RL-Series
Load Break Switch/Sectionaliser with ADVC controller
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications</td>
<td>2</td>
</tr>
<tr>
<td>Introduction and benefits</td>
<td>3</td>
</tr>
<tr>
<td>LBS / Sectionaliser overview</td>
<td>4</td>
</tr>
<tr>
<td>ADVC controller series</td>
<td>5</td>
</tr>
<tr>
<td>ADVC block diagram</td>
<td>6</td>
</tr>
<tr>
<td>ADVC features</td>
<td>7</td>
</tr>
<tr>
<td>flexVUE Operator Interface</td>
<td>8</td>
</tr>
<tr>
<td>WSOS version 5</td>
<td>9</td>
</tr>
<tr>
<td>Advanced detection / Sectionalising features</td>
<td>11</td>
</tr>
<tr>
<td>Measurement features</td>
<td>13</td>
</tr>
<tr>
<td>RL-Series - Pole mounting details</td>
<td>14</td>
</tr>
<tr>
<td>RL-Series LBS / Sectionaliser - Pole mounting details</td>
<td>15</td>
</tr>
<tr>
<td>RL-Series LBS / Sectionaliser - Specifications</td>
<td>16</td>
</tr>
<tr>
<td>Required details for order RL-Series LBS / Sectionaliser</td>
<td>17</td>
</tr>
<tr>
<td>Required details for order ADVC controller</td>
<td>18</td>
</tr>
</tbody>
</table>
Applications

Smart grid ready
With the increasing need for advanced monitoring, reduction of outages, improved network control and automation of distribution networks, the RL-Series Load Break Switch / Sectionaliser is ready to be integrated into your Smart Grid solution.

Loop automation
Restoring supply to your customers in the shortest possible time is the focus of recloser solutions' loop automation scheme. The loop automation scheme reconfigures protection settings, sectionalises faults, minimises affected areas, and restores network supply without the need for communications or operator intervention, using standard recloser features. Loop automation is a distribution system automation scheme designed to restore supply to customers in the shortest possible time.

Automatic ChangeOver (ACO)
The Automatic Changeover (ACO) system is used in support of a critical load (such as a hospital) to ensure that supply is always available in the event of a power failure. Intelligence embedded in the master switchgear device monitors the supply status and controls a slave device via a dedicated communications link. In the event of an outage the normally open point is closed to provide a secure source of supply to the load. A high level of flexibility ensures the system is compatible with most network configurations.

Operation as a sectionaliser
Reclosers and sectionalisers work together to further improve feeder reliability. The RL-Series LBS/Sectionaliser, as part of a feeder automation network, detects fault passage and automatically isolates faulty sections of a network in conjunction with upstream recloser operation. To accomplish this it senses the three-phase current and voltage to count the number of recloser trip operations. When the pre-programmed number of recloser operations is reached, the controller opens the sectionaliser during the recloser dead time to isolate the downstream fault. This allows the recloser to restore power up to the sectionaliser during the next reclose sequence.
The Schneider Electric RL-Series pole-mounted, gas insulated, load break switch is available in manual and automatic models.

The automatic model can be configured as a remotely controlled switch, or as a sectionaliser.

These automatic switches provide the features of traditional load break switches and sectionalisers, plus the benefits of an up-to-date design optimised for automation, remote control and monitoring, making them ideal for any Smart Grid Solution, now or in the future.

The development of these products was driven by customer demand for improved return on capital investment in the distribution network.

After carefully evaluating customer needs, the Schneider Electric RL-Series was developed to achieve optimum performance and reliability, making use of the latest available technology in SF6 arc interruption and microelectronics.

**Flexibility**

- The RL-Series can be used as either a locally or remotely controlled manual switch, or as a fully automated sectionaliser.
- Advanced processing capabilities allow use in complex automation schemes such as Loop Automation and Automatic Changeover (ACO).

**Reduced installation costs**

- Simple commissioning: configuration of the product is via the user friendly WSOS software tool or the Operator Interface (O.I.).
- All key components required for installation are included.
- Pole mounting brackets are provided in the standard package. An optional Voltage Transformer (VT) for auxiliary supply is available.

