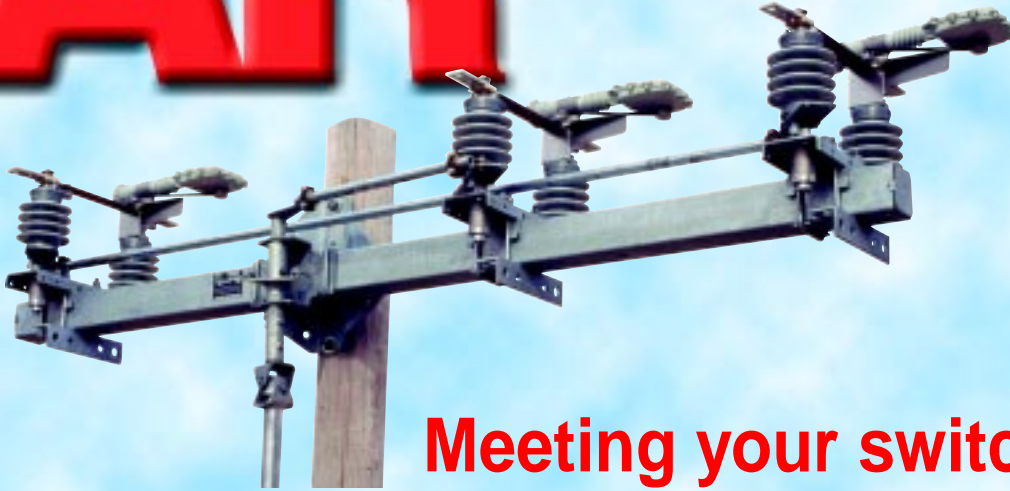


# HUBBELL

# AR

## *Automation-Ready* Distribution Switches



Meeting your switching needs  
today . . . tomorrow . . . the 2000s



POWER  
SYSTEMS, INC.

# Hubbell **AR** Automation-Ready Distribution Switch

- **Reduces installation time**

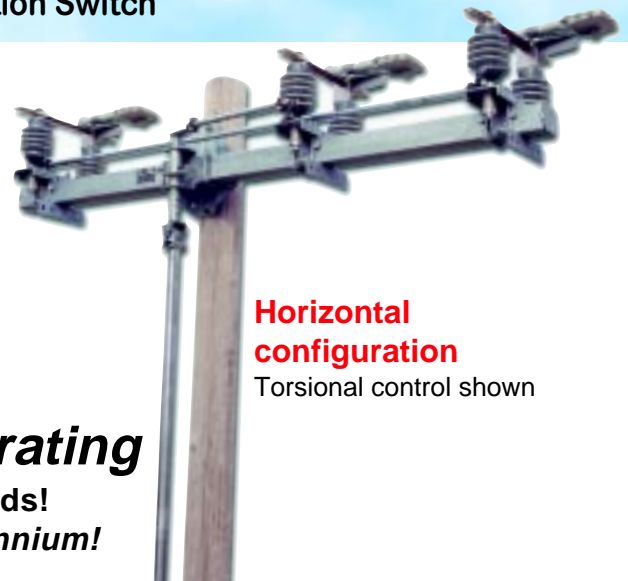
No wrap-up, minimizes control-pipe adjustment!  
*Installs even faster with hook stick control option!*

- **Positive open-close action**

Unique four-link overtoggle operating linkage!  
*Sure feedback for manual, smooth for motor drive!*

- **900-amp continuous & interrupt rating**

No low distribution limit for carrying or breaking loads!  
*Set up for switching your system into the new millennium!*



**Horizontal configuration**

Torsional control shown



**Delta configuration**

Hook stick control shown

## Smooth-operating design —

The AR is remarkably easy-to-operate due to the mechanical advantage of a unique Four-Link Overtoggle Mechanism. By design, it reduces the amount of torque to open or close the switch.

**'Snap' feedback** is an added benefit. This is the positive feel the mechanism transmits when operated to indicate all three switch phases are fully closed.

