

ELECTRICAL

TOTALINE® PROTECTION CONTROLS

PROTECTION CONTROL – HEAD PRESSURE CONTROL WITH OPTIONAL HEAT PUMP OVERRIDE

Head Pressure Controls — Temperature sensitive fan motor control which regulates head pressure at low ambients by varying the air volume through the condenser. Its unique construction permits exceptionally quick response times to changes in liquid line temperatures.

APPLICATION

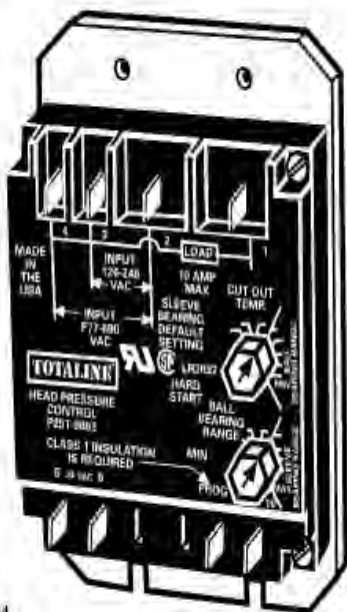
Ideal for low ambient conditions found in:

- Supermarkets - Frozen Storage
- Computer rooms
- Temperature/ Humidity Sensitive Environments

PART NO	VOLTS	DESCRIPTION
P251-0083H	120-480 VAC	HPC w/optional,HP override
P251-0094H	120 or 240 VAC	Line Voltage,HPC w/Optional,HP Override
P251-0095H	480 VAC	Line Voltage,HPC w/Optional,HP Override
P251-0083C	120-600 VAC	HPC (Canada)

ELECTRICAL

P251-0083H

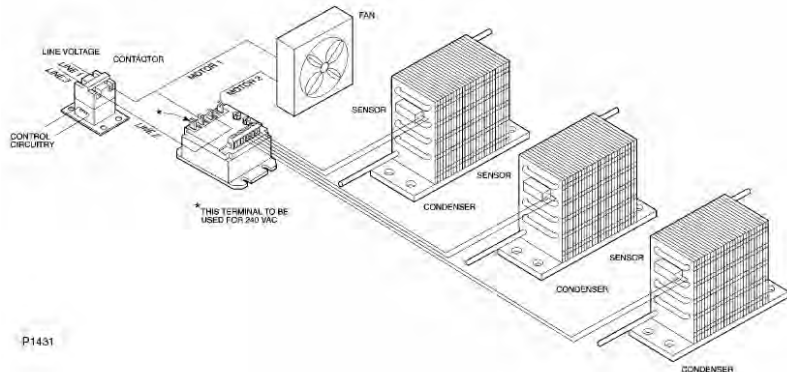


P194

FEATURES/APPLICATION	SPECS	REPLACES
<ul style="list-style-type: none"> • Integral Heat Pump Bypass circuitry allows electronic bypass of speed control during heat pump operation. • Eliminates overshoots common to on/off and pressure switch controls. • Helps prevent evaporator freeze-ups, low pressure cut-outs and liquid-slugged compressors in low ambient conditions. • One model covers 120-480 VAC. • Features: hard start, low temperature cutoff, high temperature bypass, isolated 24 VAC supply. • Controls up to 3 refrigerant circuits. • Typical application: heat pumps. 	<p>Input</p> <ul style="list-style-type: none"> • Control: 18-30 VAC <p>Line Input: 120-480 VAC</p> <p>Output</p> <ul style="list-style-type: none"> • Tlac max: 10 amps min: 100 ma • Range: 120-480 VAC 	<p>One Totaline model replaces:</p> <ul style="list-style-type: none"> • Hoffman: 800/800A/800AA/814-50 • Ranco: E31 Series • Johnson Controls: P66 • ACT: FM2000

TYPICAL SYSTEM DIAGRAM FOR P251-0094H

- Single unit controls up to 3 refrigerant circuits on a single remote condenser.