**Reduced operating costs**

- The switchgear constantly monitors line current and voltage without the need for additional measurement devices. This data can then be used for forward planning and optimisation of existing feeders.
- Long lifetime, low maintenance equipment reduces lifetime cost.

**DSA/SCADA compatibility**

When used with a compatible Distribution System Automation (DSA) or SCADA system, Schneider Electric switchgear supports remote control and monitoring to provide the following advantages:

- Reduced travel time for line crews. Information on fault current and LBS status values transmitted to system control allows fast location of the faulted line section.
- This same information allows informed remote switching, reducing the affected area and quickly restoring supply.
- Switchgear can be configured and settings managed from system control, without technicians having to visit each individual switch in the field, with a consequent reduction in travelling time and improved system integrity.

**Increased customer satisfaction**

- Reduce customer minutes lost. Supply can be quickly restored to fault-free areas.

**Deferred capital works**

- Remotely controlled and monitored switchgear gives an improved knowledge of a system and provides better system control. Feeder and substation load can then be remotely managed, improving utilisation of existing plant. Purchase of new plant can then most likely be deferred for a considerable period of time.
Schneider Electric’s RL-Series SF6 gas switch is designed to meet the growing requirements for oil free, maintenance free, long life, maximum safety and feeder automation, with a view to Smart Grid applications.

The SF6 gas as the insulating and arc quenching media together with puffing principle ensure the positive breaking of small current, mainly active load current, cable charging current and magnetising current. The extremely short arcing times (within half a cycle) plus tulip type contacts with arc resistant material ensure the long switching life and extended short circuit making capability.

The RL-Series can be operated either manually or by a DC motor in a motor compartment below the tank.

A manual operating arm allows hookstick operation from ground level. By pulling on the appropriate side of the arm the load break switch can be tripped or closed. The interrupters are ganged together and driven by an over-centring spring mechanism.

The mechanism is “operator independent” so that it does not matter how slowly the arm is moved by the operator. A motor mechanism is used in feeder automation schemes to facilitate remote control.

### Switching contacts

The RL-Series switch features a common rotary shaft driving three sets of contacts which operate on the puffer principle of arc quenching. The contacts are “tulip” style with copper-tungsten alloy to ensure a long switching life.

### Tank

The switching contacts are housed in a tank made of 316 stainless steel. The finish is the natural, unpainted finish, and is grit-blasted. The tank envelope is 3.0 mm thick and reinforced with ribbing to give excellent impact resistance.

Each tank is equipped with:

1. A mechanical operations counter which is independent of the controller.
2. An explosion vent on the side, which will safely release any overpressures developed by excessive internal arcing.
3. A mechanical low-gas interlock, which prevents operation of the switch if the gas falls below safe pressure and which provides visible indication of low gas through a window in the tank.
4. A manual lock-out ring. When pulled by the hookstick, this mechanically prevents operation of the switch, for example, if maintenance work is being done on the line downstream of the switch.

### Indication

Two on/off indicators are provided: one on the side of the tank by the operating lever and one underneath the tank in order to be visible to the operator from below. The underside indicator is directly operated by the switching shaft.

### Current transformers

A toroidal current transformer is mounted on the inside stem of each bushing on one side of the RL switch. The analogue current signal is read by the on-board electronics and passed to the controller as a digital signal. The current transformers have a range from 10 A to 16,000 A for measurement and fault detection.

### Voltage sensors

Capacitive voltage dividers are mounted in each bushing, providing an analogue current signal which is proportional to the voltage between the bushing and earth potential. This analogue signal is read by the on-board electronics and passed to the ADVC controller.

### On-board electronics

Each RL-Series switch includes a built-in electronic board which reads the current and voltage signals. It also contains memory holding the switch serial number, number of operations and contact wear.

In addition, the on-board electronics contains a temperature-compensated pressure transducer which is used to display the gas pressure at the ADVC controller.
Advanced protection, data logging & communications capabilities are made possible by the technology housed in the ADVC controller.