- **14.4kV, 25kV or 34.5kV**
- **Four configurations:**
  - Horizontal
  - Vertical
  - Phase-over-Phase
  - Delta

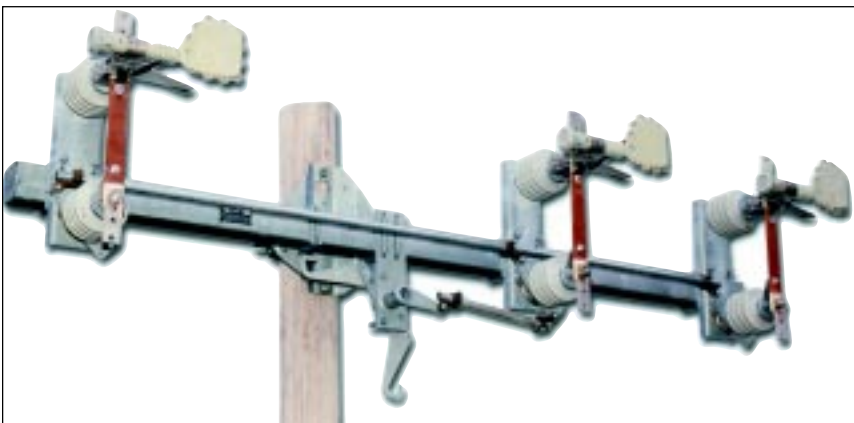


**Phase-over-phase configuration**

Reciprocating control shown

**Manual control options** — Down-the-pole torsional or reciprocating controls are standard. All configurations also are available with a crossarm-mounted hook-stick-operated control.

**Automation-ready, motor operable** — Compatible with Chance (or other) motor operators for remote operation in D/A systems.



**Vertical configuration**

Hook stick control shown

## Application flexibility

*for today . . . tomorrow . . . the 2000's*

The future of overhead distribution systems is one of change. Among the realities: Ever greater load densities (more load per mile of line), more interconnections, more laterals and branches. And, in the new competitive environment, a continuing demand for higher degrees of system reliability. Along with this, the continuing expansion of Distribution Automation.

Utility engineers must be confident that the products being installed now will meet the needs of their future distribution systems.

The Hubbell AR Switch was designed with these factors in mind. It's a switch to meet today's needs, and those of the known, anticipated future of your distribution system, including the growth of Distribution Automation.

First the basics: The AR Switch is available for 14.4kV, 25kV and 34.5kV (grounded wye) systems. And in four mounting configurations: Horizontal, vertical, phase-over-phase and delta, to meet a variety of distribution feeder line configurations. All AR Switches are fully rated for 900 ampere continuous current and 900 ampere interrupting current, a definite benefit as distribution system load densities increase.

AR Switches have a one-time and three-time duty cycle

fault-closing capability of 25,000 amperes rms asymmetrical and 20,000 amperes rms asymmetrical, respectively. This again is a substantial benefit for increasing distribution system load densities, and as distribution feeders are automated in the future.

For switches installed in icy weather conditions, AR Switch mechanical and electrical operation is ensured, even with ice buildup of up to 3/4 inch without any additional ice shielding devices, *the highest level in the industry.*

The AR Switch can be purchased as a standard switch and upgraded for Distribution Automation in the future, or ordered as a complete automated switch today. Bracket extensions are available for mounting line sensors (sensors can be provided as specified by the user) as is the Chance Motor Operator, with or without an RTU and communication package.

The Chance Motor Operator is available in rotating and reciprocating models. It can be provided with a mounting panel for an RTU and communication package or complete with the user-specified RTU/communication package, fully installed and tested. For more information, refer to Chance catalog section 14C.

## Installation simplicity and ease of operation

Until now, the most time consuming aspect of gang operated switch installation has been the installation and adjustment of control pipe. Once the switch and control pipe were installed, adjustments had to be made to ensure proper blade opening and closing. Typically, a certain amount of "wrap-up" had to be set in the operating handle/lock segment. Periodic inspection was recommended to see that the switch had not lost its adjustment due to such factors as pole twist.