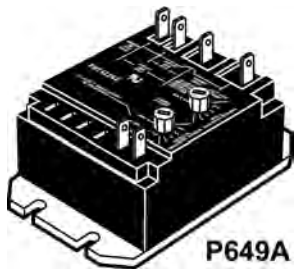


P1431

ELECTRICAL

TOTALINE® PROTECTION CONTROLS

LINE VOLTAGE HEAD PRESSURE CONTROL WITH OPTIONAL HEAT PUMP OVERRIDE



P649A

FEATURES / APPLICATION	SPECS	REPLACES
<ul style="list-style-type: none"> • Built-in transformer eliminates cost, reduces installation time and simplifies wiring. Direct set up from line voltage. • Helps prevent evaporator freeze-ups, low pressure cut-outs and liquid-slugged compressors in low ambient conditions. • Features: hard start, low temperature cutoff, high temperature bypass, isolated 24 VAC supply is built into the control. • Mechanical dimensions: 4.5" L x 3" W x 2" H. • Ideal for heat pumps, line voltage. air conditioning and refrigeration 	<p>Input:</p> <ul style="list-style-type: none"> • Frequency: 50/60 Hz • Power Consumption: 4 VA @ 24 VAC <p>Output:</p> <ul style="list-style-type: none"> • Type: triac • Output Voltage: P2510094H: 120 or 208/240 VAC P251-0095H:480 VAC • Output Current: max: 10 amps min: 100 ma 	<ul style="list-style-type: none"> • Hoffman: 800/800A/800AA/814-50 • Ranco E31 Series: • Johnson Controls: P66 <p>Integral transformer reduces inventory.</p>

PART NO

P251-0094H/P251-0095H

ELECTRICAL

ELECTRICAL

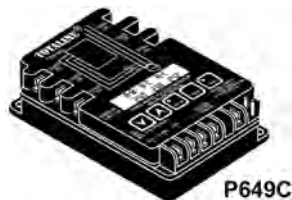
TOTALINE® PROTECTION CONTROLS

MONITORS

Designed to protect motors and other loads from premature failure and damage due to common voltage faults such as voltage unbalance, over/under voltage, phase loss, reversal, incorrect sequencing and rapid short cycling.

PART NO	VOLTS	DESCRIPTION
P251-0092-B	95-270	Single Phase Line
P251-0090	190-630	Three Phase
P251-0091	190-630	Programmable Three Phase
P251-0030	190-600	Low Cost Three Phase
P251-0031	190-600	Low Cost Three Phase

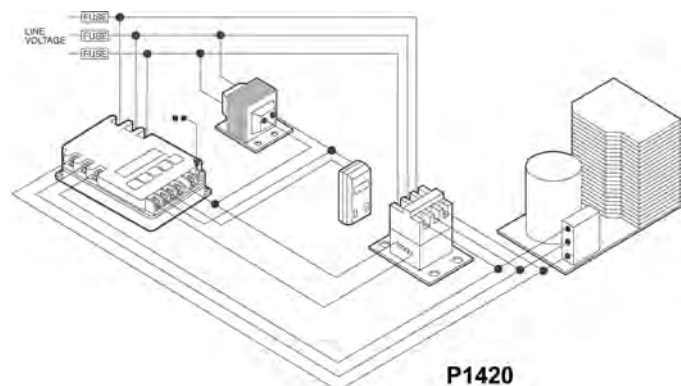
THREE PHASE PROGRAMMABLE MONITOR



FEATURES / APPLICATION	SPECS	REPLACES
<ul style="list-style-type: none"> • Monitors front and back side of system. • Programmable-25-fault memory storage. • Independent high/low voltage settings for dual voltage compressor applications. • Identifies front & back side faults. • High temperature LCD to 167° F. • 190-630 VAC operation • Simultaneous voltage display-no scrolling. • Line voltage programmable. • Reset-auto or manual. • Non-volatile memory. • Monitors: voltage unbalance, high/low voltage, phase loss, reversal, incorrect sequencing, rapid short cycling. • Does not require control voltage for operation. 	<p>Input:</p> <ul style="list-style-type: none"> • Voltage: 190-630 VACI • Frequency: 50/60Hz • Voltage Unbalance: adj.2-25% • Control: 18-240 VAC <p>Output:</p> <ul style="list-style-type: none"> • Relay, SPDT n.o.: 10 amps n.c.: 6 amps 	<ul style="list-style-type: none"> • Diversified: AC-2020, AC-301, 302 • Motorsaver: 455 • SSAC: QLM/QLV • TimeMark: 265 • Wagner: WPC-800 • Watsco: EAC-800, EAC-8000

