



GROUND-FAULT PROTECTION



GROUND-CONDUCTOR MONITORING



RESISTANCE GROUNDING/NGR MONITORING



FEEDER PROTECTION



ARC-FLASH PROTECTION



SWITCHING RELAYS & CONTROLS



MOTOR & PUMP PROTECTION



PUMP CONTROLLERS



AC SYSTEM MONITORS/LOAD SENSORS



TIMERS



**FLASHERS, TOWER &
OBSTRUCTION LIGHTING CONTROL**



INDUSTRIAL PRODUCT SELECTION GUIDE

Over 225 Relay Product Series are contained in this handy guide.

Product Selection as Easy as 1-2-3

STEP 1:

Select the product category

example

 **ARC-FLASH PROTECTION**

ARC-FLASH DETECTION

Rapidly detect an arc flash to reduce damage to equipment and risk to personnel



STEP 2:

Use the decision tree to determine what features you need for your application

example

Sensor Health Monitoring

Y

N

Overcurrent Detection

Y

N

STEP 3:

Leads you to the product series that is the best fit.

example



PGR-8800 SERIES



AF0500 SERIES



D0920

PRODUCT SELECTION GUIDE

Ground-Fault Protection	2
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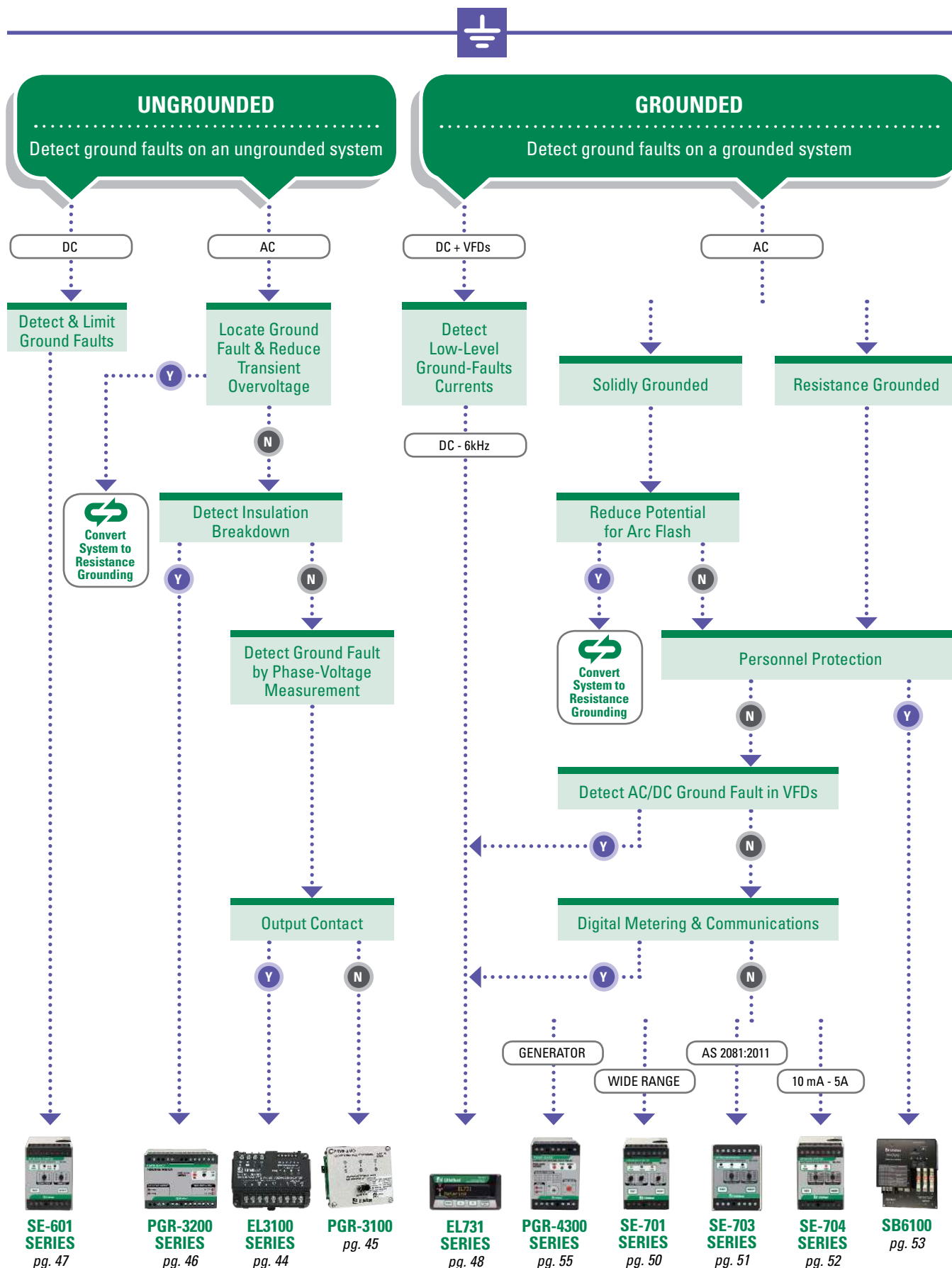
GROUND-FAULT PROTECTION



STEP 1 Select product category

STEP 2 Select the needed features in each category

STEP 3 Find the recommended product for your application



Ground-Fault Protection Relays

Page numbers beneath products refer to our Protection Relay & Controls Catalog available in print or online at www.littelfuse.com/relayscontrols/catalog

GROUND-CONDUCTOR MONITORING



GROUND-FAULT & GROUND-CHECK

Ensure ground- conductor continuity for portable equipment and submersible pumps, and detect ground faults

Cable Voltage

<5kV

>5kV



**SE-105, SE-107
SERIES**
pg. 58



**SE-134C, SE-135
SERIES**
pg. 59

Ground-Conductor Monitoring Relays

RESISTANCE GROUNDING/NGR MONITORING



RESISTANCE-GROUNDED AC

Solve problems commonly associated with ungrounded and solidly grounded systems and monitor the neutral-to-ground connection

Neutral-Grounding
Resistance (NGR)
Continuity Monitoring

Implement
Resistance
Grounding

Pulsing, Digital Filtering,
Communications, or Software

Y

N

Identify Faulted Feeder

Y

N



**SE-330 & SE-701
SERIES**
(use in combination)
pg. 63 pg. 50



**SE-330
SERIES**
pg. 63



**SE-325
SERIES**
pg. 62



**NGR
SERIES**
pg. 66

Resistance Grounding Systems & NGR Monitors

FEEDER PROTECTION



STANDARD

Protect distribution feeders in processing, manufacturing, petroleum, chemical, and wastewater treatment facilities

ADVANCED

Monitor voltage and current using a modular system with integrated protection, breaker control, metering, and data-logging functions

Current Protection & Metering IEEE/IEC Overcurrent

Current Protection, Voltage Protection, & Metering IEEE/IEC Overcurrent



**FPU-32
SERIES**
pg. 70



**FPS
SERIES**
pg. 70

ARC-FLASH PROTECTION



ARC-FLASH DETECTION

Rapidly detect an arc flash to reduce damage to equipment and risk to personnel

Sensor Health Monitoring

Y

N

Overcurrent Detection

Y

N

Multiple Zones, Communications, & Data Logging

Y

N



**PGR-8800
SERIES**
pg. 75



**AF0500
SERIES**
pg. 77



**AF0100
SERIES**
pg. 79



D0920
pg. 74

Feeder Protection Relays

Arc-Flash Relays



SOLID-STATE RELAYS

Designed for industrial applications requiring rugged, reliable operation

PHASE CONTROL

Designed for changing lamp intensity, varying the speed of a fan, or controlling the temperature of a heater

TEMPERATURE CONTROL

A single set point controller with high current, solid state output for resistive loads

Optical Isolation Between the Control Voltage Input and the Solid-State Output

Y

N

Random Switching for Inductive Loads

Random Switching for Inductive Loads

Y

N

Zero Voltage Switching for Resistive and Incandescent Loads



SIR1
SERIES
pg. 86



SIR2
SERIES
pg. 86



SLR
SERIES
pg. 88



PHS
SERIES
pg. 84



TCR9C
pg. 90

Solid-State Switching Relays

Phase Control Switching Relays

Temperature Control Relays

MOTOR & PUMP PROTECTION



SUPPLEMENTAL PROTECTION (MOTOR)

Protection for motors against insulation degradation, overheating, or ventilation failure

BASIC (PUMP)

Protection of single-phase pumps against dry-well, dead-head, jammed impeller, rapid-cycling and over/under voltage

Ground-Fault Protection & Insulation Monitoring

Temperature Monitoring Using RTDs

Mounting Options

SURFACE MOUNT

OPEN BOARD

Hand-Held Diagnostic Tool Helpful for Troubleshooting

Voltage

Voltage

115V

230V

115V

230V

HP

HP

<3HP

>5HP

1/3 - 1HP

1/3 - 3HP

Control Box Type

FRANKLIN™, PENTEK®, CENTRIPRO™

GRUNDFOS®

FOR ALL BASIC SINGLE-PHASE UNITS ON THIS PAGE



PGR-6100 SERIES
pg. 94



SIO-RTD-02-00 SERIES
pg. 128



111P
pg. 106



233P SERIES
pg. 106



235P
pg. 110



111-INSIDER-P
pg. 101



231-INSIDER-P
pg. 101



232-INSIDER
pg. 104



234-P
pg. 108



INFORMER
pg. 250

Basic Motor & Pump Protection

Page numbers beneath products refer to our Protection Relay & Controls Catalog available in print or online at www.littelfuse.com/relayscontrols/catalog



STANDARD

Multi-function protection for low and medium voltage motors

STANDARD WITH BLUETOOTH®

Multi-function protection for single-phase and three-phase low and medium voltage motors and pumps with real-time data, programming and troubleshooting via iPhone® or Android™ app

Single-Phase

Three-Phase

Under Power Protection for Pump Applications

Under Power Protection for Pump Applications

Y

N

Y

N

4-20mA Output Power

Temperature Protection & Reduced Overcurrent

Y

N

Y

N



77C-KW/HP SERIES
pg. 125



77C SERIES
pg. 118



777-ACCUPower & COM 4-20
(use in combination)
pg. 123 pg. 261



777-KW/HP-P2 SERIES
pg. 120



MPU-32 SERIES
pg. 96



777-P2 SERIES
pg. 114



MP8000 SERIES
pg. 112

Standard Motor & Pump Protection

Standard Motor & Pump Protection with Bluetooth®

MOTOR & PUMP PROTECTION



ADVANCED

Comprehensive voltage protection and starter control for medium voltage motors and pumps