It has been designed especially for outdoor pole-mounted operation and is typically mounted low on the pole for ease of access by operation personnel.

With a cubic designed to minimise temperature rise from solar heating, the 304 (COMPACT) or 316 (ULTRA) grade stainless steel enclosure is used to mount the Control And Protection Enclosure (CAPE), Power Supply Unit (PSU), customer accessories and Operator Interface.

The ADVC controller series incorporates the functions of a multi-function protection relay, a switchgear controller, a metering unit and a remote terminal unit.

Batteries are carefully located underneath these modules to help avoid overheating so that a battery life of up to 5 years (1) can be achieved. A vandal resistant lockable stainless steel door, sealed with a rubber gasket, provides access to the Operator Interface. Vents are screened against vermin entry and all electronic parts are enclosed in a sealed die-cast enclosure which protects them from entry of moisture and condensation ensuring a long lifetime.

The COMPACT cubicle is suitable for temperatures from -10°C to 50°C, while the option of a battery heater in the ULTRA cubicle extends its operating temperature range from -40°C to 50°C.

A built-in microprocessor controlled power supply provides uninterrupted operation of not only the circuit breaker and controller, but also the communications radio or modem. These accessories are connected to a built-in user programmable radio power supply. Therefore no other power supplies are required for connection into your SCADA or distribution automation system.

Due to careful design, the efficiency of all parts is extremely high, allowing a battery hold up time of up to 44 hours (2). The architecture used has the advantage that the switchgear operation is independent of the high voltage supply, relying on a set of capacitors charged by the auxiliary supply.

Due to sophisticated power supply management techniques, a switchgear operation is always guaranteed when attempted and alarms are raised over the telemetry when auxiliary power is lost.

Communications equipment can be mounted within the ADVC controller cubicle. A V23 FSK modem, RS232, RS485 and Ethernet TCP/IP are provided as standard to support all of your communications needs.

The ADVC controller series is available in two models:
- ULTRA
- COMPACT.

The table below outlines some of the differences between the two models.

<table>
<thead>
<tr>
<th></th>
<th>ULTRA</th>
<th>COMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure</td>
<td>316 stainless steel</td>
<td>304 stainless steel</td>
</tr>
<tr>
<td>Door locking</td>
<td>Three-point</td>
<td>Two-point</td>
</tr>
<tr>
<td>Customer accessory tray</td>
<td>Side tray, Upper tray</td>
<td>Side tray only</td>
</tr>
<tr>
<td>Input/output modules</td>
<td>8 inputs, 8 outputs</td>
<td>Optional N/A</td>
</tr>
<tr>
<td>Battery heater</td>
<td>Optional</td>
<td>N/A</td>
</tr>
<tr>
<td>Battery</td>
<td>7 Ah, or 12 Ah</td>
<td>7 Ah</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40°C to 50°C (with battery heater option)</td>
<td>-10°C to 50°C</td>
</tr>
<tr>
<td>Auxiliary power supply</td>
<td>115/230 Vac</td>
<td>115/230 Vac</td>
</tr>
<tr>
<td>Dual AC power supply</td>
<td>Optional</td>
<td>N/A</td>
</tr>
<tr>
<td>VT supply via switchgear</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>DC power supply</td>
<td>Optional</td>
<td>N/A</td>
</tr>
</tbody>
</table>

(1) Battery replacement interval is influenced by environmental temperature.
(2) With optional 12 Ah battery, panel off and without communications devices operating.
Schneider Electric switchgear provides many outstanding advantages to the user.

New and innovative features have been made possible by the intimate way the pole-mounted switchgear and control cubicle work together. The block diagram on this page shows how the two items are interfaced.

Special extended range current transformers provide a range from 1 A to 16,000 A for measurement and protection. Embedded voltage screens accurately image the primary voltage value and phase relationship at the analogue front end, allowing measurement of voltage, current, power factor and frequency in the electronic module.
Each controller is provided with an Operator Interface. From here a user can access and program the many measurement and protection features available. Two different Operator Interfaces are available, these are:

- **setVUE Operator Interface**
  - Based on the field-proven operator panels in the previous controllers, this menu-driven interface with large LCD display offers a familiar look and feel.