PART NO	CONTROL VOLTAGE
P251-0091	18 - 240 VAC

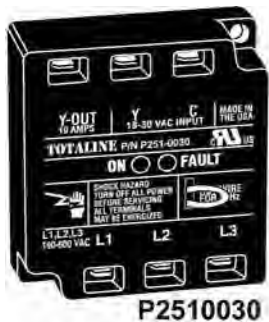
TYPICAL SYSTEM DIAGRAM FOR P251-0091



ELECTRICAL

TOTALINE® PROTECTION CONTROLS

THREE PHASE LINE VOLTAGE MONITOR



P2510030

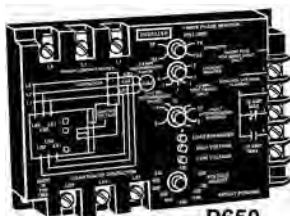


P2510031

FEATURES / APPLICATION	SPECS
<ul style="list-style-type: none"> • Low cost, single side 3-phase protection • Bright LED indications for faults and loads energized • Easy to install, no adjustments • Wide operating range: 190-600 VAC • Less than 1 second phase loss response • Automatic reset from a fault condition • Compact packaging: fits almost anywhere • Rugged, epoxy-encapsulation for extreme conditions • Works great with the Totaline P251-0091 for load side monitoring of part winding start and multiple compressor systems. 	<ul style="list-style-type: none"> • Line Voltage: 190-600 VAC • Frequency: 50/60 Hz • Control Voltage: P251-0030: 18-30 VAC P251-0031: 115- 230 VAC • Output: Relay: SPST P251-0030: N.O. 10 amps P251-0031: N.O. 30 amps • Case Dimensions: 3.1" x 3.2" x 1.4" h

PART NO	CONTROL VOLTAGE
P251-0030	18 - 30 VAC
P251-0031	115 - 230 VAC

THREE PHASE MONITOR



P650

FEATURES / APPLICATION	SPECS	REPLACES
<ul style="list-style-type: none"> • Lower cost, full performance protection. • Monitors front and back sides of system. • 190-630 VAC operation. • Bright LED indicators. • Identifies front and back side faults. • Knob-adjustable features. • Reset-auto or manual (1 trial). • Built-in short cycle protection. • Monitors: voltage unbalance, high/low voltage, phase loss, reversal, incorrect sequencing, rapid short cycling. 	<p>Input:</p> <ul style="list-style-type: none"> • Voltage: 190-630 VAC • Voltage Unbalance: adj. 2-25% • Control: 18-240 VAC • Frequency: 50/60 Hz <p>Output:</p> <ul style="list-style-type: none"> • Relay, SPDT n.o.: 10amps n.c.: 6 amp 	<ul style="list-style-type: none"> • Diversified: AC-2020 AC-301, 302 • Motorsaver: 455 • SSAC: QLM/QLV • TimeMark:265 Wagner: WPC-800 • Watsco: EAC-800, EAC-8000

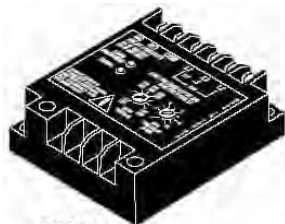
PART NO	CONTROL VOLTAGE
P251-0090	18 - 240 VAC

ELECTRICAL

ELECTRICAL

TOTALINE® PROTECTION CONTROLS

SINGLE PHASE MONITOR



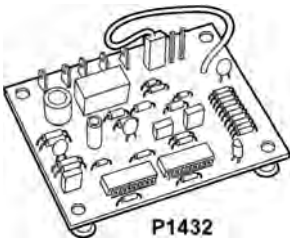
P4597

FEATURES / APPLICATION	SPECS	REPLACES
<ul style="list-style-type: none"> • Low cost single phase motor protection. • Built-in anti-short cycle protection. • Detects high/low voltage conditions. • Helps prevent rapid system recycling. • LED indicator: red for fault, green for normal conditions. • Heavy duty SPDT, isolated relay output. • 5-second interrogation delay prevents nuisance trips. 	<p>Input:</p> <ul style="list-style-type: none"> • Line: 95-270 VAC <p>Output:</p> <ul style="list-style-type: none"> • Relay, SPDT n.c./n.o.: 5amps <p>Time delay</p> <ul style="list-style-type: none"> • Range: adj. 0-600 sec. 	<ul style="list-style-type: none"> • Diversified: CV-100-RS, CV-200-RS15, CV-200-RS20 • Watsco: EAC-401, EAC-402, EAC-403, EAC-404