RETROFITS

Pre-wired plug & play replacement for obsolete and competitors' relays



MPS SERIES
pg. 98



MPU-32-X69X SERIES
pg. 100



MPS-469X SERIES
pg. 100

PUMP CONTROLLERS



SEAL LEAK DETECTORS

Detect pump seal leaks & motor overheating on submersible pumps

Controller Functionality

SINGLE-CHANNEL

DUAL-CHANNEL

Mounting Option

8-PIN SOCKET

DIN RAIL

Seal Leak & Over Temperature

Y

N

Dual Seal Leak



201-100-SLD
pg. 136



460-15-100-SLD
pg. 139



PC-102CICI-LT
pg. 132



PC-102CICI-DL
pg. 132

Advanced Motor & Pump Protection

Retrofits

Seal Leak Detection

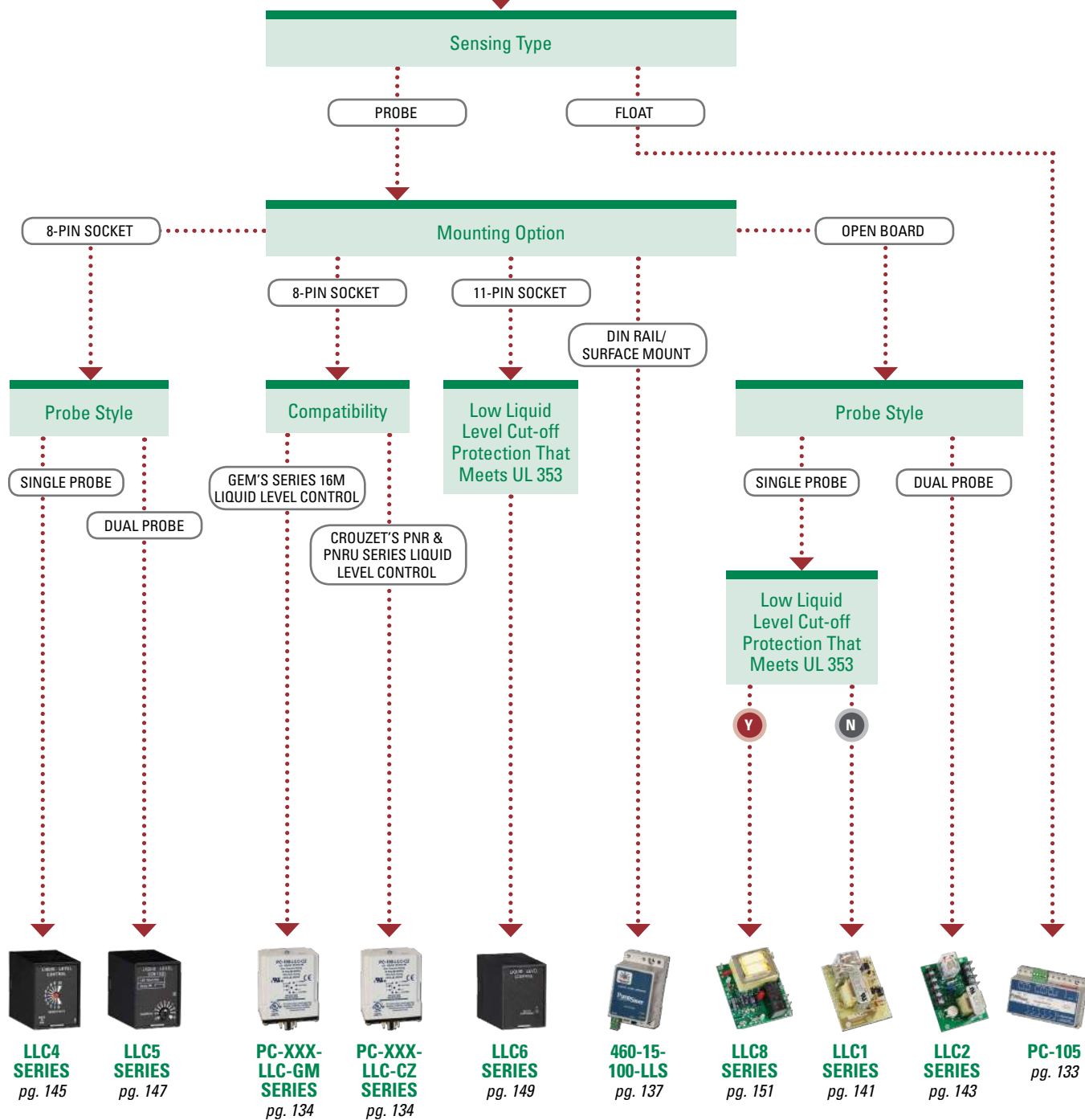
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PUMP CONTROLLERS



LIQUID LEVEL CONTROLS

Control liquid pumping operations in a pump-up or pump-down application



Liquid Level Controls

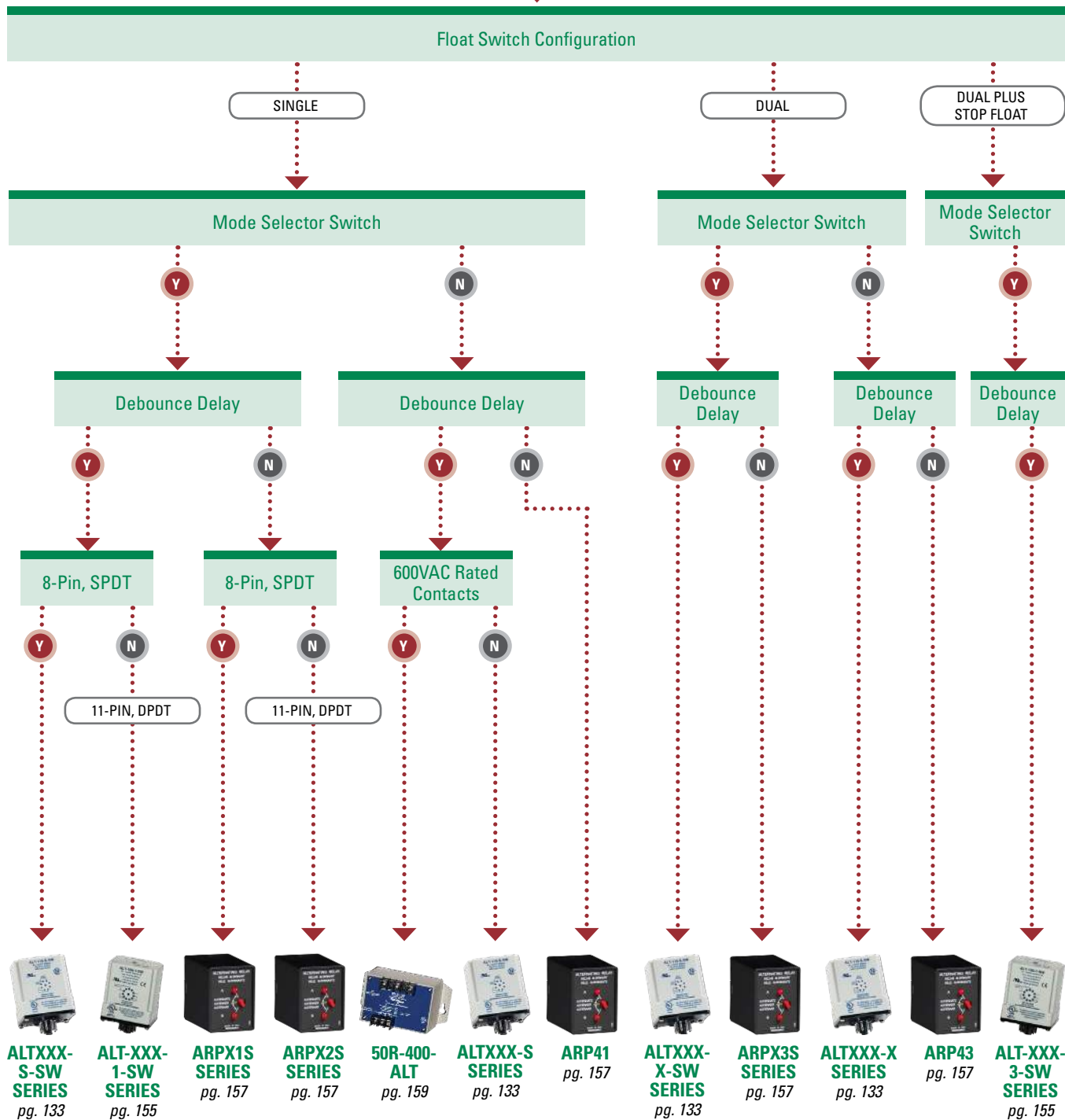
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PUMP CONTROLLERS



ALTERNATING RELAYS

Used in duplex pumping applications to balance the run time of both pumps



Alternating Relays

Page numbers beneath products refer to our Protection Relay & Controls Catalog available in print or online at www.littelfuse.com/relayscontrols/catalog

PUMP CONTROLLERS



ALARM CONTROLS/ BATTERY CHARGERS

Dual-purpose alarm control/battery charger for pump control panels

INTRINSICALLY SAFE RELAYS

Used to interface between hazardous and non-hazardous areas

INTRINSICALLY SAFE PUMP CONTROLLER

Programmable to control/equalize run time of 2, 3, or 4 pumps, with the ability to interface between hazardous and non-hazardous areas