- **flexVUE Operator Interface**
  - 20 configurable status lamps provide a quick snapshot of the protection and controller status.
  - 12 configurable quick action keys are available to execute frequently used actions such as “Remote control” ON/OFF, “Sectionalise” ON/OFF, etc. Each key has its own status lamp to indicate the ON/OFF state.
  - All status lamps and quick action keys are customisable.
  - It is possible to access event and measurement data and change settings.

### Telemetry interface

The Schneider Electric switchgear can be interfaced to your SCADA system either through its built-in V23 modem and a radio, or its RS232 ports and a modem of your choice. RS485 and Ethernet TCP/IP are also available. A radio or modem can be mounted inside the communications cubicle and power can be supplied by a variable voltage uninterruptable power supply. Many telemetry protocols can be supported such as DNP3 and IEC 60870-5-101.

### Computer interface

WSOS is an advanced personal computer based software package to allow off-line and on-line programming, monitoring and control of a recloser via a USB port, RS232 port or Ethernet.

### Remote control

The ADVC controller offers an impressive list of communication ports for use in remote control applications:

- 4 x RS232
- 1 x Ethernet
- 1 x RS485
- 1 x V23.
Customising the Operator Interface to suit your unique applications has never been easier.

The flexVUE Operator Interface uses Light Emitting Diodes (LED) and an LCD display to communicate the system status to a local operator. Operator actions that are performed on a regular basis can be mapped to 12 dedicated buttons on the interface.

Each of these buttons also have a lamp to indicate the ON/OFF state of each action. Together with the 20 status lamps the panel provides no less than 32 three-colour LEDs that display the state of the controller and overhead system. On the interface, the action buttons are grouped together and referred to as quick action keys. The status LEDs are also grouped together and referred to as status lamps.

Every controller is programmed with a standard configuration of status lamps and quick action keys - text labels are used to mark the function of each. These labels are inserted into special pockets within the flexVUE Operator Interface and can be changed in the field if required.

A graphic user interface tool is provided as part of the WSOS 5 software package that will allow full customisation of the flexVUE Operator Interface, if required. With the tool you can create your own logic functions driving the status lamps, as well as change the actions linked to each quick action key. New labels can be printed from the WSOS template using standard office stationery, cut to size and inserted into the controller.

Example of building the logic function for a status lamp

Example of setting the action keys

Inserting custom labels into the interface
WSOS is the Schneider Electric switchgear operating system software. It provides easy access to all switchgear functions from opening/closing, through configuring protection and communication parameters to accessing measurement and analytical data.

By using a PC, engineers can manage a large number of switches either remotely via a communications link or locally via a USB, serial port or Ethernet connection.

WSOS version 5 integrates Schneider Electric’s field proven Windows-based switchgear operating system and its powerful features and tools, developed over many years, into a modern desktop. The desktop includes the switchgear explorer to organise your switchgear the way you like it and the launch pad for handy links to online help, getting started, updates and much, much more. Controlling, configuring and accessing valuable switchgear data from a local or remote location is now even easier than before.

**Local and remote control**
- Switchgear operation
- Protection group selection
- Protection group copy
- NPS on/off/alarm control
- Auto reclose, earth protection and SEF on/off control
- Work tag, low gas and dead lockout on/off control
- Configurable Input/Output Expander (IOEX)
- Configurable quick keys
- Configurable delay for local Open and Close operations (Hit and Run)
- Configurable SCADA protocols (e.g. DNP3, 101/104, Modbus, MITS).

**Communication options**
- Local USB port (for connection to WSOS only)
- Local RS232 port connection
- Radio modem
- GSM / PSTN modem
- DNP3 virtual terminal object
- TCP/IP
- Communications output capture.
Measurement screens

- Three-phase, earth and sequence current
- Phase voltages:
  - Phase to phase,
  - Phase to earth,
  - Sequence voltages.
- Phase live/dead indication
- Apparent, reactive & real power:
  - Total, and
  - Per phase.
- Power factor
- Signed or unsigned power
- Frequency
- Power quality toolkit:
  - Waveform capture
  - Harmonics.