PART NO

P251-0092-B

DEFROST CONTROLS



P1432

FEATURES / APPLICATION	SPECS	REPLACES
<ul style="list-style-type: none"> • Direct replacement for OEM type 621. • Low cost, time/temperature defrost. • 24 VAC operation (18-30 VAC). • 10 min. defrost interval. Pin-selectable interval times (30/60/90). • Test pins reduce test time by 256x. • HOLD input accumulates actual compressor run times. • Sensor input for defrost terminate. • Conformally coated. 	<ul style="list-style-type: none"> • 18-30 VAC • 50/60 Hz • Relay output Form: SPST n.o. 2amps • Defrost: 10 min. fixed • Interval times: pin-selectable 30/60/90 min. 	<ul style="list-style-type: none"> • Amana C6431001 • Arco 343214 • Avion DFT100 • Coleman 30130B3741 • HeilQuaker ICM DFOS • Intertherm 6208800 • Janitrol B12260-06 • Lennox 33G950 • Ranco DT2-1000 • Rheem-Ruud 47-21776-02-00 • Snyder General 1052757, 1395-329 • Weatherking 840-4-5548

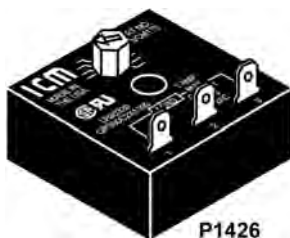
PART NO

P284-2590

ELECTRICAL

TOTALINE® PROTECTION CONTROLS

BYPASS TIMER



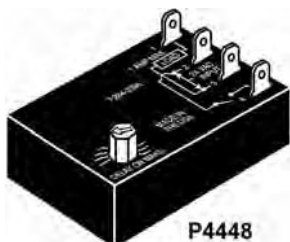
Designed to bypass a control or device during startup. Typically used to bypass a low pressure switch during compressor heat pump startup or to bypass an oil pressure switch upon startup. Helps to eliminate nuisance lockouts.

FEATURES / APPLICATION	SPECS	REPLACES
<ul style="list-style-type: none"> Designed to bypass a low pressure switch or other device during startup. Ideal for low ambient startups. Integral component for "winter start" kits. Helps to reduce nuisance lockouts. Universal AC voltage operation. Knob-adjustable time delays. Epoxy-encapsulated circuitry. 	<ul style="list-style-type: none"> 18-240 VAC 1 amp 10 amp inrush knob-adjust-able time delays: 10-1,000 sec. 	<ul style="list-style-type: none"> Mars: 32395 Supco: TDP68

PART NO

P284-2397

POST PURGE FAN DELAY TIMER

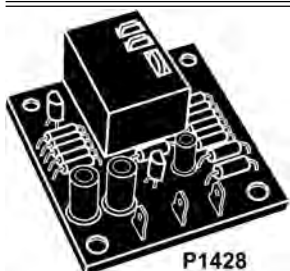


Controls the circulating fan in heat pump, air conditioning and forced air systems. OFF delay timing function continues to run the fan at the end of the heating/cooling cycle, thereby purging ducts of residual air and increasing system efficiency.

FEATURES / APPLICATION	SPECS	REPLACES
<ul style="list-style-type: none"> UL 873 Recognition. Post-Purge Fan Delay Timer. OFF Delay purges ducts of Residual Air at the end of the heating/cooling cycle. Interrogation delay eliminates nuisance trips due to thermostat bounce/tampering. 	<ul style="list-style-type: none"> 18-30 VAC 1 amp 10 amp inrush SPST, N.O. Time Delays <ul style="list-style-type: none"> fixed or adj.: ON: 1-180 sec. OFF: 12-390 sec. 	<ul style="list-style-type: none"> MARS: 32393 Gemline 1C216

PART NO

P284-2395



FEATURES / APPLICATION	SPECS	REPLACES
<ul style="list-style-type: none"> Low cost open board design. High power, relay output. Dual function fan delay timer. Controls the circulating fan in heat pump, A/C and forced air systems. OFF delay purges ducts of residual air. ON delay allows air to reach the proper comfort level prior to energizing the fan. 	<ul style="list-style-type: none"> Input: 18-30 VAC N.O.-20 amps @ 240 VAC N.C.-10 amps @ 240 VAC Time Delays <ul style="list-style-type: none"> Fixed at: ON: 1 sec. OFF: 60 sec. 	<ul style="list-style-type: none"> EMI Watsco AHBC-060 AHBC-090

PART NO

P284-1216

ELECTRICAL

ELECTRICAL

TOTALINE® PROTECTION CONTROLS

DELAY-ON-BREAK TIMERS



P651

Helps to protect air conditioning, refrigeration and heat pump equipment from damage which may be caused by the rapid short-cycling of compressor.