The AR Switch is preassembled and factory adjusted to simplify field installation. Key to this is the AR Switch's unique overtoggle operating mechanism which is factory preset. This Four-Link Overtoggle Mechanism reduces installation time by eliminating any need to adjust the control assembly. No "wrap-up" is required.

During operation, the AR's overtoggle mechanism gives the operator a "snap" feedback, positive assurance of blade closing. And it delivers a significant mechanical advantage — *the lowest force required in the industry to open and close a switch of this kind* (no more than 50 ft.-

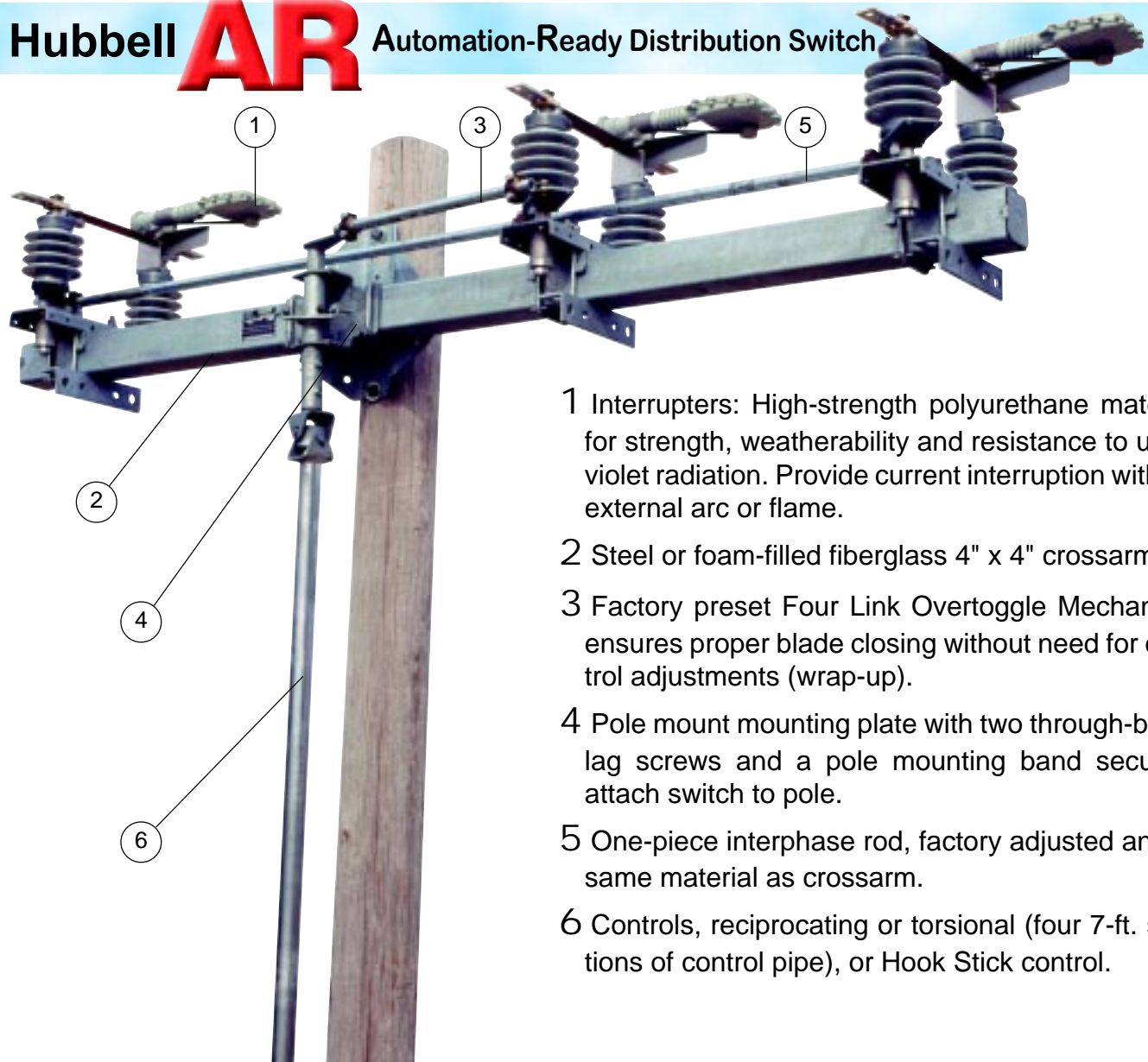
lb. for a torsional operating switch). In addition, the AR overtoggle mechanism greatly reduces the possibility of an AR Switch coming out of adjustment due to pole twist.