Interface configuration

- Status lamps:
  - Logic function to indicate; and
  - Separate true/false state colour configuration.
- Quick action keys:
  - Customise actions assigned to each key
  - Custom logic functions for lamp indication, and
  - Separate true/false colour configuration.
- Print labels to insert into Operator Interface.

Example of panel configuration tool
Fault detection

Phase fault detection
Phase fault detection monitors all three phases and makes event log entries on through-fault detection.
- Phase faults setting range: 10 - 1260 A
- Setting resolution: 1 A
- Detection time range: 0.01 - 100 s
- Time resolution: 0.01 s

Earth fault detection
Earth fault detection monitors earth faults and makes event log entries on through-fault detection.
- Earth faults setting range: 10 - 1260 A
- Setting resolution: 1 A
- Detection time range: 0.05 - 100 s
- Time resolution: 0.01 s

Sensitive Earth Fault (SEF)
SEF causes a fault to flag when the earth current rises above a set level for longer than the set time.
- SEF current range: 4 - 20 A
- SEF operating time range: 0.1 - 999 s
- SEF current setting resolution: 1 A
- SEF operating time resolution: 0.1 s

Definite time protection
Definite time works by flagging a fault at a fixed time after pick-up.
- Setting current range: 10 - 1260 A
- Definite time resolution: 0.01 s
- Definite time range: 0.01 - 100 s
- Setting current resolution: 1 A

Inrush restraint
Inrush restraint raises the phase and earth threshold currents for a short period of time to allow for short duration inrush currents when closing onto a load.
- Multiplier range: 1 - 30
- Multiplier resolution: 0.1
- Time range: 0.05 - 30 s
- Time resolution: 0.05 s

Sequence components
Negative, positive and zero phase sequence currents and voltages can be monitored and logged.
In addition, the negative phase sequence current detection can be used for detection of low-level phase-to-phase faults in the presence of high level three-phase loads.
- Setting current range: 10 - 1260 A
Advanced detection / Sectionalising features

Live load blocking
Live load blocking detection operates independently of the detection elements. It prevents the RL switch from closing when voltage is detected on the load side bushings.
- Live load threshold voltage range: 2 - 15 kV

Cold load pick-up
Cold load pick-up allows for a loss of diversity when a load has been without supply for a period of time.
- Multiplier range: 1 - 5
- Multiplier resolution: 0.1
- Time constant range: 1 - 480 min.
- Time constant resolution: 1 min.

Multiple detection groups
The ADVC supports up to 10 detection groups (protection groups with an ACR). Each group can be configured with completely separate detection characteristics with different trip counts and setting currents. The number of detection groups available to the operator can be configured using WSOS, thereby restricting or enabling access to detection settings as required.
- Range of detection groups: A - J

Automatic detection group selection
Automatic detection group selection is used to change the detection group depending on the direction of power flow. This allows the LBS / Sectionaliser to be correctly graded with devices downstream regardless of the power flow direction.
- Range of detection group pairs: A&B; C&D; E&F; G&H; I&J

Sectionalising

Supply interruption
- Supply interruption count range: 1 - 4

Sequence reset time
- Sequence reset time: 1 - 180 s
- Timing resolution: 1 s

WSOS offers a quick, easy way to configure the protection groups. (Protection groups on ACRs).
The RL-Series uses the CTs, voltage sensors and advanced control electronics to provide the following measurement features:

**Voltage**
True RMS voltage is measured on all six terminals. A user-configured threshold indicates a live terminal (accuracy ± 2.5%).

**Current**
RMS current is measured on three phases (accuracy ± 2.5%, reading 2.5 - 630 A).

**Real power (signed or unsigned)**
Real power is determined by multiplying the line voltage and line current in real time and averaging over 2 seconds (accuracy ± 5% of reading, within limits of V and I above).

**Power factor**
The power factor of the line is determined from the line voltage and the line current phase relationship and the previously calculated real power (accuracy ± 5% of reading, within limits of V and I above).

**Default historical measurements**
Power flow is integrated over 5, 15, 30, or 60 minute intervals (kWh) and recorded for two months at the default setting. This can be viewed on the operator control panel, computer, or compatible SCADA system. Additionally, data can be uploaded into a portable computer or a compatible SCADA system.

**Configurable historical measurements**
Average demand profiles may be configured using WSOS. Customised configuration enables the user to specify only the parameters that are required, negating unnecessary information capture. Parameters such as line voltages and currents, power, kW, battery voltage and cubicle temperature can be recorded in intervals selectable between 1 and 1440 min.

**Event history**
- Maximum number of typical events stored in the event history: 30,000 events.

**Gas pressure measurement**
- Gas pressure display resolution: 5 kPa
- Gas pressure display accuracy: ± 10 kPa
- Gas low alarm setting: 65 kPa Gauge at 20°C
- Gas low alarm/interlock accuracy: ± 10 kPa

**Power quality toolkit**
- Supply outage measurement:
  - The supply outage measurement feature utilises built-in switch features to record the number and duration of outages. These statistics are recorded in the controller and are available to the utility to help calculate system outage customer minutes.
  - The controller records:
    - cumulative total number of outages
    - cumulative total outage duration, and
    - the time and duration of each outage event in the event log.
  - These records are accessible to the user and can be retrieved using the operator control panel, WSOS or a SCADA system.
- Harmonic analysis:
  - Harmonics 2 to 16 and the Total Harmonic Distortion (THD) are calculated over an 80 ms period for four currents, six line-line voltages and six line-earth voltages. These harmonics are available via WSOS.
- Waveform capture:
  - Based on a user defined trigger, the ADVC captures and stores, in non-volatile memory, scaled raw data (10 x 3200 samples per second) of the six line-earth voltages and four currents for a predefined time window either side of a user-defined trigger.
  - The user can configure a pre and post trigger time ratio for data to be stored. This defaults to 50% pre-trigger and 50% post-trigger.
  - The captured data can be uploaded at anytime in COMTRADE (IEEE Std C37.111-1999) format via WSOS.
RL-Series
Pole mounting details

Surge arrester always earthed to tank, even if mounted separately

Antenna (if fitted) earthed to tank

Control cable (optional)

2 x M20 bolts for timber pole mount (not supplied)
or2 x clamp bands for concrete pole mounting (not supplied)

Earth stud

Motor pack

Main earth bond

Tee Off

Control cubicle earth

Earth stud

Surge arrester

Control cubicle
**RL-Series LBS / Sectionaliser**

**Pole mounting details**

**Notes**
1 - Details given in this illustration are subject to change without notice. For full details see the Installation Manual.
2 - Switch can be mounted closer to pole if lightning arresters are pole-mounted.

**Terminal / Bushing options**

- **Bare terminal (15 kV only)**
- **2 hole lug (250 A & 400 A)**
- **2 hole lug (630 A)**
- **Threaded end (630 A)**

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**Side view**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
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<tbody>
<tr>
<td>250</td>
<td>10.0&quot;</td>
</tr>
<tr>
<td>250</td>
<td>10.0&quot;</td>
</tr>
<tr>
<td>289</td>
<td>11.5&quot;</td>
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<tr>
<td>331</td>
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<td>331</td>
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<td>974</td>
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<tr>
<td>203</td>
<td>8.0&quot;</td>
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<tr>
<td>605</td>
<td>24.0&quot;</td>
</tr>
<tr>
<td>854</td>
<td>33.75&quot;</td>
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2 x M20 Bolt mounting (not supplied)

or

2 x clamp band mounting (optional)

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**Front view**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>448</td>
<td>17.75&quot;</td>
</tr>
<tr>
<td>374</td>
<td>14.75&quot;</td>
</tr>
<tr>
<td>430</td>
<td>17.0&quot;</td>
</tr>
</tbody>
</table>

