

OPERATING PRINCIPLE

Series 20 Heavy-Duty Level Switches

HOW IT WORKS

Series 20 liquid-level switches are purpose-built for industrial inductive load switching — solenoid valves, contactors, motor starters, and similar control loads that demand a switching element engineered for arc-producing service. The Yaskawa Bestact™ element at the core of Series 20 is fundamentally different from the reed switches used in Series 10, 11, and 15.

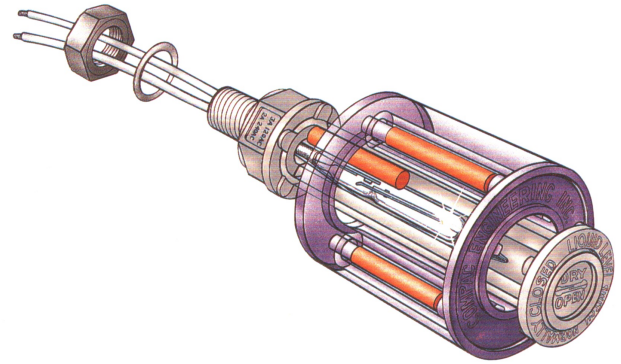
Bestact Switching Element

The Bestact switch uses **hinged armatures**, **wrought contacts**, and a **wiping action** during actuation. As the contacts close, they slide slightly against each other, breaking up any micro-welds formed during prior inductive switching events. This is the opposite of reed switch behavior, where contacts snap closed with no relative motion.

The wiping action, combined with a contaminate-free hermetically sealed envelope, makes the Bestact element uniquely suitable for inductive load switching. Fumes and particles that would accelerate reed switch failure are excluded by the sealed envelope; the wiping action continuously refreshes the contact interface.

Magnetic Actuation

A magnetic float rides up and down a double-welded molded stem containing the Bestact element. As the float approaches the switch, its magnetic field crosses the threshold required to close (or open) the armature contacts. No mechanical linkage, no wear surfaces exposed to process fluid — only the float and the sealed stem interact with the liquid.



20-611 cutaway — Bestact element inside hermetic envelope

Reversible Mode of Operation

The 20-611 can be mounted "threads up" or "threads down", and the unit is offered as either **Wet Open** (N.O.) or **Dry Open** (N.C.) at the end of the stem. Because the unit can be mounted in either orientation, specifying N.O. or N.C. is insufficient by itself — the product label states "WET OPEN" or "DRY OPEN" to define behavior unambiguously.

Wet Open: switch opens as float approaches the hex, closes as float approaches the stop ring at the opposite end.

Dry Open: switch opens as float approaches the stop ring, closes as float approaches the hex at the opposite end.

POINT OF OPERATION & ELECTRICAL

Point of Operation

The point at which the changing liquid level will cause the switch to actuate is determined by float buoyancy, stem dimensions, and the switch’s trip point. This point is at the approximate center of the device.

Trip Point (Dry State Behavior)

Wet Open: contact closes when the gap between the float and the stop ring is not less than **0.35"/8.9 mm** and reopens when the gap is increased to not more than **0.75"/19 mm**. Typical differential between open and closed states: 0.10"/2.54 mm.

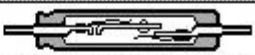
Dry Open: contact closes when the gap between the float and the hex is not less than **0.35"/8.9 mm** and reopens when the gap is increased to not more than **0.8"/20.3 mm**. Same typical differential of 0.10"/2.54 mm.

Specification Tables

The electrical rating, float buoyancy, materials, and application environment tables apply to all Series 20 products.

Values apply equally to the 20-611 single-point switch, the 20-202 2-station control set, and all extended-stem assemblies.

Electrical Rating

ELECTRICAL RATING	
Bestact™ Inductive load switching 	
Contact life	240 VAC MAKE 5, BREAK .5 100K OPERATIONS 115 DC MAKE .3, BREAK .3 300K OPERATIONS
Contact rating	 120 VA, 240 VAC Inductive Yaskawa Electric America Inc. Bestact model R25 Northbrook, IL 60062
UL file	E159361
Class 1, Division 2, Groups A,B,C,D.	
AC	240V .5 AMP, 10 AMP MAX MAKE, 24V 1 MA MIN
DC	115V .3 AMP, .5 AMP MAX BREAK, 24V 1 MA MIN

Yaskawa Bestact — inductive load switching

Contact Life

240 VAC: 5 A MAKE, 0.5 A BREAK — 100,000 operations at rated load.

115 VDC: 0.3 A MAKE, 0.3 A BREAK — 300,000 operations at rated load.

Contact rating: **120 VA at 240 VAC Inductive.** Minimum pilot current: **1 mA at 24 V.** For loads exceeding this rating, use the 20-725 Control Head with integral 20 A relay.

Hazardous Location

Class 1 Division 2, Groups A, B, C, D — qualified for use in hazardous locations as defined by the National Electrical Code.

Yaskawa Electric UL file E153361 covers the Bestact switching element. Observe applicable electrical codes when using this product.

MATERIALS & OEM APPLICATIONS

Series 20 is offered in three injection-molded materials, each selected for a distinct family of process chemistries. Material selection determines chemical compatibility; it does not alter electrical ratings or trip-point behavior.

Polypropylene (PP) — Gray & Black

- Industrial wash-down tanks
- Cooling tower basin controls
- HVAC expansion reservoirs
- Potable water storage systems
- Soap and detergent dispensing
- Commercial laundry and dishwashing
- Deionized water storage monitoring

Acetal (AC) — Red

- Diesel day tanks
- Hydraulic oil reservoirs
- Generator fuel tank monitoring
- Engine coolant expansion tanks
- Mobile equipment lubrication
- Gasoline dispensing equipment
- Compressor lubricant monitoring

PVDF Kynar (KR) — Natural

- Electroplating chemical baths
- Semiconductor wet process tanks
- Sulfuric and nitric acid dosing
- Hydrofluoric acid etch baths
- Chlorine bleach storage
- Sodium hypochlorite dosing
- Photoresist developer tanks
- Caustic soda neutralization
- Pharmaceutical process monitoring
- High-purity water polishing loops

Why Series 20 vs. Series 10 or 15

Series 20 is the right choice when the switched load is **inductive** — solenoid valves, contactors, relays, small motors.

Series 10 and 15 use reed switches optimized for **resistive** loads (lamps, LEDs, logic inputs).

Mismatching a reed switch to an inductive load causes early contact failure from arc damage. The Bestact element in Series 20 is designed for exactly this service.

Design Assistance

Compac provides free engineering consultation: chemical compatibility review, circuit protection recommendations, and sample qualification.

Contact sales@compac.com with process chemistry and operating conditions.