The AR Switch provides for the fastest and easiest installation possible. Installation time can be reduced even further with the Hook Stick Operation feature which eliminates down-the-pole controls.



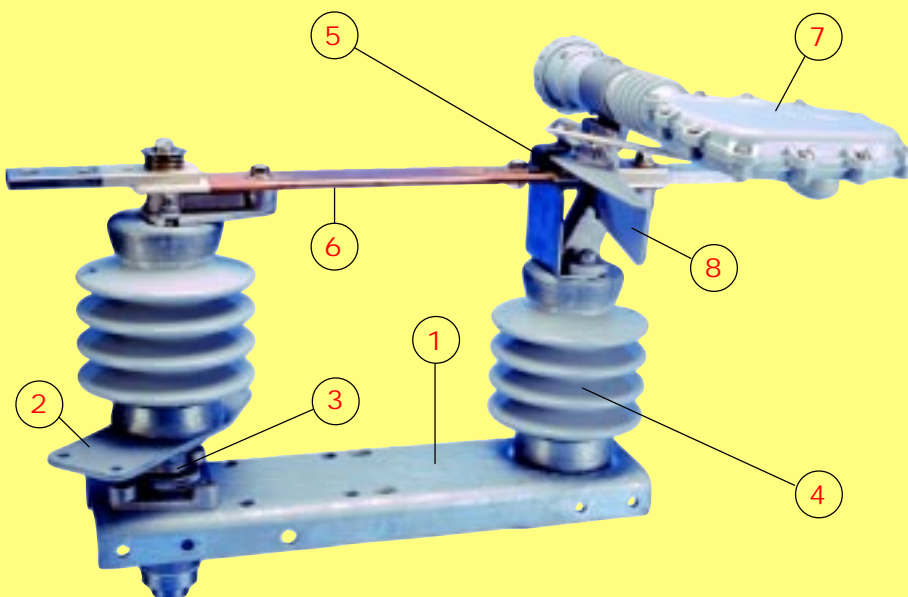
*Above and at right, Hook Stick Control option opening and closing switch.*

# Hubbell **AR** Automation-Ready Distribution Switch



- 1 Interrupters: High-strength polyurethane material for strength, weatherability and resistance to ultra-violet radiation. Provide current interruption without external arc or flame.
- 2 Steel or foam-filled fiberglass 4" x 4" crossarm.
- 3 Factory preset Four Link Overtoggle Mechanism ensures proper blade closing without need for control adjustments (wrap-up).
- 4 Pole mount mounting plate with two through-bolts, lag screws and a pole mounting band securely attach switch to pole.
- 5 One-piece interphase rod, factory adjusted and of same material as crossarm.
- 6 Controls, reciprocating or torsional (four 7-ft. sections of control pipe), or Hook Stick control.

## Single Phase Details of AR Switch



- 1 Hot-rolled steel base formed into a channel and galvanized per ASTM A153.
- 2 Hot-rolled crank lever provides high strength and corrosion resistance. Galvanized per ASTM A153.
- 3 Delrin® bushing coupled with a cast aluminum rotating shaft eliminates the need for lubrication during the life of the switch.
- 4 Insulators available in 2.25" bolt circle, porcelain or polymer.
- 5 High-conductivity copper with phosphorous-bronze back-up springs and copper-tungsten fault-closing tips provide reliable contact areas. Silver-to-silver current-transfer points.
- 6 Blade formed from hard-drawn, high-conductivity copper for maximum current carrying capability.
- 7 Bolted tongue-in-groove interrupter mounting ensures positive alignment of the interrupter.
- 8 Polycarbonate ice shield helps protect contacts from ice build up.

\*Delrin® is a registered trademark of The Du Pont Company.

# Construction and operation

*for today . . . tomorrow . . . the 2000's*

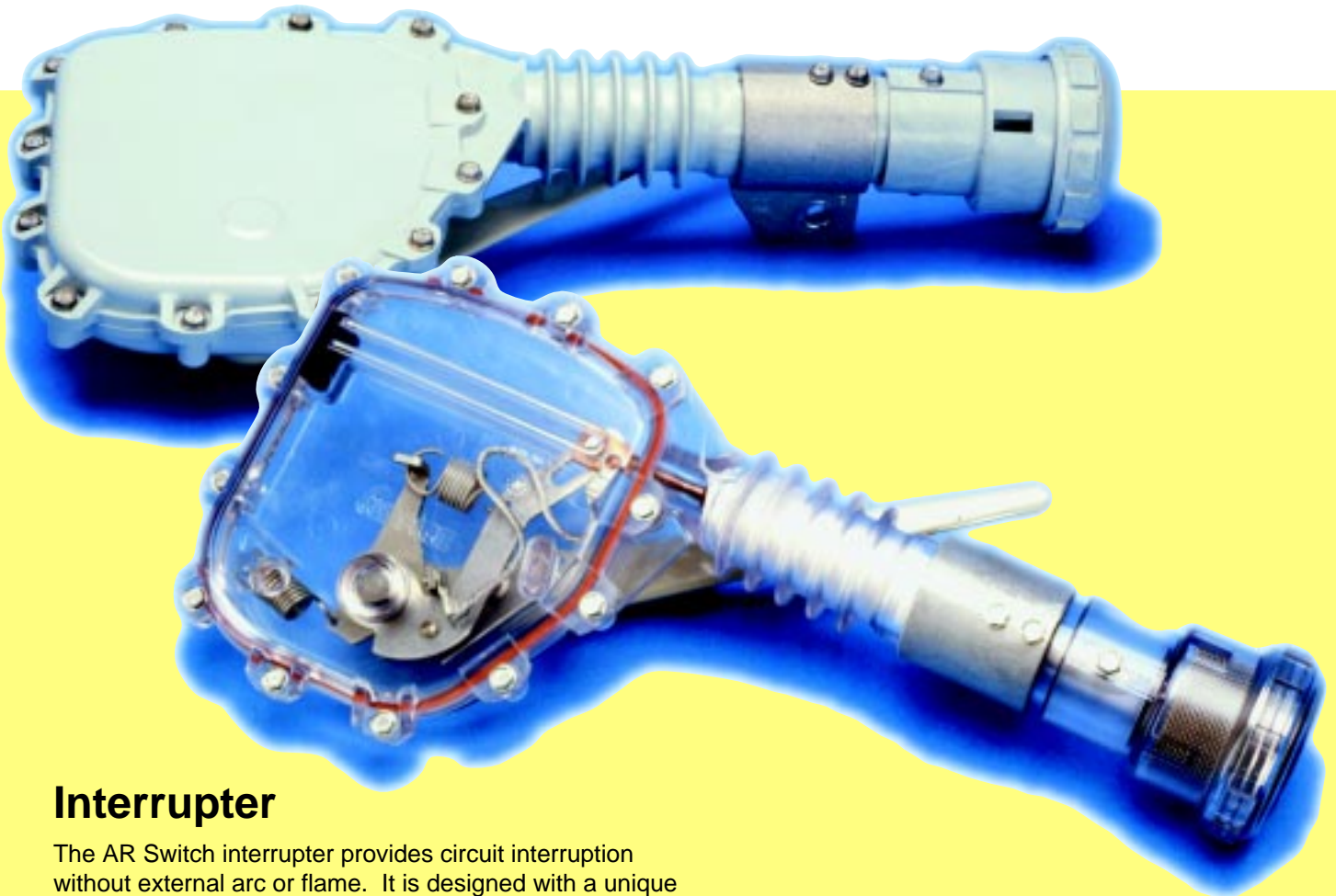
## AR switch

AR Switches are unitized, preassembled switches available with such basic design options as:

- Polymer or porcelain insulators.
- Steel or foam-filled fiberglass 4" x 4" crossarm and interphase shaft, each providing 8,000-lb. working (equal loading) dead-ending capability.
- Steel control sections, one fiberglass control section (four 7-ft. steel sections, or one 7-ft. fiberglass and three 7-ft. steel sections provided) or Hook Stick Control.

Ease of operation and effortless movement of the rotating insulators is ensured with the factory preset Four-Link Overtoggle Mechanism and Delrin® bushings coupled with a cast aluminum rotating shaft that never needs lubrication during the life of the switch. Under extensive testing, the AR switch withstood forces and numbers of operations far greater than would be expected in service, with no significant increase in required operating force.

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## Interrupter

The AR Switch interrupter provides circuit interruption without external arc or flame. It is designed with a unique trailer, liner and muffler, to create the necessary de-ionizing gases for efficient circuit interruption.

AR Switch interrupter housings are manufactured from a high strength polyurethane material for strength, weatherability and resistance to ultraviolet radiation. The housing is a two part housing which is fully gasketed to prevent water entry. The interrupter incorporates a self

resetting mechanism, to ensure that the interrupter is in the circuit and ready to operate for each switch opening.

Extensive testing has been conducted to ensure proper operation under a variety of switching applications (magnitude and varying duties), as well as varying environmental conditions.

# Switch operation performance

*for today . . . tomorrow . . . the 2000's*

## Current-carrying parts

The AR Switch blades are formed from hard-drawn, high-conductivity copper for maximum current carrying capability. The leading edge of the Blade incorporates a copper-tungsten inlay, for fault closing performance. The stationary contacts are high-conductivity copper with phosphorous-bronze back-up springs to maintain optimum contact pressure and operating ease. The

stationary contact also includes a copper-tungsten fault close tip. All current transfer points are silver to silver.

The hinged contact includes a stainless steel compression spring for optimum contact pressure, operating ease and terminal pad stability. All current transfer points are silver to silver.

## Opening Sequence: Switch Blade and Interrupter

**1** Switch blade in closed position



**2** As switch blade is opened, current is transferred to the Interrupter before the main contacts fully separate



**3** Current is fully transferred to the Interrupter and arc interruption is accomplished by thermal interaction of the arc on the specifically designed arc trailer and liner within the interrupter



**4** Switch is fully opened and the Interrupter self-resets







<sup>®</sup>  
**POWER  
SYSTEMS, INC.**

Hubbell Power Systems, Inc.  
210 North Allen Street  
Centralia, MO USA 65240-1395  
(573) 682-5521  
Fax: (573) 682-8714

Hubbell Canada Inc.  
Power Systems Division  
870 Brock Road South  
Pickering, Ontario L1W 1Z8  
(905) 839-1138  
Fax: (905) 831-6353

Hubbell Power Systems Europe  
Woburn Road Industrial Estate  
Ronald Close, Kempston  
Bedford, MK42 7SH  
+44 (0)1234 843632  
Fax: +44 (0)1234 843987

***The Companies of Hubbell Power Systems, Inc.***

**ANDERSON™ CHANCE® CHARDON™ FARGO® Kerite® ~~OHIO/BRASS®~~**

NOTE: Because Hubbell has a policy of continuous product improvement, we reserve the right to change design and specifications without notice.