12-Pin Socket Included

Y

N

Number of Channels

SINGLE-
CHANNEL

TWO
CHANNELS

THREE
CHANNELS

FOUR
CHANNELS

FIVE
CHANNELS

Mounting Option

DIN RAIL/
SURFACE MOUNT

8-PIN SOCKET



ACBC-120-SD
pg. 130



ACBC-120
pg. 130



ISS-100
pg. 160



ISS-101
pg. 161



**ISS-102
SERIES**
pg. 163



**ISS-105-
ISO-3**
pg. 165



**ISS-105-
ISO-4**
pg. 165



**ISS-105-
ISO**
pg. 165



ISS-105
pg. 165

Alarm Control/Battery Charger

Intrinsically Safe Relays

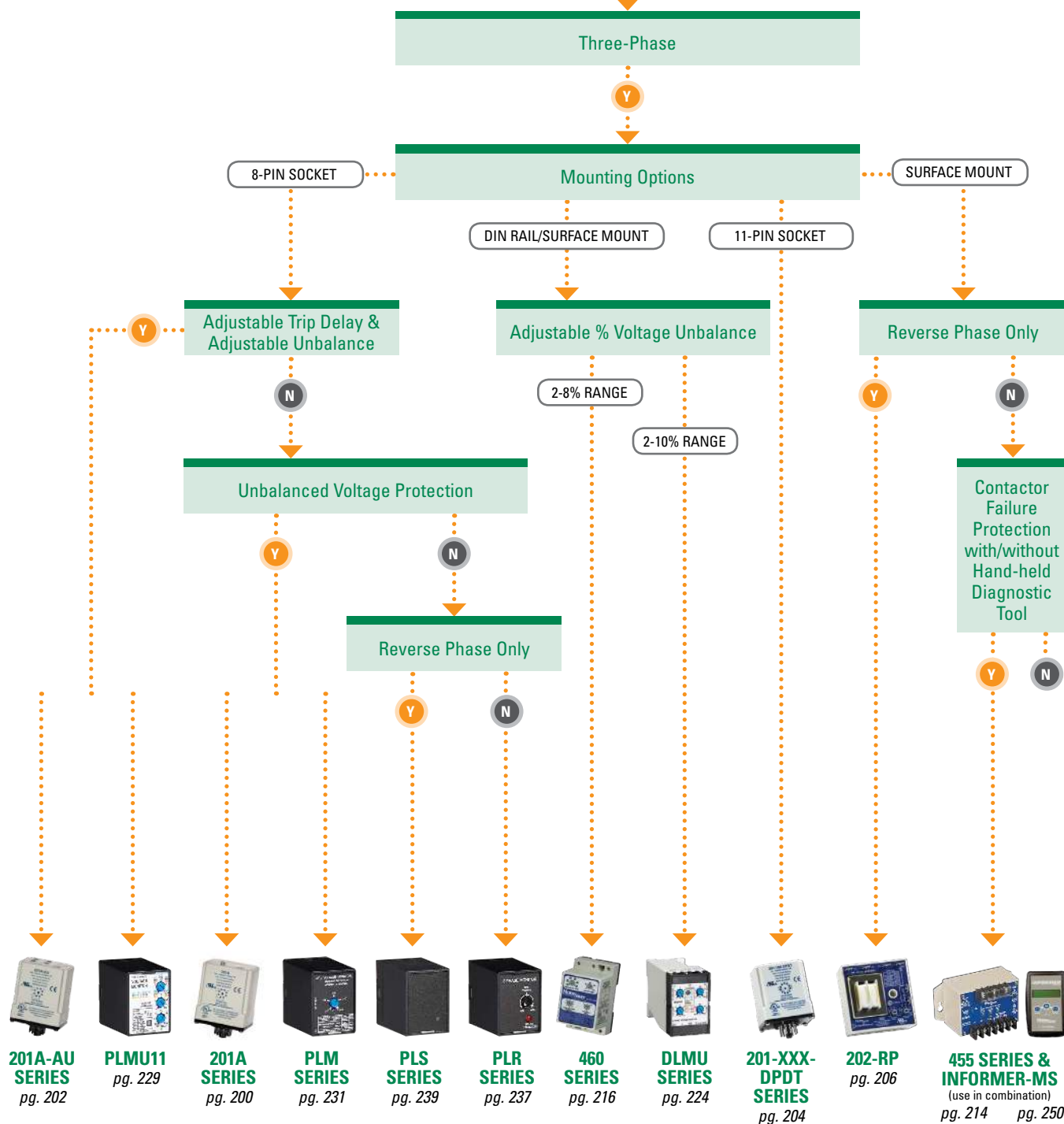
Intrinsically Safe Pump Controller

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VOLTAGE MONITORS (1 of 2)

Highly accurate and precise voltage measurements to provide high sensitivity while minimizing nuisance tripping



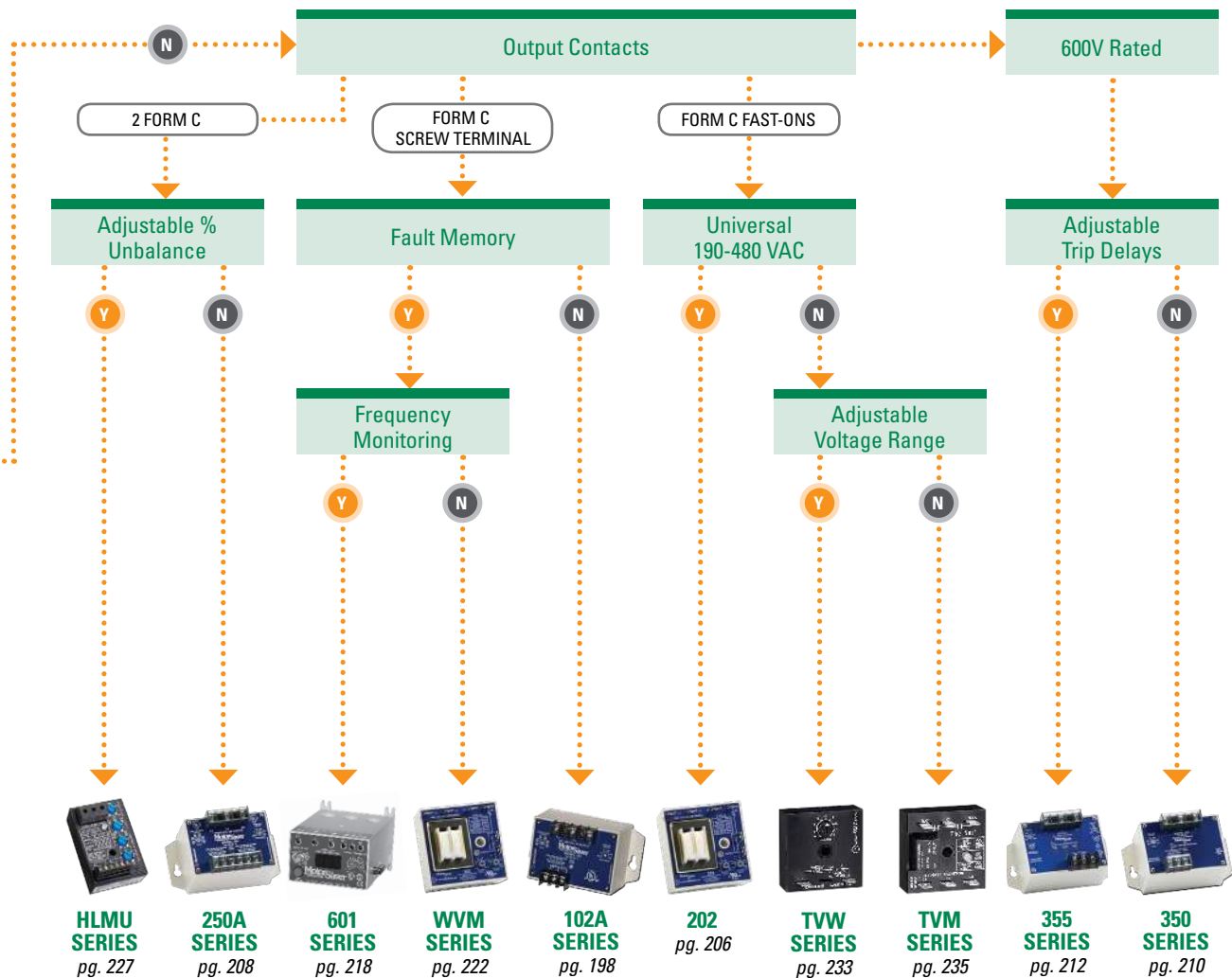
Voltage Monitoring Relays

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VOLTAGE MONITORS (1 of 2)

(Continued from previous page)



Voltage Monitoring Relays

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AC SYSTEM MONITORS/LOAD SENSORS

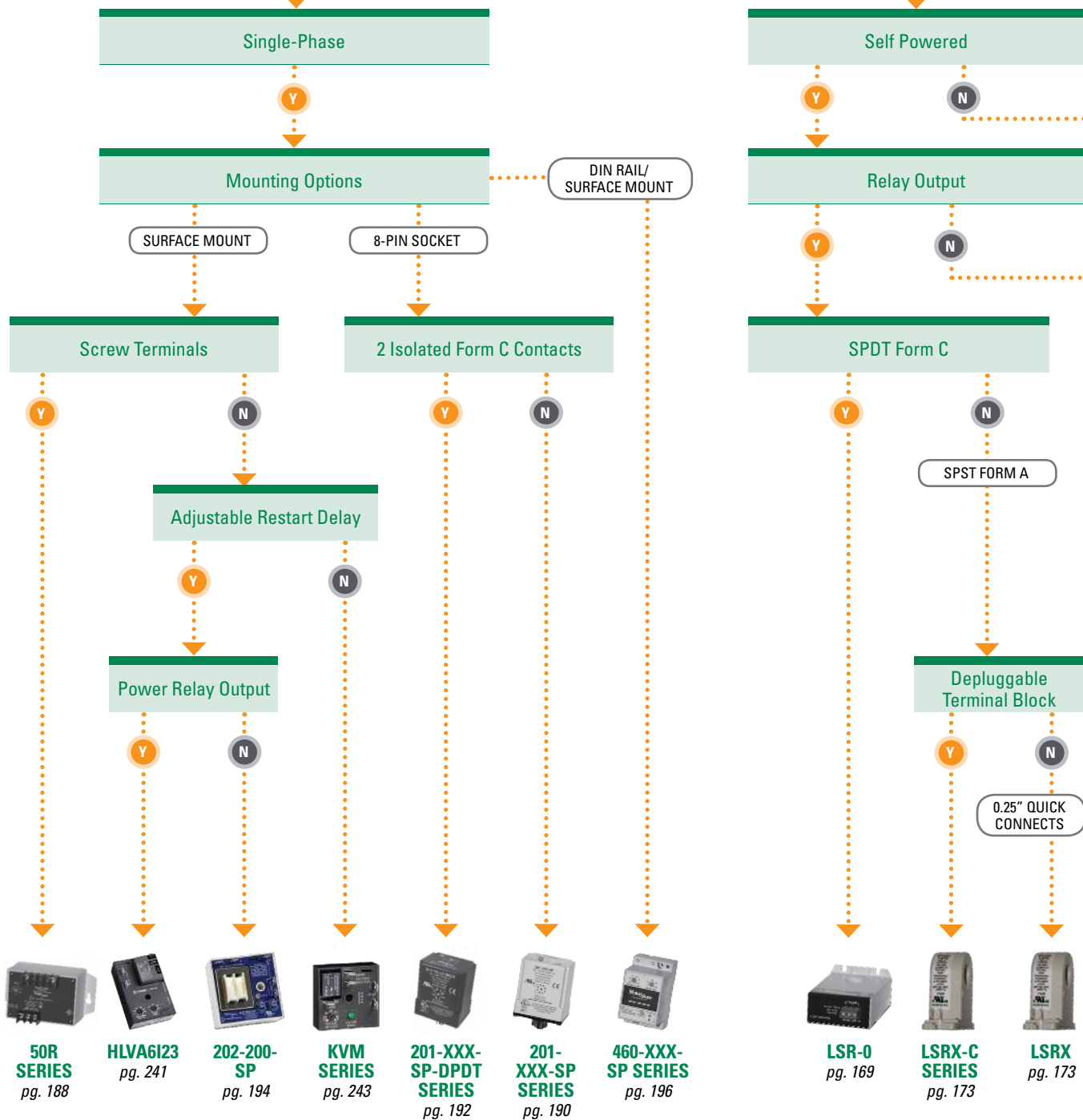


VOLTAGE MONITORS (2 of 2)

(Continued from previous page)

CURRENT MONITORS/LOAD SENSORS (1 of 2)

Multi-purpose controls used for pump and motor protection, to provide closed-loop feedback in a system, as a proof relay to indicate a load is energized, and more...



Voltage Monitoring Relays

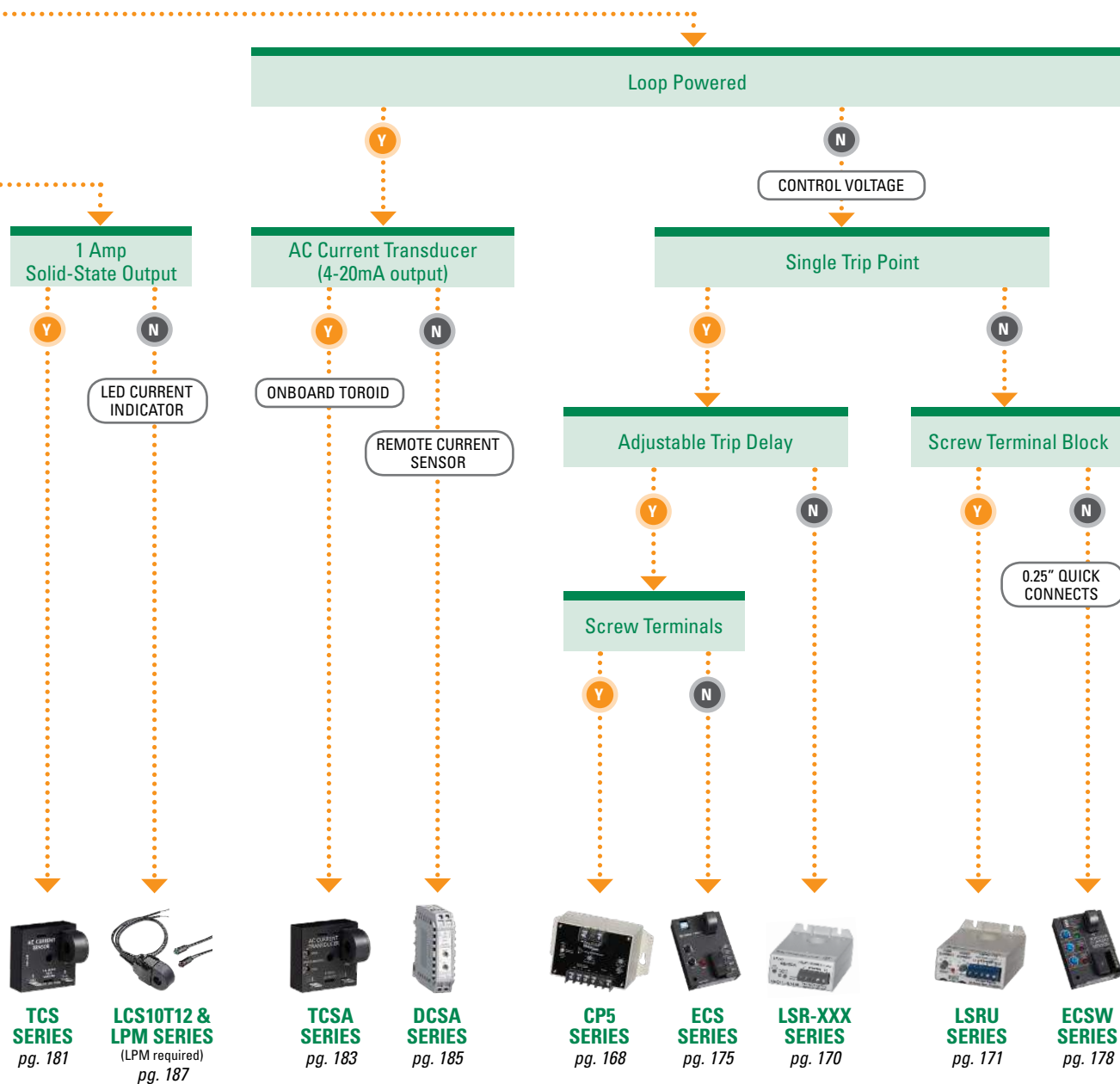
Current Monitoring/Load Sensing Relays

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CURRENT MONITORS/LOAD SENSORS (2 of 2)

(Continued from previous page)



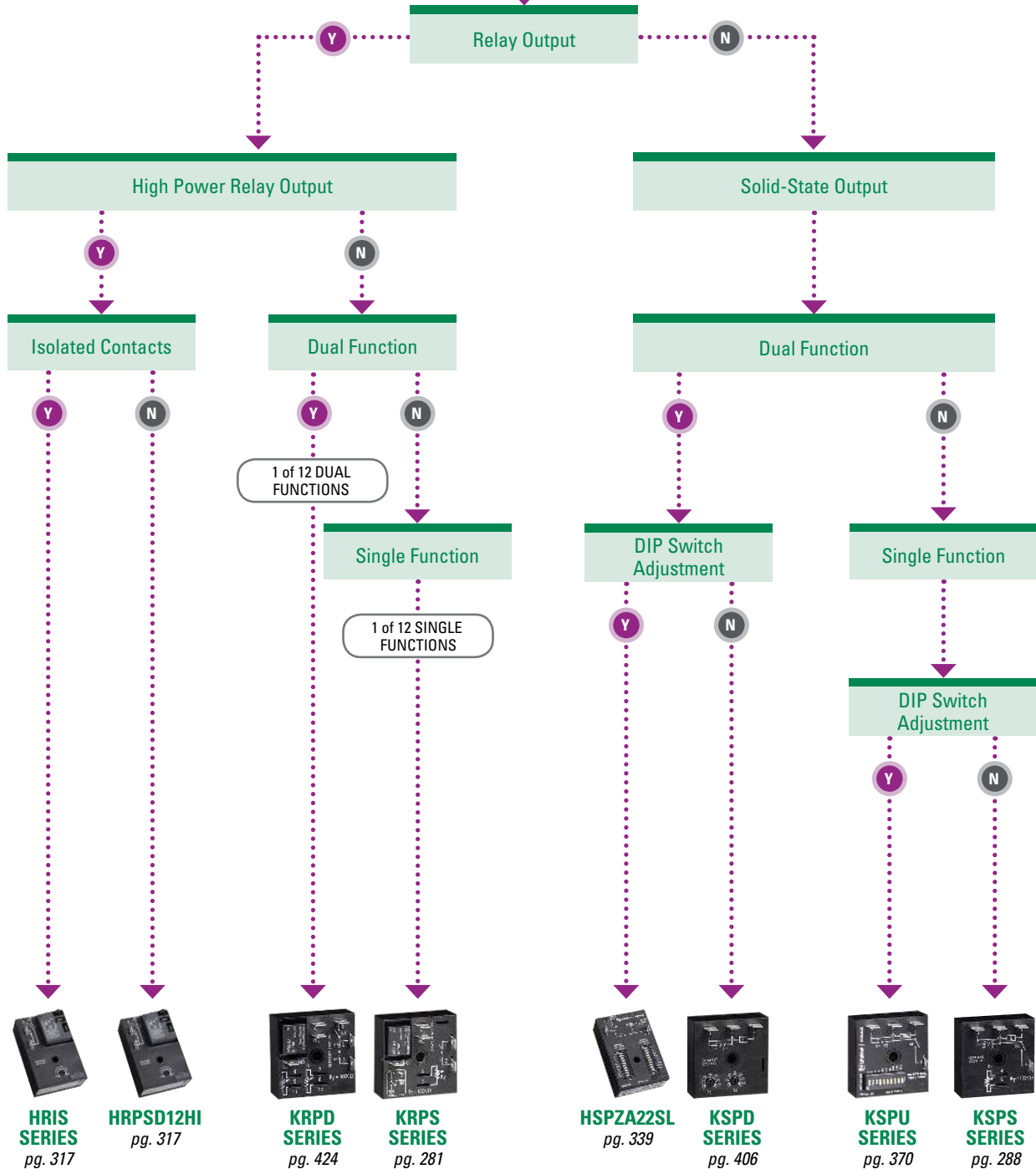
Current Monitoring/Load Sensing Relays

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FACTORY PROGRAMMABLE

Microprocessor based circuitry provides excellent repeat accuracy and stability



Factory Programmable Timers

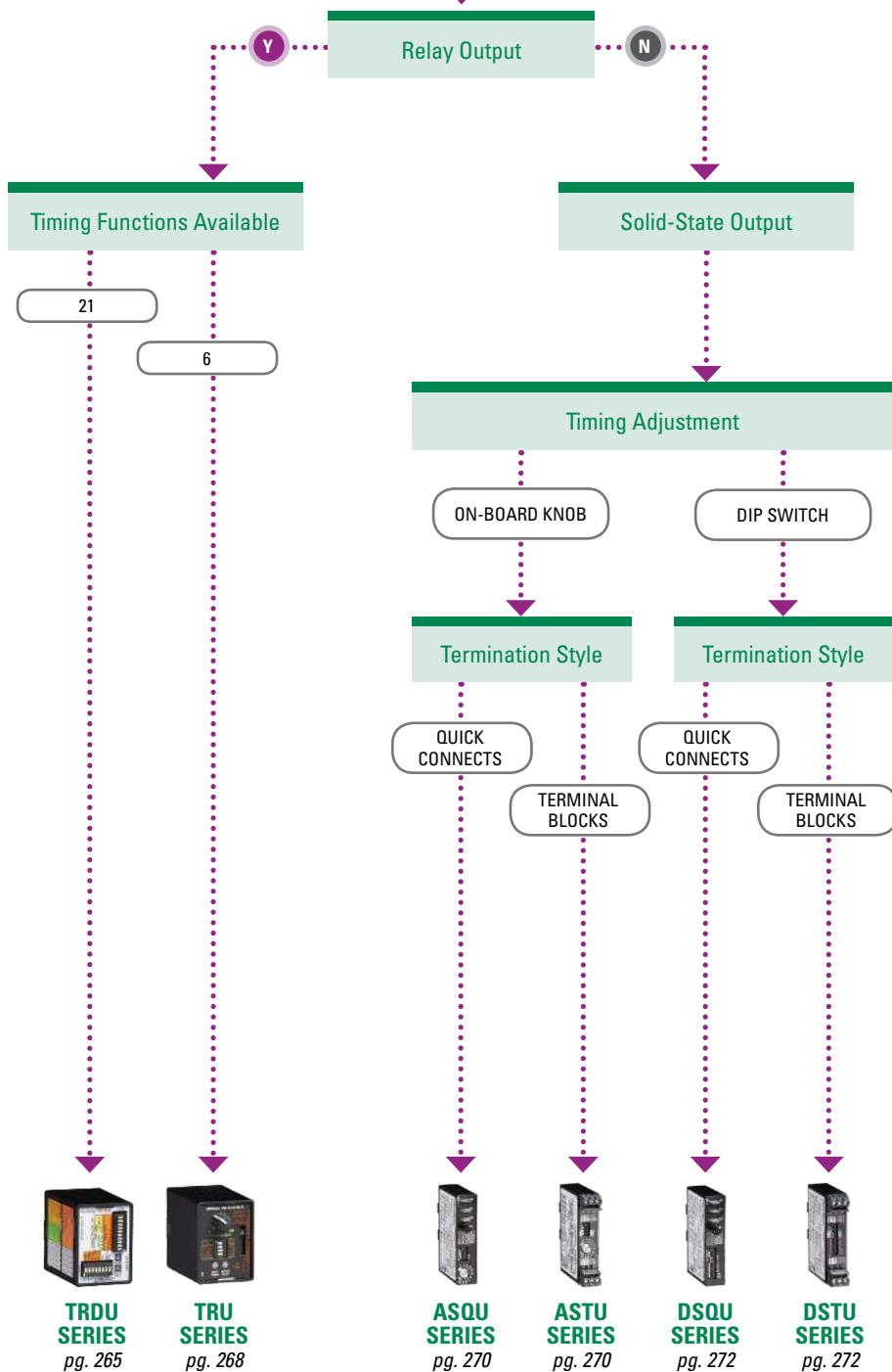
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TIMERS



MULTIFUNCTION

Universal and fully programmable timing relays



Multifunction Timers

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TIMERS



DEDICATED — SINGLE FUNCTION

Wide product offering to meet OEM and industrial requirements

DELAY-ON-MAKE

Package Style

8-PIN PLUG-IN

8-PIN OR 11-PIN
PLUG-IN

PC MOUNT/
STRANDED WIRE
LEADS TO
REPLACE BIMETAL
TYPE TIMERS

SURFACE MOUNT

DIP Switch Adjustment

Relay Output

Timing Ranges

Isolated

1-1023 s
in increments
of 1 s

0.1-102.3 s
in increments
of 0.1 s

10-10,230 s
in increments
of 10 s

Relay with
Isolated
DPDT or
SPDT

Isolated
DPDT
Relay

Contact Type

DPDT

SPDT

480/600V Contacts



**TDM
SERIES**
pg. 297



**TDMH
SERIES**
pg. 297



**TDML
SERIES**
pg. 297



**PRLM
SERIES**
pg. 295



**TRM
SERIES**
pg. 307



**ORM
SERIES**
pg. 293



**MSM
SERIES**
pg. 291



**ERDM
SERIES**
pg. 275



T10
pg. 274



**KRDM
SERIES**
pg. 279



**HRDM
SERIES**
pg. 277

Delay-on-Make Timers

Page numbers beneath products refer to our Protection Relay & Controls Catalog available in print or online at www.littelfuse.com/relayscontrols/catalog

Selecting a Timing Relay

Solid-State with Normally Open Contacts (Y) → **High Current (6, 10, or 20A)** (Y) → **Timing Ranges**

Timing Ranges branches:

- 0.1 s – 1000 m in 6 ranges** → **THD1B410.5S** (pg. 303)
- 0.1 s – 600 m in 4 ranges** → **TH1 SERIES** (pg. 301)

High Current (6, 10, or 20A) (N) → **Low Current (1A)** → **Adjustment Style**

Adjustment Style branches:

- FIXED** → **KSDU SERIES** (pg. 286)
- ONBOARD KNOB** → **TDU SERIES** (pg. 299)
- EXTERNAL** → **TMV8000** (pg. 305), **TSU2000** (pg. 305), **TS1 SERIES** (pg. 309)

EXTERNAL further branches:

- FIXED/EXTERNAL** → **TSD1 SERIES** (pg. 311)
- FIXED/ONBOARD KNOB/EXTERNAL** → **KSD1 SERIES** (pg. 284), **TS441165S** (pg. 313)

19



DEDICATED — SINGLE FUNCTION

Wide product offering to meet OEM and industrial requirements

DELAY-ON-BREAK

Package Style

8-PIN OR 11-PIN
PLUG-IN

OPEN PC BOARD

SURFACE MOUNT

DIP Switch Adjustment

Relay Output

Y

N

Y

N

Timing Ranges

Isolated

Solid-State with Normally Open Contacts

1-1023 s
in increments
of 1 s

0.1-102.3 s
in increments
of 0.1 s

10-10,230 s
in increments
of 10 s

SPDT

Isolated

Timing Ranges

SPDT/DPDT

0.1 s to 100 m
in 5 ranges

0.1 s to 1000 m
in 6 ranges



**TDB
SERIES**
pg. 325



**TDBH
SERIES**
pg. 325



**TDBL
SERIES**
pg. 325



**TRB
SERIES**
pg. 331



**ORB
SERIES**
pg. 323



**HRDB
SERIES**
pg. 315



**KRDB
SERIES**
pg. 319

Delay-on-Break Timers

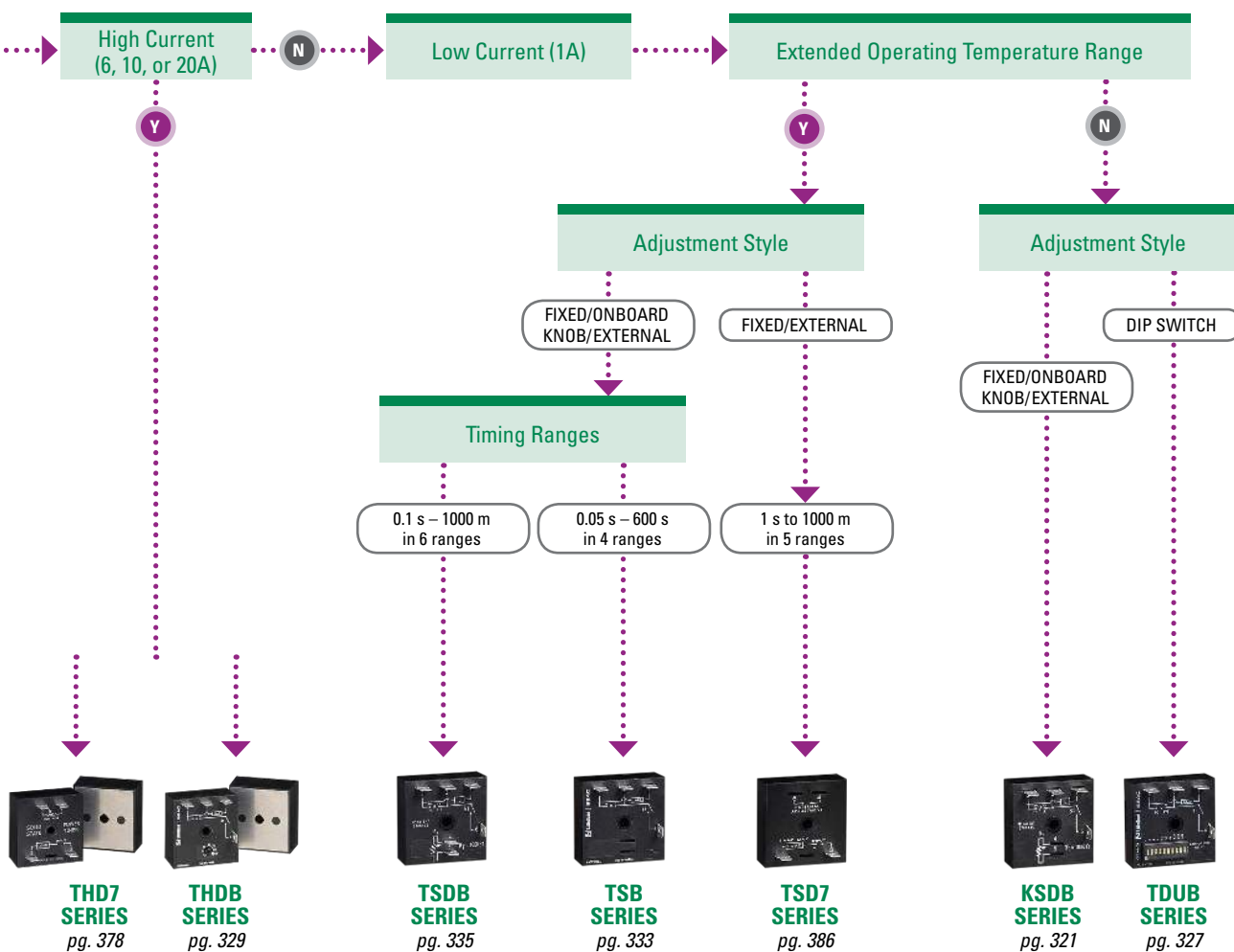
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TIMERS



DEDICATED — SINGLE FUNCTION

(Continued from previous page)



Delay-on-Break Timers

Page numbers beneath products refer to our Protection Relay & Controls Catalog available in print or online at www.littelfuse.com/relayscontrols/catalog

TIMERS



DEDICATED — SINGLE FUNCTION

Wide product offering to meet OEM and industrial requirements

SINGLE SHOT

Package Style

8-PIN OR 11-PIN
PLUG-IN

OPEN PC BOARD

SURFACE MOUNT

DIP Switch Adjustment

Retriggerable

Relay Output

Timing Ranges

Fixed/Knob/
External Adjustment

Isolated

Relay Output

Isolated

1-1023 s
in increments
of 1 s

0.1-102.3 s
in increments
of 0.1 s

10-10,230 s
in increments
of 10 s

Knob Adjust Only

Timing Ranges

0.1 s to 1000 m
in 6 ranges

DPDT

SPDT



**TDS
SERIES**
pg. 348



**TDSH
SERIES**
pg. 348



**TDSL
SERIES**
pg. 348



**TRS
SERIES**
pg. 356



PRS65
pg. 347



**ORS
SERIES**
pg. 345



**KRD9
SERIES**
pg. 388



TSD94110SB
pg. 390



**ERDI
SERIES**
pg. 362



**KRDS
SERIES**
pg. 341



**HRDS
SERIES**
pg. 337

Single Shot Timers

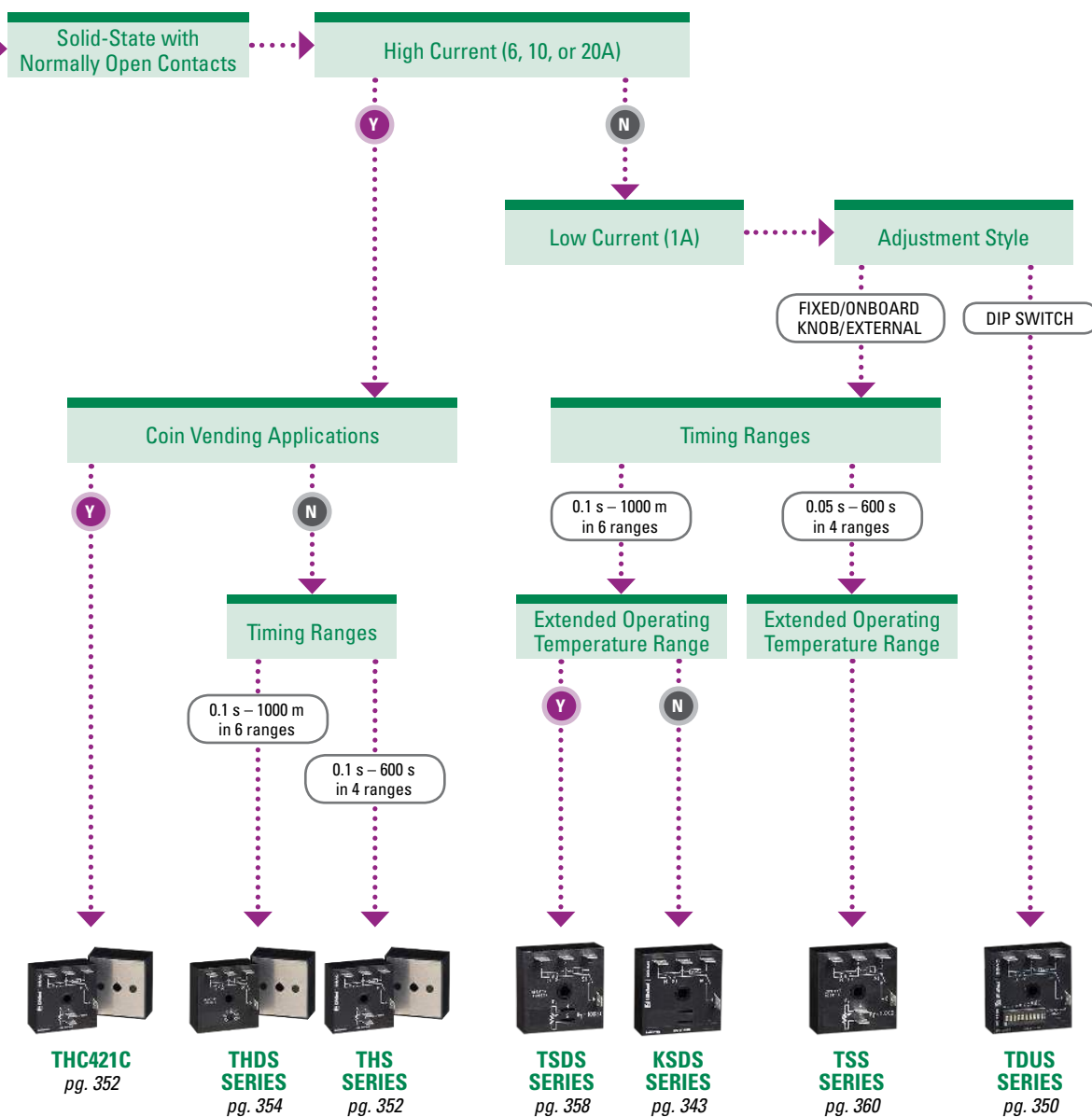
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TIMERS



DEDICATED — SINGLE FUNCTION

(Continued from previous page)



Single Shot Timers

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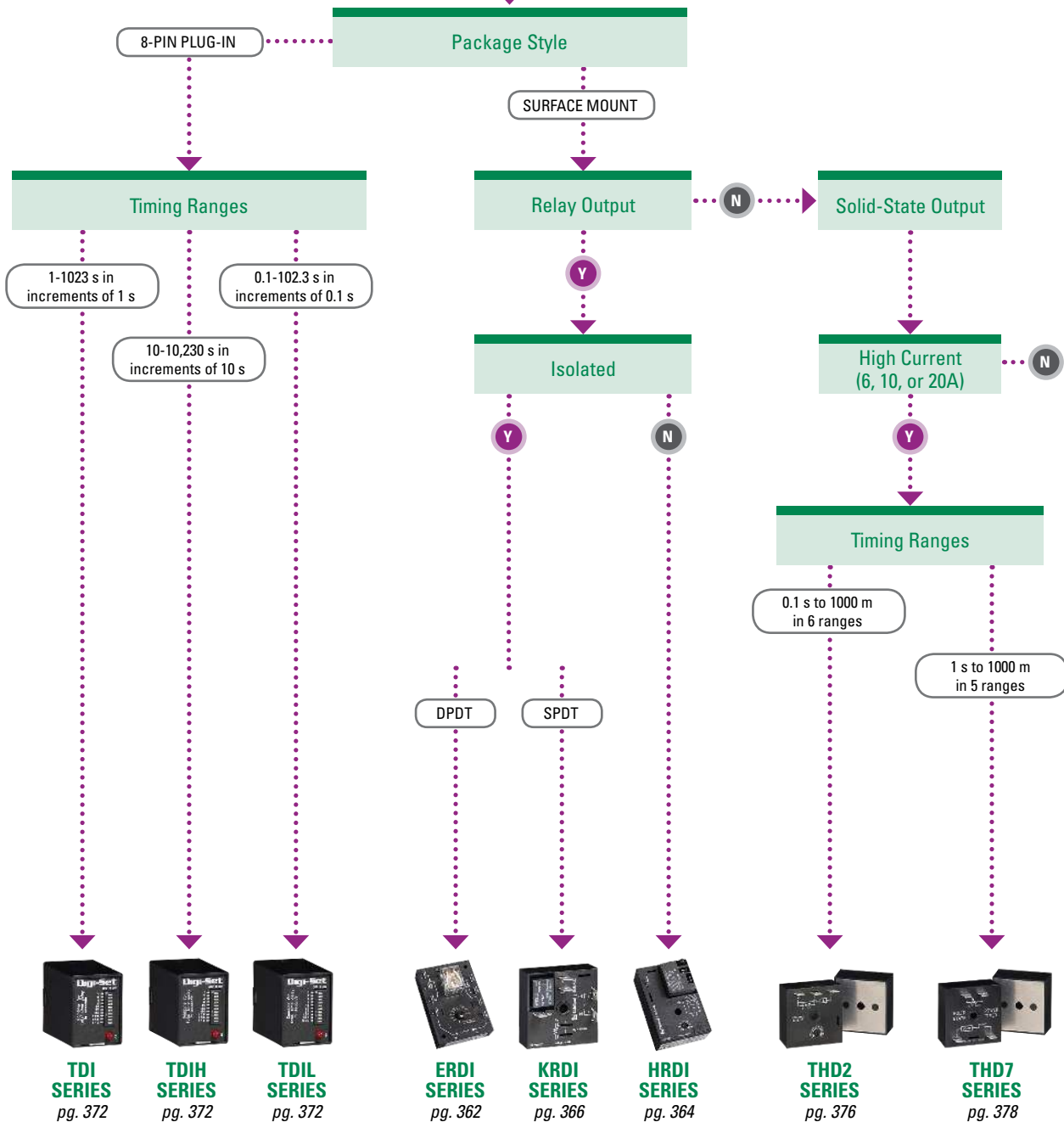
TIMERS



DEDICATED — SINGLE FUNCTION

Wide product offering to meet OEM and industrial requirements

INTERVAL



Interval Timers

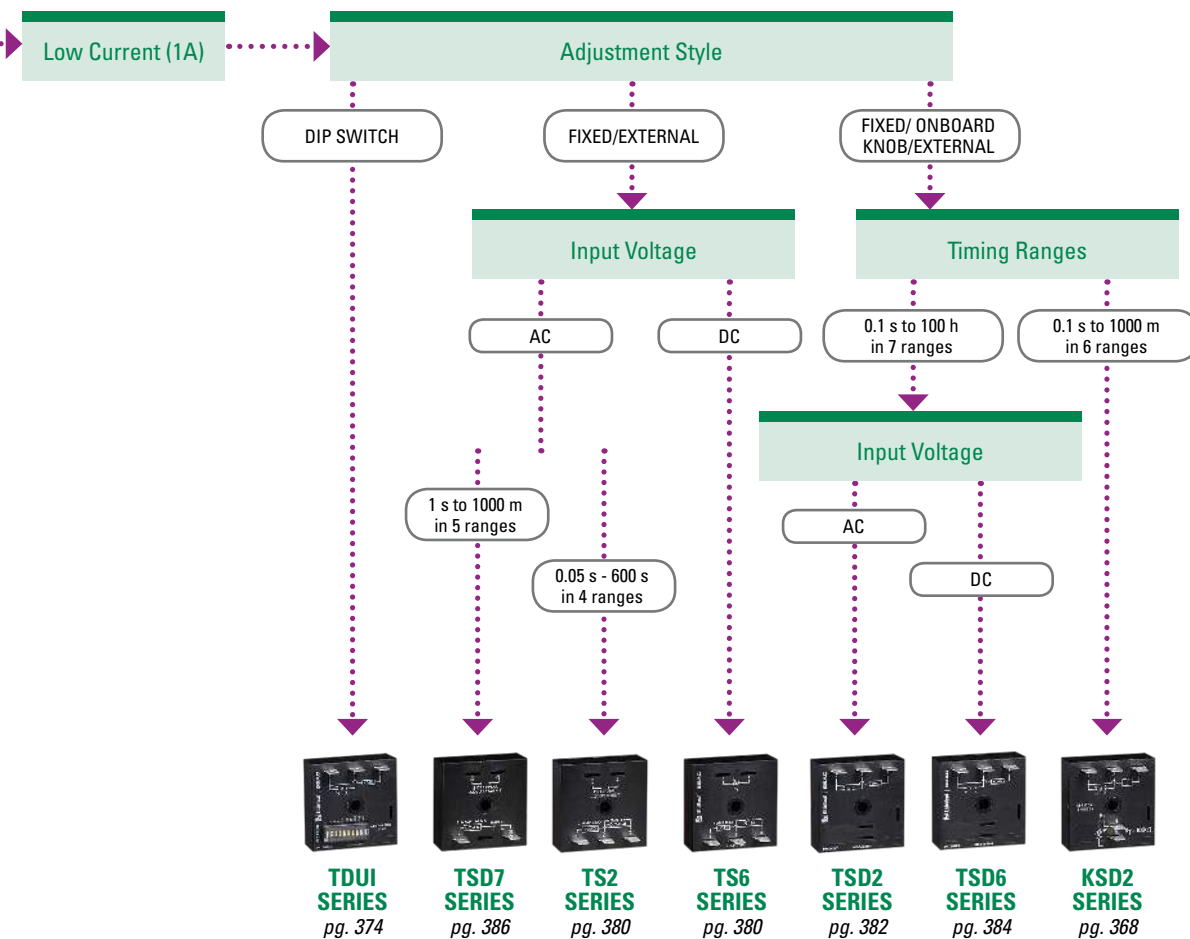
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TIMERS



DEDICATED — SINGLE FUNCTION

(Continued from previous page)



Interval Timers

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DEDICATED — SINGLE FUNCTION

Wide product offering to meet OEM and industrial requirements

RECYCLING

Package Style

SURFACE MOUNT

8-PIN PLUG-IN

Relay Output

N

Solid-State with Normally Open Contacts

Recycling Flashers

N

Y

Y

Isolated

High Current (6, 10, or 20A)

Y

N

Y

N

Contacts Type

Timing Ranges

SPDT

DPDT

0.1 s to 1000 m in 6 ranges

Adjustment Style

FIXED/ONBOARD KNOB

FIXED/ONBOARD KNOB/EXTERNAL

Extended Operating Temperature Range

FIXED

0.1 s to 1000 m in 6 ranges



TDR SERIES
pg. 410



KRDR SERIES
pg. 400



KRD3 SERIES
pg. 398



ERD3425A
pg. 391



HRDR SERIES
pg. 396



THD3C42A0
pg. 412



TSD3411S
pg. 414



KSD3 SERIES
pg. 402

Recycling Timers

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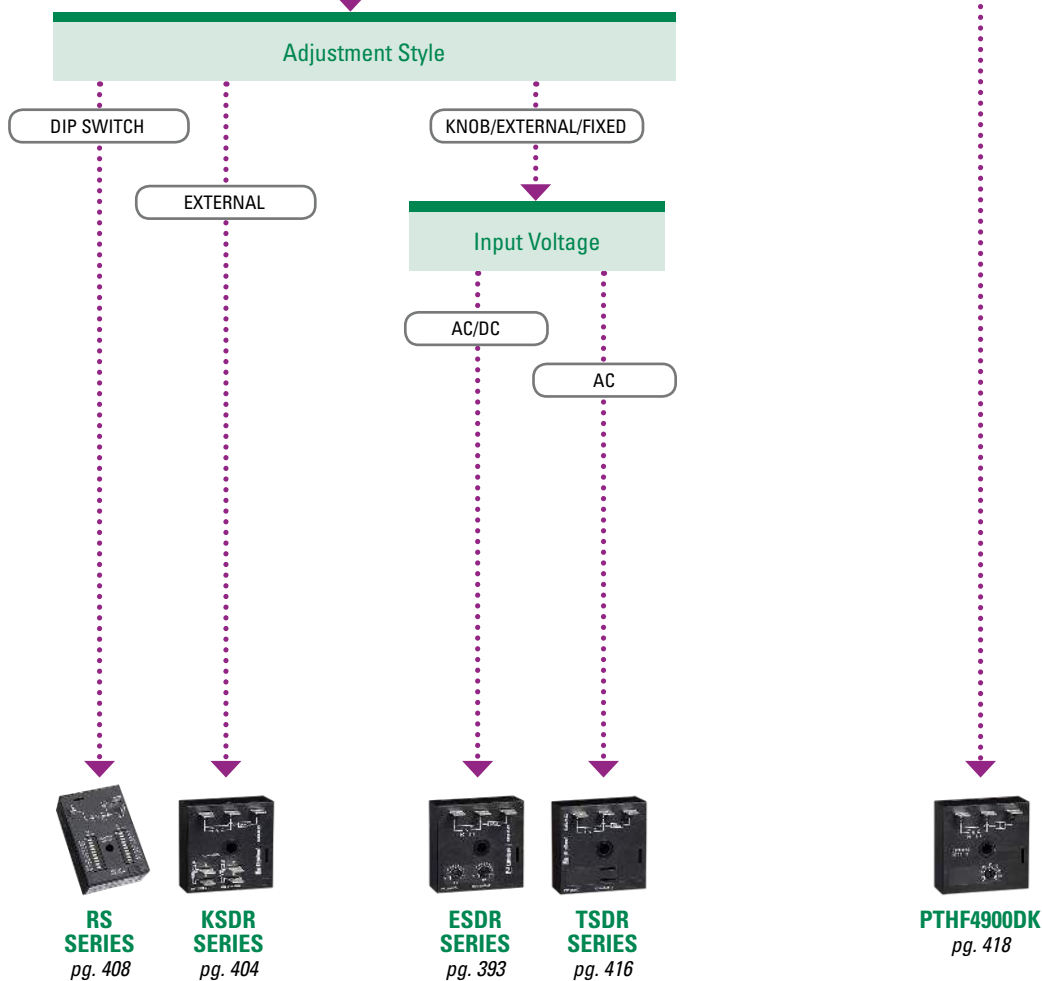
TIMERS



DEDICATED — SINGLE FUNCTION

(Continued from previous page)

PERCENTAGE



Recycling Timers

Percentage Timers

TIMERS



DEDICATED

Wide product offering to meet OEM and industrial requirements

DUAL FUNCTION

DELAY-ON-MAKE/
DELAY-ON-BREAK

DELAY-ON-MAKE/
INTERVAL

HVAC

Lockout Delay

Anti-short Cycle with Random Start

Anti-short Cycle with
Random Start

Low Voltage
Brownout Protection

Fan Delay



**TDMB
SERIES**
pg. 420



**ESD52233
SERIES**
pg. 422



**T2D120A15M
SERIES**
pg. 428



TSA141300
pg. 436



**TA
SERIES**
pg. 430



**TL
SERIES**
pg. 434



**TAC1
SERIES**
pg. 432



**CT
SERIES**
pg. 426



**HRV
SERIES**
pg. 437

Dedicated Timers – Dual Function

Dedicated Timers – HVAC

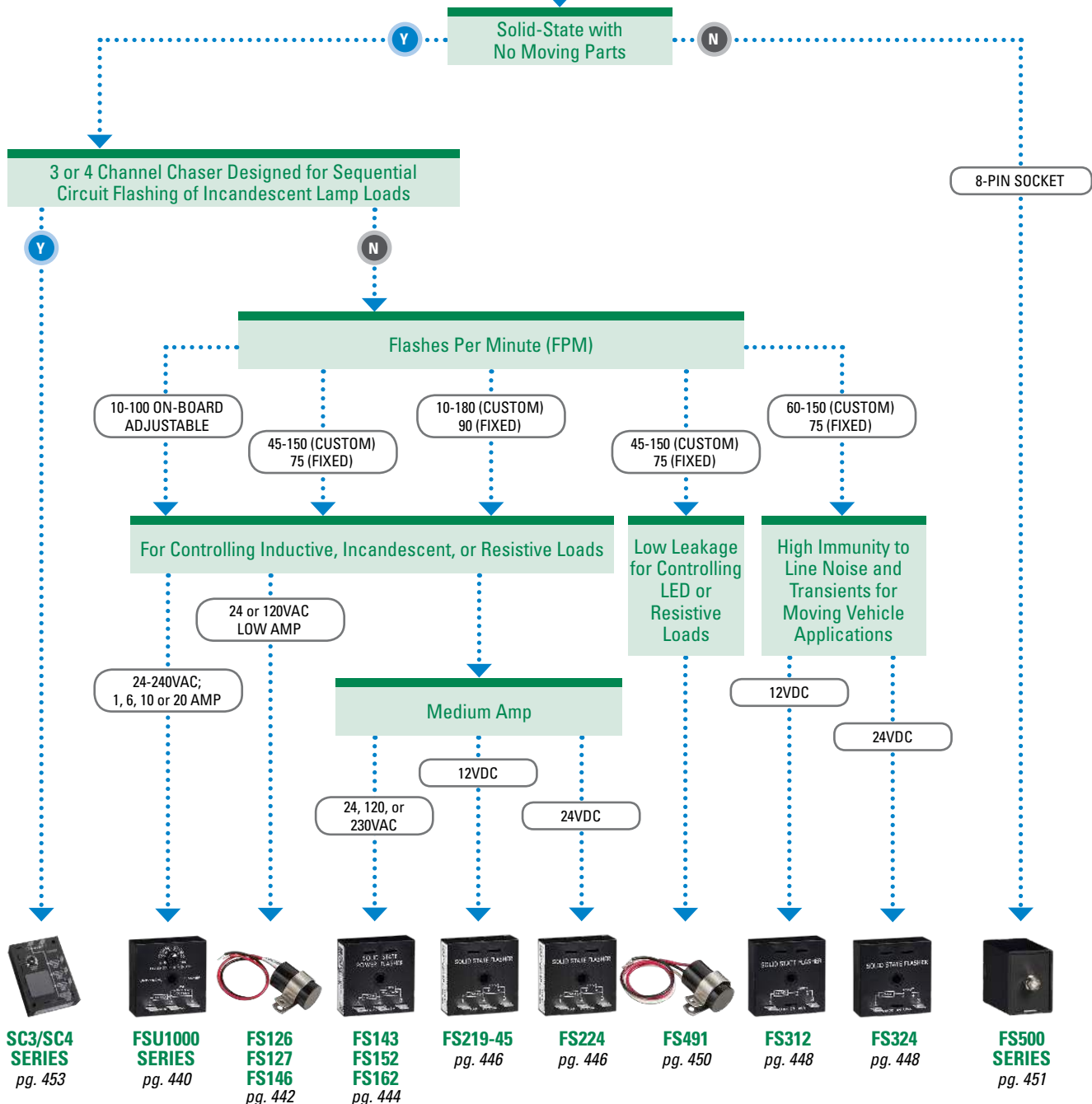
Dedicated Timers – Coin Vending

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FLASHERS

Designed to cycle power to lamps and LEDs to turn them on and off repeatedly



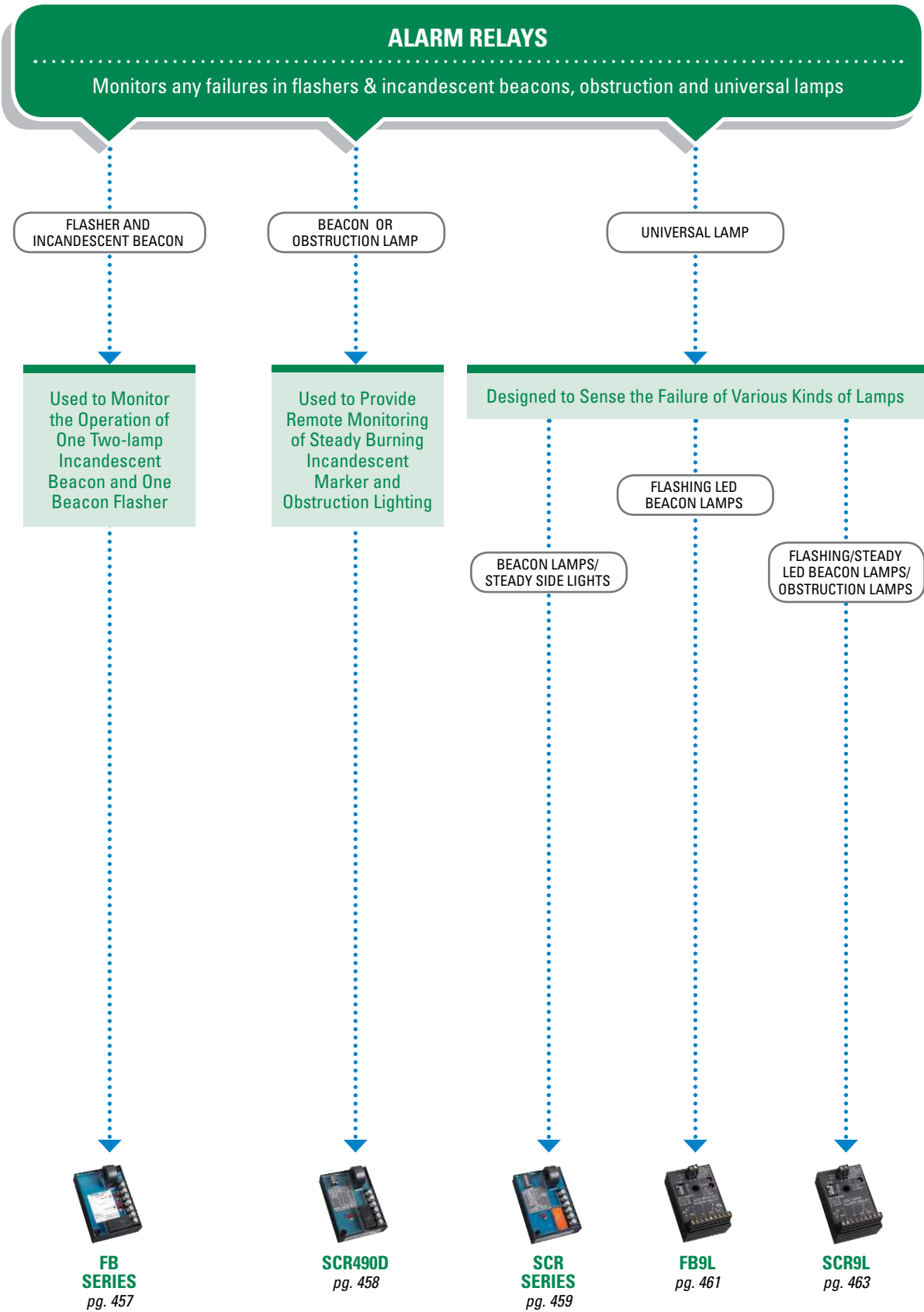
Flashers



STEP 1 Select product category

STEP 2 Select the needed features in each category

STEP 3 Find the recommended product for your application



Alarm Relays



BEACON TOWER FLASHERS

Designed for use on communication towers, smoke stacks, cooling towers, tall buildings, bridges, and utility towers

FLASHER (OFF FIRST)

AUXILIARY MODULES



**FS
SERIES**
pg. 455



**FA
SERIES**
pg. 455

Beacon Tower Flashers

PHOTO CONTROL

Designed to meet the demands of the most vigorous requirement tower & obstruction lighting control. Factory calibrated to meet FAA and FCC specifications



**PCR
SERIES**
pg. 465

Photo Control

INDUSTRIAL SUCCESS STORIES



HVACR: Climate of Reliability

A major furnace manufacturer has a reputation for extreme environmental testing of their products before the design makes it to market. They know to trust the reliability of Littelfuse fuse, relay and timer components in their designs to provide the ultimate protection that stands up to rigorous testing. Our OEM customers rely on the Littelfuse reputation for making extreme reliability an everyday practice.



Manufacturing: Assembly of Protection

A brick manufacturing plant in the western United States processes clay into bricks and other building materials for residential and commercial projects. The Littelfuse SB6100 is installed between the MCC and the wet saws on the factory floor as shock protection for their workers. High-speed fuses and the PGR-8800 arc-flash relays are found in their switchgear for advanced circuit protection and improved worker safety from arc-flash incidents.



Oil & Gas: Refined Power Protection

Littelfuse industrial products such as ground-check monitors are used by one of the largest producers of crude oil from oil sands. Our high resistance grounding packages are found on oil and gas drilling rigs to reduce ground-fault troubleshooting time by 90%. Refineries producing 140,000 barrels a day rely on Littelfuse to protect their VFD drives from ground faults. Fracking firms depend on Littelfuse circuit protection for service mains and injection panels. Upstream, midstream, or downstream. No matter where safety is needed, Littelfuse is there to deliver reliable protection.



Mining: Power and Protection Run Deep

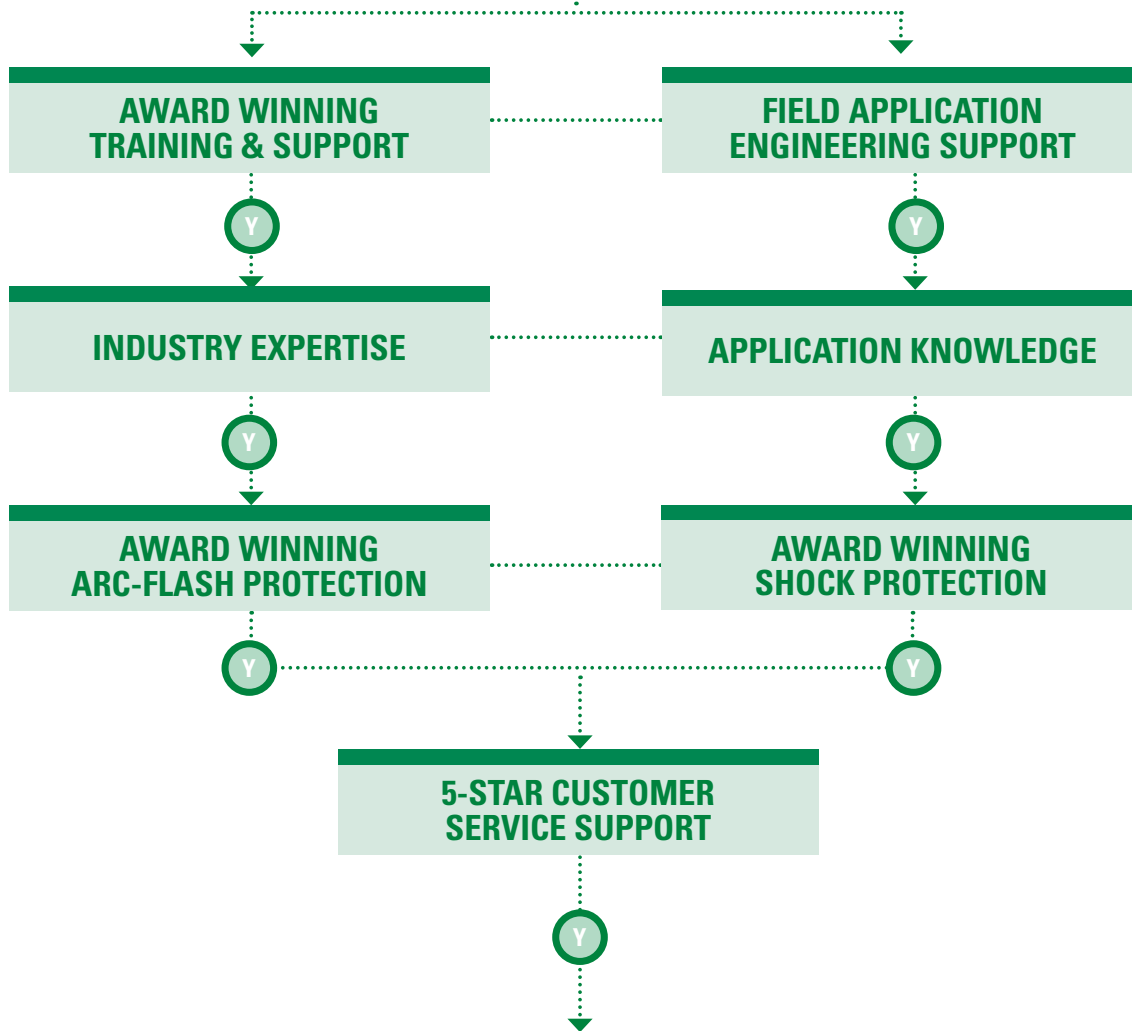
When the world's largest fertilizer company is mining for potash 1000 meters below the surface, they come to Littelfuse because of our reputation for quality and engineering expertise. There is no room for poor quality in mining. Littelfuse products are an integral part of the electrical systems that power and protect critical applications in the harshest underground and above ground mining environments. The world's top mining companies trust Littelfuse for custom power distribution centers, substations, switchgear, mining machine controls and protection relays.



Water/Wastewater: Reclaiming Productivity and Protection

One of the Top 200 Electrical Wholesalers recommends Littelfuse MotorSaver® and PumpSaver relays with confidence because it saved their customer from replacing a 200 hp motor valued at \$30,000. Their customer experienced a phase loss situation and thankfully had a MotorSaver 201A-AU installed on a motor in their treatment plant. The MotorSaver relay was a wise investment that saved the cost of the motor and kept the plant humming.

PARTNER SELECTION GUIDE



Expertise Applied | Answers Delivered



CONSULTING • SPECIFYING
engineer.
2016
PRODUCT OF THE YEAR Silver



PROTECTING CRITICAL INDUSTRIAL APPLICATIONS



CONSTRUCTION



CONTRACTOR



FOOD & BEVERAGE



GENERAL INDUSTRIAL



HVAC/R



MINING



OEM



OIL & GAS



PANEL SHOP



PORTS & MARINA



WATER/WASTEWATER



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