FEATURES / APPLICATION	SPECS	REPLACES
<ul style="list-style-type: none"> Higher 1.5 amp power rating. Compressor lockout/anti-short cycle timer. Helps to protect compressors from damage caused by rapid short cycling Simple, 2-wire hookup. Compact 2" x 2" package. Model with 6? wire leads shown at left. 	<ul style="list-style-type: none"> 18-30 VAC 1.5 amps •15 amp inrush 3 or 5 min. fixed time delays Voltage drop: 3.5 V typical 4.5 V max 	<ul style="list-style-type: none"> Diversified: ASC-500, 501, ASC-502 ASC-505-5 Gemline: IC321, IC322 Watsco: EAC-500 EAC-501-180-W EAC-501-300-W

PART NO

P284-2387



P652

FEATURES / APPLICATION	SPECS	REPLACES
<ul style="list-style-type: none"> Universal voltage operation. Higher 1.5 amp power rating. Compressor lockout/anti-short cycle timer. Helps to protect compressors from damage caused by rapid short cycling. Simple, 2-wire hookup. Compact 2" x 2" package. 	<ul style="list-style-type: none"> 18-240 VAC 1.5 amps 15 amp inrush knob-adjustable delays .03-10 min. (1.8-600 seconds) Voltage drop: 3.5 V typical 4.5 V max 	<ul style="list-style-type: none"> Diversified: ASC-500, 501, ASC-502 ASC-505-5 Gemline: IC320 Mars: 32392 Robertshaw: 3310-072 Supco: TD-73 Watsco: EAC-501-ADJ. EAC-501-ADJ.-X

PART NO

P284-2392

ELECTRICAL

TOTALINE® PROTECTION CONTROLS

DELAY-ON-BREAK TIMERS



FEATURES / APPLICATION	SPECS	REPLACES
<ul style="list-style-type: none"> UL 873 recognition as compressor controller. Help to prevent scroll compressors from reversing. Fast response time: 16 ms. Compressor lockout/anti-short cycle timer. Prevents low voltage starts. Eliminates relay chatter due to thermostat bounce or tampering. Works with anticipator-type thermostats. Patented: U.S. Patent No. 4,991,049. 	<ul style="list-style-type: none"> 18-30 VAC 1.5 amps 15 amp inrush 3 or 5 min. fixed or 10 min. adjustable time delays 	<ul style="list-style-type: none"> Gemline: IC243 Mars: 32381/32382 Supco: TL243, TL245 Robertshaw: 3310-183, 3310-305 Watsco: EAC-511, EAC-426-180, EAC-426-300, EAC-426-ADJ.

PART NO

P284-2390

DELAY-ON-MAKE TIMER



General purpose “delay on make” timing function. Ideal for compressor staging and stagger-starting multiple units. Helps to reduce power surges in multiple compressor applications.

FEATURES / APPLICATION	SPECS	REPLACES
<ul style="list-style-type: none"> Universal voltage operation. Higher 1.5 amp power rating. Knob-adjustable time delays. Work with anticipator-type thermostats. One model replaces many in field. Ideal for compressor staging. Simple 2-wire hookup. Compact 2" x 2" package. 	<ul style="list-style-type: none"> 18-240 VAC/VDC 1.5 amps 15 amp inrush SPST, N.O. Adjustable delays .03-10 min. (1.8-600 sec.) Voltage drop: 2.5 V @ 1.5 amps 	<ul style="list-style-type: none"> Diversified: AC-800 fixed volt: ASC-00/601 Gemline: IC310/ICS213 Mars: 32391/32367 Robertshaw: 3310-068 Supco: TD-68 D-69 Watsco: EAC-701-ADJ., -X, EAC-700-A

PART NO

P284-2391

ELECTRICAL

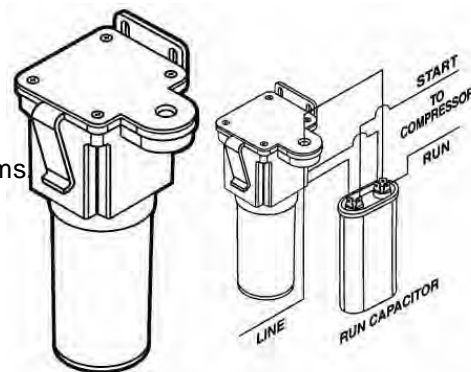
ELECTRICAL

TOTALINE® PROTECTION CONTROLS

Smart Start Kits - “Current Sensing”

By monitoring the compressor “**current**” upon start-up, the Smart Start is able to engage the hard start capacitor for precisely the correct amount of time, ensuring maximum starting torque without the risk of supplying too much current into the start winding.

