frequency monitoring relays, harmonic filters, VFDs, and proper power regulation.

3Ø Phase Monitor Voltage Based Functions



3Ø Phase Monitor Unbalance Based Functions



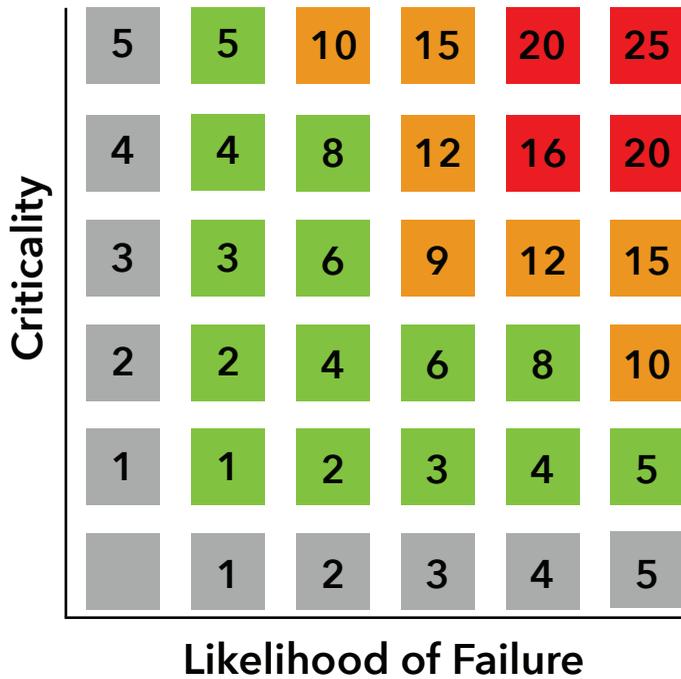
3Ø Phase Monitor Frequency Based Functions



Aligning Risk, Cost, and Safeguards

These two matrices don't just map risk; they forecast the consequences of ignoring it. The top matrix reveals how critical your motors are and how much collateral damage a failure can cause. The bottom matrix shows the level of protection required to avoid that disaster.

If your protection strategy leaves you and your equipment under protected, you're on a direct path to downtime, production bottlenecks, idle labor, missed deadlines, and steep recovery costs. One overlooked imbalance or phase loss could set off a chain reaction your operation can't afford.



Criticality	Likelihood of Failure
<ul style="list-style-type: none"> Replacement/Repair Costs Lost Production/Downtime Environmental Harm Injury/Loss of Life Regulatory Fines 	Determined By: <ul style="list-style-type: none"> Environment Operational Duty Cycle Preventative Maintenance
5 Very High	5 Very High
4 High	4 High
3 Medium	3 Medium
2 Low	2 Low
1 Very Low	1 Very Low

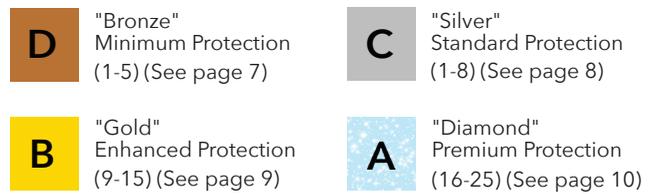
RISK RATING



↓ Apply your Criticality/Failure matrix score to the matrix below to determine your optimal level of protection. ↓



PROTECTION PODIUM



Minimum Protection (D)

This tier covers single-phase or basic three-phase systems where failure may not halt production, but still leads to hidden risks. Minimum protection helps prevent nuisance trips, voltage dips, and phase irregularities that quietly degrade performance. Even low-criticality motors benefit from these essential safeguards.

Appropriate When:

- Single-phase motors or low-horsepower 3-phase systems
- Failure impact limited to minor inconvenience or local reset
- Low exposure to voltage swings or electrical disturbances
- Non-critical roles (e.g., exhaust fans, basic conveyors, & light-duty pumps)

Applications:

- Consumer electronics
- Refrigerators
- AC units
- Freezers



Model / Series	OVL	MPB	CV	DPR175A
Product Category	Bimetallic Overload Relays	Circuit Breaker	Single Phase Monitor	Phase Monitor
Protection/ Operation	Thermal Trip Class 10	Thermal Overload Short Circuit	Under Voltage Over Voltage	Phase Sequence Under Voltage Over Voltage
Nominal Line Voltages Phase to Phase 50/60 Hz	600 VAC max	600 VAC max	Single Phase 110, 120, 230, 240 VAC	3-Phase 230 VAC
Reset	Manual	Manual	Auto	Auto reset on removal of fault condition
Contacts			SPDT	SPDT
Adjustable Trip Point	0.28 - 50Amps	0.1 - 32A setting range Magnetic Trip 13x rated Current		
Contact Rating Resistive			110/120 VAC - 15A or 20A 230/240 VAC - 15A or 20A	N/O 5A at 250 VAC N/C 3A at 250 VAC
Approvals	UL, CE	UL, CE		UL, CE
Mounting Style	Breaker Mount	DIN Rail Mount	Outlet Receptacle or Surface Mount with ¼ inch quick disconnect terminals	DIN Rail Mount
SENSERT® Compatible?				Yes; Dry contact

Standard Protection (C)

This tier supports essential systems where moderate downtime or equipment wear could affect productivity, scheduling, or maintenance resources. It adds configurable protection functions to better respond to fluctuating power quality and motor loading.

Appropriate When:

- Applications with fluctuating loads or risk of phase issues
- Systems where downtime causes delays but not total shutdown
- Motors that cycle frequently or serve secondary production roles
- Facilities seeking better visibility into voltage and current conditions

*Pair **SENSERT®** with temperature, vibration, and encoder outputs for real-time condition monitoring.

Applications:

- HVAC
- Refineries
- Pharmaceutical
- Compressor motors
- Water/wastewater
- Food and beverage
- Industrial heating/cooling
- Petrochemical
- Manufacturing



Model / Series	UOA	SLA/SUA	CMG
Product Category	Single Phase Monitoring Relay	3 Phase Monitoring Relay	Current Monitor/Relay
Protection	Under Voltage	Phase Loss, Under Voltage, Phase Reversal	Under Current Over Current
Nominal Line Voltages Phase to Phase 50/60 Hz	Single Phase 12, 24, 48, 110, 220, 240 VDC 24, 120, 208, 240 VAC	3-Phase 120, 208, 220, 240, 380, 415, 440, 460, 480, 575 VAC	
Control Voltage			Self-Powered
Adjustable Current Trip Point			20-36 Amps fixed (CMG-0100) 2 Amps fixed (CMG-0101)
Range (Amps)			400 Amp (CMG-0100) 200 Amp (CMG-0101)
Reset	Auto	Auto, Manual	Auto
Contacts	DPDT, SPDT	SPDT, DPDT	SPST N/O Optional SPST N/C
Contact Rating Resistive	5A or 10A by Model No.	10A, 5A, 3A	5A Relay or 1A Solid State
Approvals	UL, CSA	UL, CSA	UL
Mounting Style	Plug-In Surface Mount	Plug-In Surface Mount	Style D Surface Mount
SENSERT Compatible?	Yes; Dry contact	Yes; Dry contact	Yes; Dry contact

Enhanced Protection (B)

This protection tier is designed for environments where motor-driven systems play a critical role in maintaining process flow, safety conditions, or product quality. Enhanced diagnostics, configurable thresholds, and time-delay logic give maintenance and engineering teams the tools to act before faults escalate into outages.

Appropriate When:

- Equipment with start-up or inrush sensitivity
- Operations with strict uptime and predictive maintenance goals
- High-duty cycle motors in chemical, pharma, or process environments
- Systems exposed to inconsistent supply conditions or load-driven stress

*Pair **SENSERT®** with temperature, vibration, and encoder outputs for real-time condition monitoring.

Applications:

- Refineries
- Pharmaceutical
- Petrochemical
- Manufacturing
- Water/wastewater
- Food and beverage
- Compressor motors
- Industrial heating/cooling



Model / Series	VBA	DPR350C	SLM	MPA2	CMU100USD
Product Category	Single Phase Monitoring Relay	Voltage Phase Monitor	Microprocessor Based Three-Phase Monitor	Motor Protection Analyzer	Multifunction AC Current Monitoring Relay
Protection	Under Voltage Over Voltage	Under Voltage Over Voltage Under Frequency Over Frequency Asymmetry Phase Failure Phase Sequence	Phase Loss Under Voltage Over Voltage Phase Unbalance Frequency Shift Phase Sequence Microprocessor Based	Overload Undercurrent Overvoltage Undervoltage Frequency Shift Voltage/Current Unbalance Single Phasing Phase Reversal Locked Rotor	Over Current Under Current Window Monitoring Available in 2A or 5A CT Expandable
Nominal Line Voltages Phase to Phase 50/60 Hz	Single Phase 12, 24, 28, 48, 110 VDC 24, 120, 208, 230, 240 VAC	3-Phase 208, 220, 240, 380, 415, 440, 460, 480, 575, 600 VAC	3-Phase 120, 208, 220, 240, 380, 415, 440, 460, 480 VAC	3-Phase 208, 220, 240, 380, 415, 440, 460, 480, 575, 600 VAC	
Control Voltage					24 - 240V AC/DC
Adjustable Trip Point					10 to 100% of Rated Current
Reset	Auto	Auto, Manual	Auto, Manual	Auto, Manual	Auto, Manual
Contacts	SPDT, DPDT	SPDT x 2	DPDT	SPST N/O x 2	SPDT
Approvals	CSA, cURus	UL, CE	UL, CSA	UL	UL, CE
Mounting Style	Plug-In Surface Mount	DIN Rail Mount	Surface Mount	DIN Rail Mount Surface Mount	DIN Rail Mount
SENSERT Compatible?	Yes; Dry contact	Yes; Dry contact	Yes; Dry contact	Yes; Dry contact	Yes; Dry contact

Premium Protection (A)

This tier isn't just about preventing failure—it's about enabling predictive action, automating diagnostics, and giving your team real-time insights across all key performance indicators. This tier is built for facilities where uptime, safety, and system coordination are paramount.

Appropriate When:

- Motors driving mission-critical loads
- High-value equipment with limited downtime windows
- Environments requiring full audit trails or compliance reporting
- Facilities focused on data-driven reliability and remote diagnostics

***Integrates with existing SCADA and PLC control schemes.**

Applications:

- Refineries
- Petrochemical
- Pharmaceutical
- Manufacturing
- Water/wastewater
- Food and beverage
- Compressor motors
- Industrial heating/cooling



Model / Series	Motor Director™
Protection	Overload Undercurrent Overvoltage Undervoltage Frequency Shift Voltage/Current Unbalance Single Phasing Phase Reversal Locked Rotor Temperature Vibration Other Sensor-based Conditions
Nominal Line Voltages Phase to Phase 50/60 Hz	3-Phase 208, 220, 240, 380, 415, 440, 460, 480, 575, 600 VAC
Reset	Auto, Manual
Contacts	SPST N/O x 2
Contact Rating Resistive	B 300 Pilot Duty 1 A @ 240 VAC 0.5 A @ 480 VAC
Approvals	UL
Mounting Style	UL508 Panel
SENSERT® Compatible?	Included

What is Motor Director™?

Maximize motor performance and efficiency with our comprehensive UL-508A Motor Director™ Motor Protection System. Gain instant access to vital motor data from any location, 24/7, allowing for real-time decision-making. Customize alerts to notify you via push notification, text, or email about any irregularities, ensuring you're always a step ahead. This powerful system not only prevents potential issues but also ensures continuous, efficient operation, providing you with complete peace of mind regarding the health of your motors.

Motor Director™ provides:

- Real-time data monitoring
- Access to key information anywhere, at any time
- Alerts sent based on custom thresholds
- Data logging to identify trends over time and make predictive maintenance a reality

* For VFD compatible option, consult factory

* For wireless temperature and vibration monitoring options, consult factory

What is SENSERT®?

SENSERT is a remote, cloud-based process monitoring and alert system with I/O designed to work with a variety of sensors, such as temperature, humidity, vibration, and rotation, to add real-time condition-based monitoring to your motor protection and control schemes.

The SENSERT Base Units

- Available with Wi-Fi or Cellular communication technology
- 4 analog inputs, 2 discrete inputs, and 1 dry output for an external alarm
 - Analog inputs: 0-20mA, 4-20mA, 0-10V, and 0-5V
 - Discrete inputs: Dry Contact or NPN Solid State

SENSERT Remote I/O

- 1 analog and 1 discrete input
- Available with Bluetooth or Wireless Mesh communication back to SENSERT Base Unit
- Up to 5 Remote I/O units can be paired to 1 SENSERT Base Unit.

SENSERT Phone/Web App

- Apps available for iOS/Android
- Web access via PC/Mac/Other
- Custom dashboards, alerts, and data acquisition
- Alerts via Push Notification, Email, and optional Text

Unlock the hidden potential of your current assets with SENSERT!

Add SENSERT to your existing motor protection and control schemes to take advantage of condition-based monitoring, alerting, and data acquisition, enhancing your ability to decrease unplanned downtime.

- Monitor the auxiliary contact of the motor's contactor for On/Off status
- Monitor the dry contact status of existing installed Phase Monitors
 - SLA Series, SLU Series, SLM Series, DPR Series
- Monitor the dry contact status of existing installed Current Monitors
 - CMG Series, CMU Series, CMB Series, CLB Series
- Add condition-based monitoring, alerting, and data logging
 - Temperature, Vibration, Rotation Speed sensors

SENSERT with Motor Director™

SENSERT is the technological backbone of the Motor Director™ system allowing real-time condition-based monitoring of all running parameters with data acquisition and alerts sent straight to your phone.

- Monitored Motor Parameters:
 - Voltage, Current, Frequency, Power Factor, Reactive Power, Real Power, Energy Consumption
- Optional Monitored Parameters:
 - Bearing Temperature, Housing Temperature, Vibration, Rotation Speed



Motor Protection Strategy Worksheet

Motor Name: <i>Compressor #1</i>			
Location: <i>Maintenance Dept.</i>			
Voltage: <i>460V AC</i>			
Full Load Amperage: <i>77 Amps</i>			
VFD in Use? <i>No</i>			
Criticality Assessment: <i>9</i>			
		Existing?	Desired?
Protection:	Under Voltage	X	X
	Over Voltage		X
	Phase Loss	X	X
	Phase Sequence	X	X
	Phase Imbalance		X
	Frequency Shift		X
	Under Current		X
	Over Current		
	Temperature		
	Vibration		
	Tachometer		
Solution: <i>DPR350C & CMU100USD (Enhanced Protection)</i>			

Motor Name:			
Location:			
Voltage:			
Full Load Amperage:			
VFD in Use?			
Criticality Assessment:			
		Existing?	Desired?
Protection:	Under Voltage		
	Over Voltage		
	Phase Loss		
	Phase Sequence		
	Phase Imbalance		
	Frequency Shift		
	Under Current		
	Over Current		
	Temperature		
	Vibration		
	Tachometer		
Solution:			

Motor Name:			
Location:			
Voltage:			
Full Load Amperage:			
VFD in Use?			
Criticality Assessment:			
		Existing?	Desired?
Protection:	Under Voltage		
	Over Voltage		
	Phase Loss		
	Phase Sequence		
	Phase Imbalance		
	Frequency Shift		
	Under Current		
	Over Current		
	Temperature		
	Vibration		
	Tachometer		
Solution:			

Motor Name:			
Location:			
Voltage:			
Full Load Amperage:			
VFD in Use?			
Criticality Assessment:			
		Existing?	Desired?
Protection:	Under Voltage		
	Over Voltage		
	Phase Loss		
	Phase Sequence		
	Phase Imbalance		
	Frequency Shift		
	Under Current		
	Over Current		
	Temperature		
	Vibration		
	Tachometer		
Solution:			



More worksheets available online!
 Scan the QR code or visit our website:
https://rebrand.ly/Motor_Protection_Worksheet

Motor Protection Strategy Worksheet

Motor Name:			
Location:			
Voltage:			
Full Load Amperage:			
VFD in Use?			
Criticality Assessment:			
		Existing?	Desired?
Protection:	Under Voltage		
	Over Voltage		
	Phase Loss		
	Phase Sequence		
	Phase Imbalance		
	Frequency Shift		
	Under Current		
	Over Current		
	Temperature		
	Vibration		
	Tachometer		
Solution:			

Motor Name:			
Location:			
Voltage:			
Full Load Amperage:			
VFD in Use?			
Criticality Assessment:			
		Existing?	Desired?
Protection:	Under Voltage		
	Over Voltage		
	Phase Loss		
	Phase Sequence		
	Phase Imbalance		
	Frequency Shift		
	Under Current		
	Over Current		
	Temperature		
	Vibration		
	Tachometer		
Solution:			

Motor Name:			
Location:			
Voltage:			
Full Load Amperage:			
VFD in Use?			
Criticality Assessment:			
		Existing?	Desired?
Protection:	Under Voltage		
	Over Voltage		
	Phase Loss		
	Phase Sequence		
	Phase Imbalance		
	Frequency Shift		
	Under Current		
	Over Current		
	Temperature		
	Vibration		
	Tachometer		
Solution:			

Motor Name:			
Location:			
Voltage:			
Full Load Amperage:			
VFD in Use?			
Criticality Assessment:			
		Existing?	Desired?
Protection:	Under Voltage		
	Over Voltage		
	Phase Loss		
	Phase Sequence		
	Phase Imbalance		
	Frequency Shift		
	Under Current		
	Over Current		
	Temperature		
	Vibration		
	Tachometer		
Solution:			



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Motor Protection Strategy Worksheet

Motor Name:			
Location:			
Voltage:			
Full Load Amperage:			
VFD in Use?			
Criticality Assessment:			
		Existing?	Desired?
Protection:	Under Voltage		
	Over Voltage		
	Phase Loss		
	Phase Sequence		
	Phase Imbalance		
	Frequency Shift		
	Under Current		
	Over Current		
	Temperature		
	Vibration		
	Tachometer		
Solution:			

Motor Name:			
Location:			
Voltage:			
Full Load Amperage:			
VFD in Use?			
Criticality Assessment:			
		Existing?	Desired?
Protection:	Under Voltage		
	Over Voltage		
	Phase Loss		
	Phase Sequence		
	Phase Imbalance		
	Frequency Shift		
	Under Current		
	Over Current		
	Temperature		
	Vibration		
	Tachometer		
Solution:			

Motor Name:			
Location:			
Voltage:			
Full Load Amperage:			
VFD in Use?			
Criticality Assessment:			
		Existing?	Desired?
Protection:	Under Voltage		
	Over Voltage		
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	Phase Sequence		
	Phase Imbalance		
	Frequency Shift		
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	Temperature		
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Solution:			

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Voltage:			
Full Load Amperage:			
VFD in Use?			
Criticality Assessment:			
		Existing?	Desired?
Protection:	Under Voltage		
	Over Voltage		
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Solution:			



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Location:			
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Full Load Amperage:			
VFD in Use?			
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		Existing?	Desired?
Protection:	Under Voltage		
	Over Voltage		
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	Phase Sequence		
	Phase Imbalance		
	Frequency Shift		
	Under Current		
	Over Current		
	Temperature		
	Vibration		
	Tachometer		
Solution:			

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Location:			
Voltage:			
Full Load Amperage:			
VFD in Use?			
Criticality Assessment:			
		Existing?	Desired?
Protection:	Under Voltage		
	Over Voltage		
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	Phase Sequence		
	Phase Imbalance		
	Frequency Shift		
	Under Current		
	Over Current		
	Temperature		
	Vibration		
	Tachometer		
Solution:			

Motor Name:			
Location:			
Voltage:			
Full Load Amperage:			
VFD in Use?			
Criticality Assessment:			
		Existing?	Desired?
Protection:	Under Voltage		
	Over Voltage		
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	Phase Sequence		
	Phase Imbalance		
	Frequency Shift		
	Under Current		
	Over Current		
	Temperature		
	Vibration		
	Tachometer		
Solution:			

Motor Name:			
Location:			
Voltage:			
Full Load Amperage:			
VFD in Use?			
Criticality Assessment:			
		Existing?	Desired?
Protection:	Under Voltage		
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	Phase Imbalance		
	Frequency Shift		
	Under Current		
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	Temperature		
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	Tachometer		
Solution:			



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Let's Protect What Drives Your Process

From simple relays to advanced cloud-connected systems, ATC Diversified delivers scalable motor protection that reduces downtime, safeguards equipment, and supports long-term productivity. Wherever motors matter, we've got you covered.

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