[A] 15 kV 992 mm 39.25" 27 kV 1362 mm 53.75" 38 kV 1451 mm 57.25"
**RL-Series LBS / Sectionaliser Specifications**

<table>
<thead>
<tr>
<th>Ratings</th>
<th>RL-Series</th>
<th>15 kV</th>
<th>27 kV</th>
<th>38 kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated maximum voltage kV</td>
<td>15.5</td>
<td>27</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Rated continuous current A</td>
<td>630</td>
<td>630</td>
<td>630</td>
<td></td>
</tr>
<tr>
<td>Fault make capacity (RMS) kA</td>
<td>12.5 / 16</td>
<td>12.5 / 16</td>
<td>12.5 / 16</td>
<td></td>
</tr>
<tr>
<td>Fault make capacity (Peak) kA</td>
<td>31.5 / 40</td>
<td>31.5 / 40</td>
<td>31.5 / 40</td>
<td></td>
</tr>
<tr>
<td>Power operating time (Close / Open) s</td>
<td>&lt; 2 s</td>
<td>&lt; 2 s</td>
<td>&lt; 2 s</td>
<td></td>
</tr>
<tr>
<td>Mechanical operations</td>
<td>10,000</td>
<td>10,000</td>
<td>10,000</td>
<td></td>
</tr>
<tr>
<td>Rated full load operations</td>
<td>600</td>
<td>600</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Short time current kA</td>
<td>12.5 / 16</td>
<td>12.5 / 16</td>
<td>12.5 / 16</td>
<td></td>
</tr>
</tbody>
</table>

**Breaking capacity**

| Mainly active (0.7 pf) A     | 630       | 630   | 630   |
| Cable charging A             | 25        | 25    | 25    |
| Transformer magnetising A    | 22        | 22    | 22    |

**Lightning impulse withstand level**

| Phase to phase kV            | 125       | 150   | 170   |
| Phase to earth kV            | 125       | 150   | 170   |
| Across interrupter kV        | 145       | 170   | 200   |
| On loss of SF6 kV            | 50        | 70    | 70    |

**Power frequency withstand voltage**

| Phase to earth kV            | 40        | 60    | 70    |
| Across interrupter kV        | 50        | 60    | 80    |

**Service conditions**

| Ambient temperature (ºC)     | -30 to 50 | -30 to 50 | -30 to 50 |
| Solar radiation (Max.) kW/m² | 1.1        | 1.1        | 1.1        |
| Humidity %                   | 0 to 100   | 0 to 100   | 0 to 100   |
| Altitude meters (Max. (2)) m | 3000       | 3000       | 3000       |
| Altitude feet (Max. (2)) ft  | 9840       | 9840       | 9840       |

**Net weights**

| Circuit breaker with pole mount bracket kg / lbs | 128 / 282 | 128 / 282 | 128 / 282 |
| Control cubicle with control cable kg / lbs     | 41 / 90  | 41 / 90  | 41 / 90   |
| Gross weight of crate kg / lbs                  | 285 / 628 | 285 / 628 | 285 / 628 |
| External VT (N-Series only) kg / lbs             | 60 / 132 | 60 / 132 | 60 / 132 |

**Crate dimensions**

| Width mm / in | 1200 / 47.2 | 1200 / 47.2 | 1200 / 47.2 |
| Depth mm / in | 1150 / 45.3 | 1150 / 45.3 | 1150 / 45.3 |
| Height mm / in| 755 / 29.7 | 755 / 29.7 | 755 / 29.7 |

(1) Option when cubicle battery heater is fitted (-10ºC to 50ºC (-14ºF to 122ºF) without heater)

(2) For altitudes above 1000 m (3280 feet), derate in accordance with ANSI C37.60 for reclosers (ANSI C37.63 for LBS)
## RL-Series

### Required details for order

**RL-Series LBS / Sectionaliser**

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Only one of the boxes (ticked or filled with the required value) have to be considered between each horizontal line. Red circle lead-time should be requested from your distributor.

For details about the manual RL-Series switch contact your local distributor. Certain configurations may attract additional cost. To clarify these details, please consult your local distributor.

---

### Switch unit

<table>
<thead>
<tr>
<th>Rating (System voltage / Interrupt / BIL)</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.5 kV / 12.5 kA / 125 kV</td>
<td></td>
</tr>
<tr>
<td>27 kV / 12.5 kA / 150 kV</td>
<td></td>
</tr>
<tr>
<td>38 kV / 12.5 kA / 170 kV</td>
<td></td>
</tr>
<tr>
<td>15.5 kV / 16 kA / 125 kV</td>
<td></td>
</tr>
<tr>
<td>27 kV / 16 kA / 150 kV</td>
<td></td>
</tr>
<tr>
<td>38 kV / 16 kA / 170 kV</td>
<td></td>
</tr>
</tbody>
</table>

- **Rated current (A)**: 630 A
- **Frequency**: 50 Hz, 60 Hz
- **Rating plate language**: English, Spanish, Portuguese
- **Switch state indication**: ON / OFF, I / O

### Accessories

<table>
<thead>
<tr>
<th>Mounting arrangement</th>
<th>Pole mount:</th>
<th>None</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surge arrester brackets</td>
<td>Not applicable</td>
<td>Standard inclusion</td>
<td></td>
</tr>
</tbody>
</table>

- **Concrete pole clamps**: Not applicable, 230 - 270 mm, 270 - 310 mm, 310 - 360 mm
- **Control cable length**: 4 metres, 7 metres (Default), (Max) 11 metres

### Options

- **Terminal cable length (Set of 6)**: 3 metres, 4 metres, 5 metres, 6 metres
- **Terminal cable rating**: Not applicable, 250 A (Aluminium), 400 A (Aluminium), 630 A (Aluminium)

- **Medium Voltage terminals options (Set of 6)**: Bare Terminal (15 kV only)
  - **Bushing Boots**: 770 mm (15-27 kV), 1100 mm (38 kV)
  - **HV cable current rating**: 250 A, 400 A, 630 A

### Special notes

- Surge arresters: Not applicable, Surge arresters
- VT mounting: Not applicable, Pole mounting
- Dressing (Australia only): Not applicable, Dressed
**Required details for order**

**ADVC controller**

<table>
<thead>
<tr>
<th>Details</th>
<th>COMPACT</th>
<th>ULTRA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong> <em>(Features highlighted are only available on ULTRA)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operator Interface (O.I.)</strong></td>
<td>setVUE</td>
<td>flexVUE</td>
</tr>
<tr>
<td><strong>Ambient temperature (°C)</strong></td>
<td>Standard</td>
<td>-10°C to 50°C</td>
</tr>
<tr>
<td></td>
<td>Extended with battery heater</td>
<td>-40°C to 50°C</td>
</tr>
<tr>
<td><strong>Auxiliary supply type</strong></td>
<td>Single AC supply:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>115 Vac</td>
<td>230 Vac</td>
</tr>
<tr>
<td></td>
<td>Add 27.8 Vac integrated supply to above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dual AC</td>
<td>DC supply</td>
</tr>
<tr>
<td><strong>Maximum battery hold up time</strong></td>
<td>26 hours</td>
<td>44 hours</td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td>English</td>
<td>US English</td>
</tr>
<tr>
<td></td>
<td>Spanish</td>
<td>Portugese</td>
</tr>
<tr>
<td><strong>Standard protocol</strong></td>
<td>MODBUS</td>
<td>IEC</td>
</tr>
<tr>
<td><strong>Accessories</strong> <em>(Additional costs may apply)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FTIM</strong> <em>(Ultra FTIM cable only)</em></td>
<td>Not applicable</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>IOEX</strong></td>
<td>Not applicable</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>General purpose IEC socket</strong> <em>(only available with 115 Vac, 230 Vac and Dual AC)</em></td>
<td>Not applicable</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>GPO 10 A max.</strong> <em>(only with IEC socket)</em></td>
<td>None</td>
<td>AUS</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>UK</td>
</tr>
</tbody>
</table>

**Special notes** *(For other available accessories, contact local suppliers)*
As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

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