- A timed safety circuit is provided in the event the motor fails to start within 600ms
- Current sensing Hard Start precisely increases starting torque.
- Operates from 95 - 288 VAC
- Max Input Voltage: 502 VAC
- Patented current sensing circuitry
- Self-Adjusting to voltage fluctuation
- Easy to install, 2 wires, clips or screws
- Bos starting torque
- Disengages upon start



PART NO	HP Rating	Replaces
P290-0803	1/2 - 3 HP	Supco : SPP-8 Kickstart : TO-5 A-1 : WSX-1
P290-0805	3 - 5 HP	Kickstart : KS1
P290-0810	5 - 10 HP	--

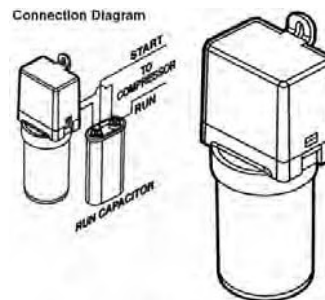
Smart Start Kits - “Voltage Sensing”

Products employ patented circuitry which monitors differential compressor auxiliary voltage, determines the state of the motor and precisely engages and disengages the start capacitor.

- Not Effected by Ambient temperature
- Recycles instantly (less than 1 second)
- Multi-voltage operation - either 115 or 230 VAC

Ideally suited for:

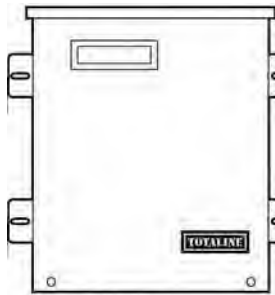
- Water Coolers
- Vending Machines
- Household Refrigerators (115 or 230 VAC)
- Commercial Refrigeration (115 or 230 VAC)
- Air Conditioners and Heat Pumps



PART NO	VOLTAGE	Replaces	Voltages	MFD	Oper Temp Range	Max Input Voltage	Range	Recommended Range
P290-0850	90-277 VAC	Supco : SPP-5 MARS : 32701 A-1 : WSX-5	330 capacitor	44-52	-40° C to +65° C	390 VAC	1/12 - 10 HP	1/12 - 1 HP
P290-0860	90-277 VAC	Supco : SPP-6 MARS : 32703 A-1 : WSX-6	330 capacitor	88-106	-40° C to +65° C	390 VAC	1/12 - 10 HP	1/2 - 1 HP

TOTALINE® PROTECTION CONTROLS

TOTALINE® 3-PHASE HEAD PRESSURE CONTROLS



P4277

The Totaline P251-0096, P251-0097 3-Phase Head Pressure Controls are application specific three phase frequency inverters designed to regulate head pressure at low ambient conditions by varying the amount of airflow through the condenser, which helps to ensure sufficient pressure across the expansion valve and prevent costly downtime.

ADVANTAGES:

- True sine wave output.
- Eliminates harmonic resonance.
- Works with standard 3-phase motor (no need to purchase expensive inverter grade motors).
- Quick installation (no need to program around noisy harmonic frequencies).
- Easy to program.
- Large LCD readout.
- Weatherproof enclosure.
- Coast feature (allows fan to continue running at minimum frequency setting).

Power Ratings:

- **P251-0096** — 240 VAC, 1-3 Hp
- **P251-0097** — 480 VAC, 1-5 Hp

SPECIFICATIONS:

Sensor Input Type:

- Temperature
- Pressure
- 4-20mA
- 0-10VCD

Sensor Temperature:

40°F to 140°F (4°C to 60°C)

Pressure Set Point: 20 to 420 psig

Minimum Frequency:

- 3 to 55Hz

Maximum Frequency:

- 8 to 60Hz

Current Trip:

- 4 to 24 Amps

Operating Characteristics:

- Input Voltage:
 - 240 VAC — P251-0096
 - 480 VAC — P251-0097
- Maximum Operating (adjustable 70°C)

Optional Totaline P251-0098 Pressure Transducer:

