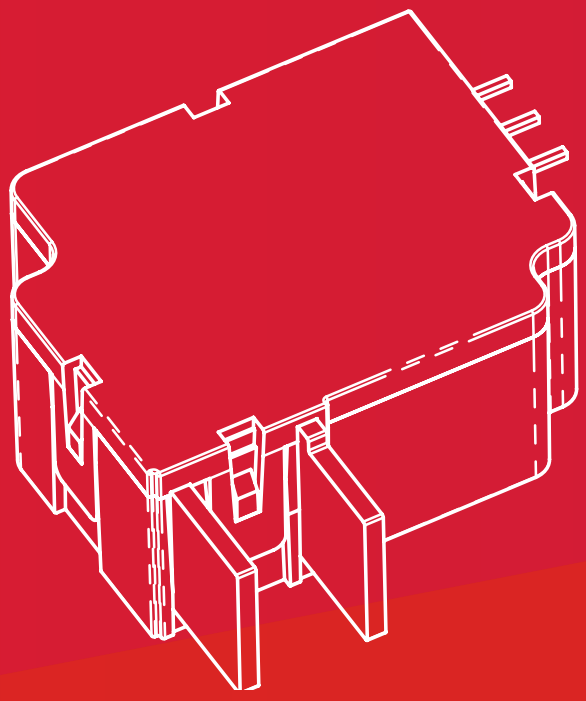
REDBOURN
Group

The Redbourn Guide to Load Switching for Smart Electricity Meter Manufacturers

June 2016 Revision



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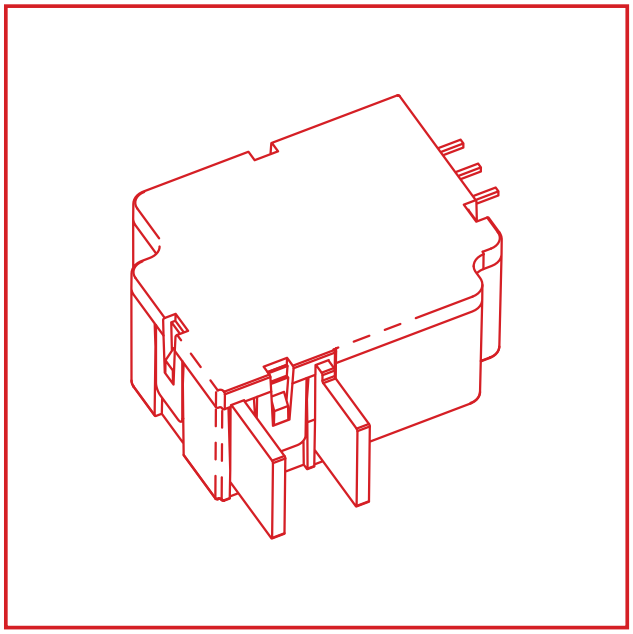
Contents

Introduction



In September 2015, the International Electro technical Commission (IEC) released "IEC 62052-31:2015 Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 31: Product safety requirements and tests". A new load switching safety standard for Smart Meters.

The standard specifies product safety requirements for equipment for electrical energy measurement and control. It applies to newly manufactured metering equipment designed to measure and control electrical energy on 50 Hz or 60 Hz networks with a voltage up to 600V. It also applies to metering equipment containing supply and Load Control Switches (Previously referred to as Latching Relays, Disconnect Switches or Contactors). This standard replaces the Standard IEC 62055-31:2005 and specifically Annex C, which was originally established for pre-payment credit meters.

Because of the load switching capability of Smart Meters, it was considered necessary by the IEC to create a dedicated safety standard for meters fitted with Load Switches (sometimes called 'Latching relays' 'Contactors' or 'Disconnect Switches').

This guide is aimed at Meter Manufacturers

To help them understand and interpret the new standard with respect to Load Switching Requirements. This guide is a high level presentation to highlight key aspects.

We hope that it is useful to you and we welcome feedback on how it can be improved for future revisions.

Why we are writing this guide

There is often a lack of understanding regarding standards which Redbourn are seeking to clarify. For example, it's important to understand that IEC 62052-31 relates to the electricity meter and not the load switch. A good example of this is the designation of the UC rating. A load switch can't be certified to a UC level, only the meter, when fitted with a load switch.

The "Redbourn guide to load switching for Smart Electricity Meter Manufacturers" is a simplified guide to the new standard. It is not intended to replace the standard, but simply to help manufacturers understand the key elements that are now defined, with particular emphasis on safe load switching.

Redbourn acknowledge the IEC – International Electrotechnical Commission, Rue de Varembé 3, PO Box 131, CH-1211 Geneva 20, Switzerland for agreement to reference particular clauses of the Standards IEC62052-31:2015 and IEC62055-31:2005.

Thanks to several key industry figures and Meter Manufacturers who have supported us in the compiling of this document and encouraged us in the development of our Load Switch product range.

If you would like further help on the integration of load switches into your metering devices then please contact us either by email, phone or social media

redbourn.com
connect@Redbourn.com

Introduction to Redbourn

Redbourn Group Comprises

Redbourn Innovation
Focusing on intellectual property development and product development

Redbourn Technology
Providing Load Switch Relay devices for the Smart Grid and associated Smart Devices that need to safely switch electrical loads and withstand certain short circuit conditions

Redbourn Engineering
Precision pressings, shunt resistors and custom assemblies

Established for more than 15 years, the company is a supplier of precision stamped products for Electricity Metering and Shunt Resistors for intelligent battery sensors, plus other precision custom assemblies.

In 2013, Redbourn embarked on a development program to develop innovative products for Specialist Load Switching - predominantly Electricity Metering.
This resulted in a major expansion for the company; reshaping its future as an Innovation and Technology leader for Smart Grid applications. As of January 2016, Redbourn devices are already approved in more than 10 Meter platforms globally.

Details on the range of products that Redbourn have available can be found at the back of this publication or via our website at redbourn.com/resources

Redbourn is proud to be nominated for two Smart Energy UK awards

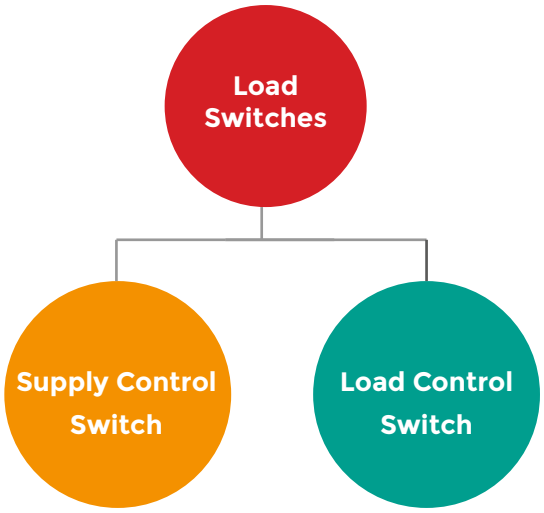
Performance and Cost Top 10 Tips

for optimised load switch selection

For an optimised solution, engage with your load switch supplier as early as possible during your development. Early engagement can realise performance and cost benefits. To help you, here are our top 10 suggestions for optimised load switch selection.

	Success Tip	Rationale	Customer Benefit
1	**Define Clear Load Switching requirements**	Set out clear requirements for Load Switching in the following areas: Electrical specification Mechanical specification Reliability requirements Environmental constraints Manufacturing constraints Hardware integration Specific standards	Clear project path with no late surprises! Validate and verify requirements throughout project
2	**Aim for simple load switch-meter integration**	Complex designs add complexity to assembly. Keep it simple!	Low cost
3	**Design short bus bars**	Keep external bus bars as short as possible from load switch to terminals to keep costs low and for easier integration	Easy integration into meter and low cost
4	**Specify a single drive coil**	A balanced load switch mechanism enables single coils to be specified. Single coils are reliable and quicker to wind	Optimised cost and performance
5	**Avoid mechanical joints**	Riveted joints, semi shears and screw joints impede current flow and increase heating in the meter	Low contact resistance Low meter self heating
6	**Select load switches with fast 'contact settling time'**	Less contact bounce to enable long lifetime performance Fast operation for cost optimisation of power supply	Lifetime reliability
7	**Integrate shunts**	Integrate shunts onto simple bus bar geometries to minimise raw material waste	Low cost
8	**Increase heat dissipation by design**	Increase heat dissipation by increasing the surface area of bus bars	Lower meter self heating
9	**Define maximum resistance values**	Define the maximum allowable resistance values before the custom design phase to control heat performance	Lower meter self heating
10	**Early engagement of Load Switch manufacturer**	Early involvement with your load switch manufacturer can support the above points and provide you with an optimal load switching solution for your meter	Optimised cost and performance

Load Switch Terminology



The Switch Device in an electricity meter is defined in the standard as

A "supply Control Switch" and "Load Control Switch" (Clause 6). Collectively they are known as Load Switches

These replace often used terms such as 'Relay' 'Latching relay' 'Contactor' or 'Disconnect Switch' which are considered ambiguous

A Supply Control Switch (SCS) – Controls supply to a premises and shall be able to

- Carry, make and break currents up to Imax of the meter
- Carry, make and break negligible currents; the starting current of the meter
- Carry, make and break overload current
- Carry and make short circuit currents

A Supply Control Switch is designed for uninterrupted duty and for infrequent use – **3 operating cycles per day**

A Load Control Switch (LCS) – may be connected in series with current circuits in the meter or with independent terminals

- The rated current of a LCS may be lower than the meter current
- Carry, make and break currents up to their rated operational current
- Carry short circuit currents

A Load Control Switch is designed for uninterrupted duty and for infrequent use – **1 operating cycle per hour**

Objects in scope

(related to Load Switches)

Purpose of the Requirements of the standard is to ensure that hazards to the user and the surrounding area are reduced to a tolerable level. Requirements for protection against particular types of hazard are given in clauses 6-12.

This guide focuses on the main electrical aspects of clause 6 and specifically the safety related requirements of 6.10.1. References are made to other clauses in this guide when there are load switch considerations.

The standard (Clause 1.2) defines the objectives of IEC62052-31 as

Clause	Description
6	Electrical shock and burn
7 & 8	Mechanical hazards and stresses
9	Spread of fire from equipment
10	Excessive temperature
11	Penetration of dust and water
12	Liberated gases, explosion and implosion

REL100S

REL120E

History and development of the standard related to load switching

The IEC released the standard: IEC 62055 Part 31: Static payment meters for active energy (Classes 1 and 2) which was last updated in 2005.

Part 31 specifically addressed the load switching requirements of pre-payment meters. The introduction of this standard defines the requirements of these particular meter types.

Payment meters are used in situations where the supply of electrical energy to the load may be interrupted or its restoration enabled under the control of the payment meter in relation to a payment tariff agreed between the customer and the supplier.

Due to Demand Side Management initiatives and safety related aspects of Smart Meters, the original IEC62055-31 Standard has now been superseded by IEC 62052-31. This improved standard is specifically tailored to Smart Meters and specifically provides clarification on the key aspect of Load Switching.

Meters with Supply Control Switches

SCS

	Requirement	Value			
		Utilisation category [a]			
		UC1	UC2	UC3	UC4
1	Rated operational voltage (U_e)	Equal to the reference voltage of the meter [b]			
2	Rated frequency	Equal to the reference frequency of the meter			
3	Rated operational current I_e equal to the maximum current Imax of the meter, [c]	≤ 63 A	≤ 100 A	≤ 125 A	≤ 200 A
4	Duty	Uninterrupted duty			
5	Rated uninterrupted current (I_u) at 1, 15 U_e	Equal to I_e			
6	Endurance / Number of operating cycles [d]	5000 at U_e I_e cos φ = 1 and then 5000 at U_e I_e cos φ = 0.5 ind performed on the same switch			
	For detailed requirements and test methods see 6.10.6.4				
7	Surge voltage withstand across open contacts	max. 12000 V			
	For detailed requirements and test methods see 6.10.6.5				
8	Rated making capacity (I_m) at 1, 15 U_e cos φ = 1	Equal to I_e			
9	Rated breaking capacity (I_c) at 1, 15 U_e cos φ = 1	Equal to I_e			
10	Maximum overload current I_{ov1}	As agreed between the manufacturer and the purchaser			
11	Rated safe short-time withstand current (I_{ssw}) [e] at 1, 15 U_e	3000 A	4500 A	6000 A	10000 A
	For detailed requirements and test methods see 6.10.6.6				
12	Rated operational short-time withstand current (I_{osw}) [d] at 1, 15 U_e	1500 A	2500 A	3000 A	4500 A
	For detailed requirements and test methods see 6.10.6.7				
13	Rated short-circuit making capacity (I_{sm}) [d] at 1, 15 U_e	1500 A	2500 A	3000 A	4500 A
	For detailed requirements and test methods see 6.10.6.8				
14	Neutral switching (optional)	UC equal to UC of phase switches			
	For detailed requirements and test methods see 6.10.6.3				

Table 22 - Summary of requirements for current circuits of direct connected meters with SCS

Descriptions of these tests can be found on page 15 and 16.

Meters with Supply Control Switches

SCS

Test Requirement Highlights

Supply Control Switches shall be able to

- carry, make and break currents up to and including Imax of the meter;
- carry, make and break negligible currents: the starting current of the meter;
- carry, make and break overload currents;
- carry and make short-circuit currents.

A Supply Control Switch may have additional functions like circuit breaker, contactor, isolator, earth leakage detector, under / over voltage detector and raised neutral detector. Requirements and tests of such functions are out of the scope of this standard.
A Supply Control Switch shall be designed for uninterrupted duty.
A Supply Control Switch is intended for infrequent use: up to 3 operating cycles per day.
The current circuit of the meter, including the supply control switch(es) is protected by the upstream (supply side) protection of the installation.
This standard applies only to supply control switches being part of meters.

For meters with Imax above 200 A the values of test currents shall be agreed between the supplier and the purchaser.

a) The utilisation category is subject to the purchase agreement between the supplier and the purchaser. For marking, see 5.3.5.
b) If the meter has several reference voltages, the Ue is equal to the highest reference voltage of the meter.

c) Values of rated operating current have been taken from IEC 60898-1:2015, 5.3.2 except the 200 A value.
d) Values for short-time withstand current and short-circuit making capacity have been taken from IEC 60898-1:2015, 5.3.4, except the 2500 A value. For power factor see Table 27.

Test sequence for Supply Control Switches

SCS

The Product Safety Requirements and tests defined in the standards include the lifetime electrical endurance requirements, as well as exposure to short-time over currents. For a meter to be correctly certified to the standard at a defined UC rating, it must successfully meet ALL of the defined electrical lifetime and over current requirements of the standard as well as meeting stringent acceptance criteria on completion of the tests.

Test Number	Test Clause		SCS Sample			
			1	2	3	4
1	0	Pre-conditioning	■	■	■	■
2	6.10.6.3	Switching the neutral by the supply control switch	■			
3	6.10.6.4	Endurance/Number of operating cycles	■			
4	6.10.6.5	Surge voltage withstand across open contacts				■
5	6.10.6.6	Verification of the ability to carry the rated safe short-time withstand current (I_{ssw})		■		
6	6.10.6.7	Verification of the ability to carry the rated operational short-time withstand current (I_{osw})			■	
7	6.10.6.8	Verification of the ability to carry the rated short-time withstand current (I_{sm})				■
8	6.10.6.9	Minimum switched curret (pass / fail criterion)	■	■	■	■
9	6.10.6.10	Power consumption (pass / fail criterion)	■	■	■	■
10	6.10.6.11	Dielectric test (pass / fail criterion)	■	■	■	■

Table 26 - Test sequence and sample plan for supply control switches

The ■ in the table indicates that the particular test should be performed on the particular sample, but the sequence of the tests shall always follow the same order as the test number sequence. For example: SCS sample 1 shall be subjected to test numbers 1, 2, 3, 8, 9 and 10, in that specific order.

SCS sample 3 might not be required, depending on the result of test 5 on SCS sample 2. Test 8, 9 and 10 on SCS sample 2 has to be carried out only if the switch remains operational after test 5.

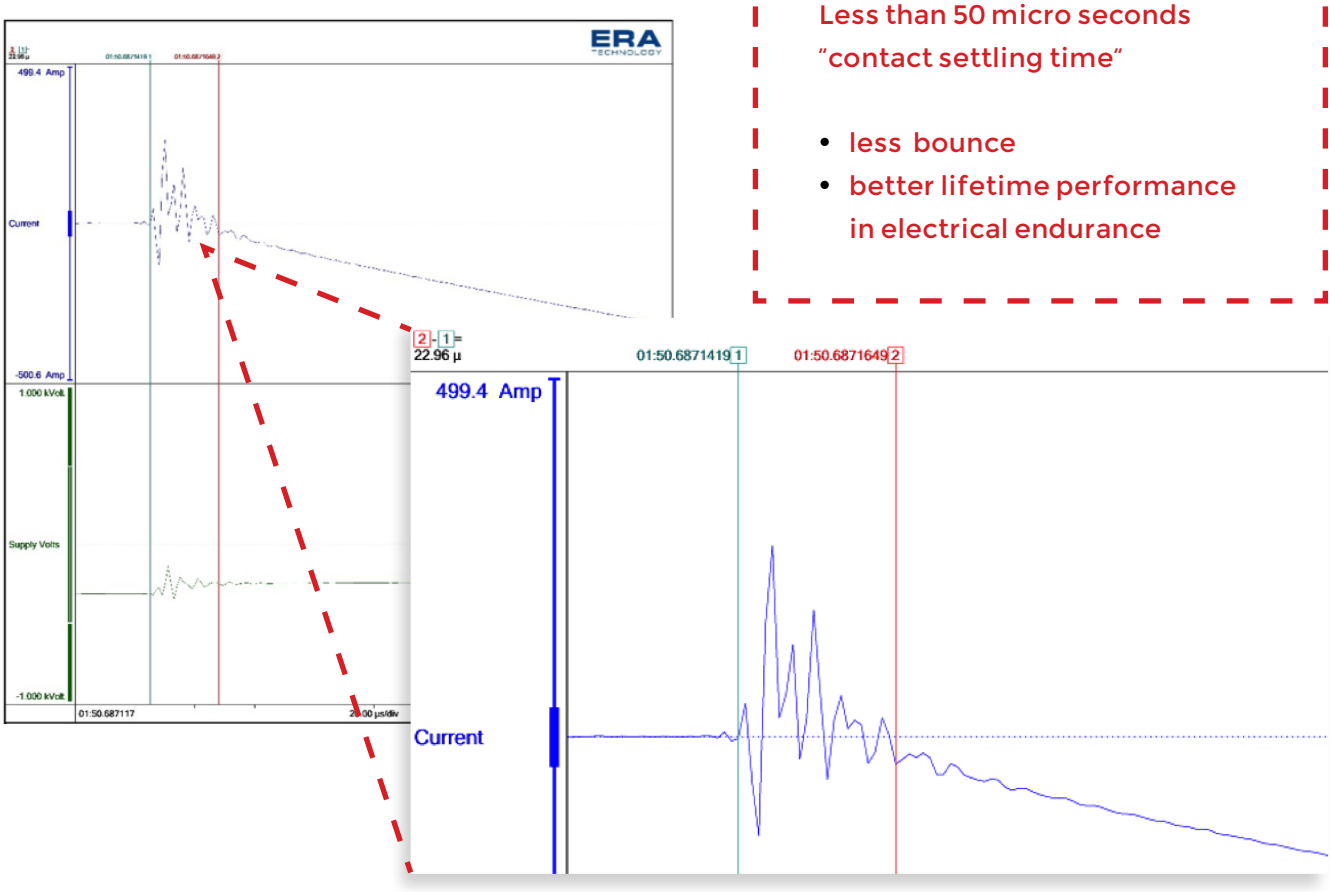
Success Tip!

In order for long term electrical endurance and lifetime performance, select a Load Switch with fast "contact settling time"

The balanced mechanism at the heart of the Redbourn device ensures long term reliability for electrical life endurance – well beyond the requirements of industry standards. Contact bounce is the enemy of high current switching, but with a 'contact settling time' under 50 micro seconds, our products are five times quicker than our competitors, giving you the confidence of superior life-time performance.

Less than 50 micro seconds "contact settling time"

- less bounce
- better lifetime performance in electrical endurance



The graph above shows the "settling time" of electrical current on the closing of the REL100S load switch.

Electrical tests on current circuits

SCS

of direct connected meters with SCSs

Test sequence and sample plan	6.10.6.1	This defines the sequence to which the test sequences should be conducted.
Pre-conditioning	6.10.6.2	**A pre-conditioning for all sample tests described** The defined nominal voltage and maximum meter current is set with a resistive load and the switch operated 3 times. Switches must operate at the first attempt and with no evidence of sticking.
Switching the neutral by the supply control switch	6.10.6.3	This is applicable on meters where the neutral is switched. The standard defines the order of switching between live and neutral.
Endurance / number of operating cycles	6.10.6.4	**This endurance regime and the associated power consumption/switched current tests have safety critical implications** 5000 cycles at max rated current and voltage with a resistive load (PF=1) at 10 seconds ON and 20 seconds OFF. The same switch is then subject to a further 5000 cycles at max rated current and voltage with an inductive load (PF=0.5) at 10 seconds ON and 20 seconds OFF. PASS/FAIL criterion are defined in 6.10.6.9 and 6.10.6.10 which must be passed. For multi-phase meters, each phase can be tested independently.
Surge voltage withstand across open contacts	6.10.6.5	**SCSs shall withstand a simulated lightening surge** This test is conducted on all meter circuits with switches fitted and set to the open position. Voltage is pulsed from 1KV up to a maximum of 12KV in order to establish the flash over voltage. . PASS/FAIL criterion are defined in 6.10.6.9, 6.10.6.10, and 6.10.6.11 which must be passed.
Verification of the ability to carry the rated safe short-time withstand current	6.10.6.6	**This test assesses the ability of the SCS to withstand the short circuit current** as defined in table 22-11. For example, the UC3 test requires the switch to withstand 6000Amps until the fist zero crossing of the voltage. The test is performed 3 times on the same sample. IF the contacts within the sample welds, then test 6.10.6.7 must be performed on a new sample. If no weld occurs, then 6.10.6.7 can be omitted providing that the PASS/FAIL criteria is met.

Electrical tests on current circuits

SCS

of direct connected meters with SCSs

Verification of the ability to carry the rated operational short-time withstand current	6.10.6.7	**This test assesses the ability of the SCS to withstand the short circuit current** as defined in table 22-12. For example, the UC3 test requires the switch to withstand 3000A until the first zero crossing of the voltage. The test is performed 3 times on the same sample. PASS/FAIL criterion are defined in 6.10.6.9, 6.10.6.10, and 6.10.6.11 which must be passed.
Verification of the ability to make the rated short-circuit current	6.10.6.8	**This test assesses the ability of the SCS to withstand 'switching into' the short circuit current** as defined in table 22-13. For example, the UC3 test requires switching into a short circuit current of 3000A which is maintained until the first zero point crossing of the voltage. The test is repeated 3 times. PASS/FAIL criterion are defined in 6.10.6.9, 6.10.6.10, and 6.10.6.11 which must be passed.
Minimum switched current (pass / fail criterion)	6.10.6.9	**Post test for all samples** This test verifies that the SCS is capable to switch minimum current after testing.
Power consumption (pass / fail criterion)	6.10.6.10	**Post test for all samples** This test verifies that the SCS has not exceeded the allowable Power Consumption values defined in the standard or defined by the customer.
Dielectric test (pass / fail criterion)	6.10.6.11	**Post test for all samples** This test verifies that the SCS can withstand a 2KV DC impulse, followed by 1KV r.m.s AC for 1 minute after testing.

Success Tip!

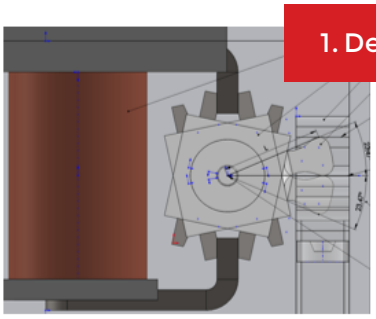
Work with your Load Switch supplier to define the specific requirements of the power supply to the load switch. Efficient electromagnet design maximizes the available voltage and current for minimum power usage. Optimisation ensures fast actuation to minimise pulse width requirements.

The balanced mechanism at the heart of Redbourn's load switches comfortably delivers efficient opening and closing in less than 20 milliseconds, giving you confidence for full power supply optimisation.

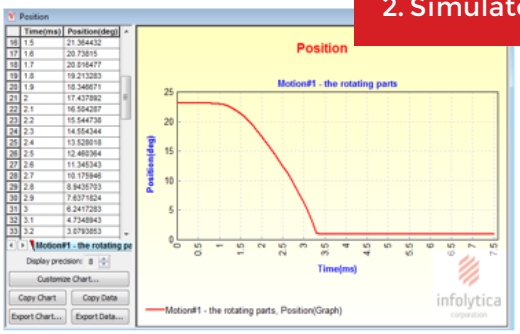
Our Development approach

Complete optimisation of the system design using scientific approaches

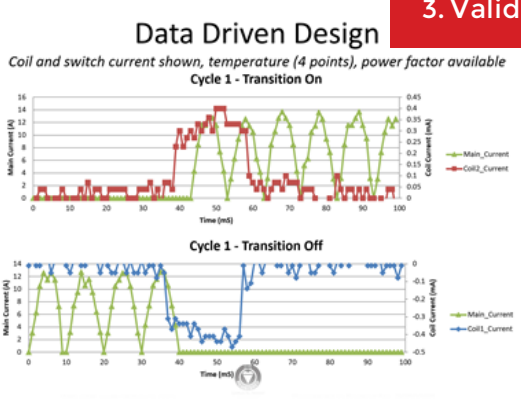
1. Designed



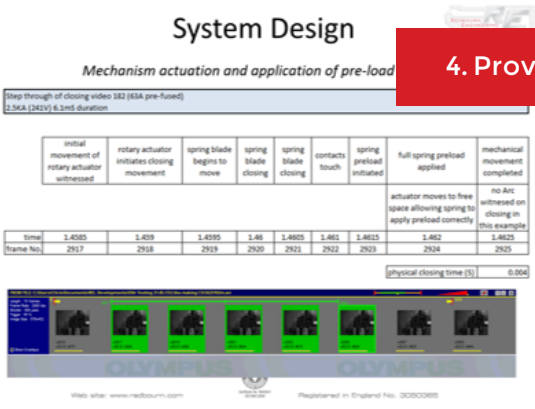
2. Simulated



3. Validated



4. Proven



Meters with Load Control Switches

LCS

	Requirement	Value
1	Rated operational voltage (U_e)	Equal to the reference voltage of the meter or tariff and load control device [a]
2	Rated frequency	Equal to the reference frequency of the meter or tariff an load control device
3	Rated operational current I_e, A[b] at cos φ = 1	2 | 10 | 16 | 25 | 32 | 40 | 63 | 80 | 100
4	Rated operational current I_e, A[b] at cos φ = 0.4	1 | 5 | 8 | 10 | 10 | 10 | 10 | 10 | 10
5	Duty	Uninterrupted duty
6	Endurance / Number of operating cycles [c] at U_e, I_e, cos φ = 1 at U_e, reduced I_e, cos φ = 0.4 No load	30000 on sample 1 30000 on sample 2 75000 on sample 3 NOTE See also Figure 10
	For detailed requirements and test methods see 6.10.7.3	
7	Rated making capacity (I_m) at 1, 15 U_e cos φ = 1	Equal to I_e
8	Rated breaking capacity (I_c) at 1, 15 U_e cos φ = 1	Equal to I_e
9	Rated conditional safe short-circuit current (I_{cssw})[c]	7000 A
	For detailed requirements and test methods see 6.10.7.4	
10	Rated conditional operational safe short-circuit current (I_{cosw})[c]	3000 A
	For detailed requirements and test methods see 6.10.7.5	

Table 23 – Summary of requirements for load control switches

Meters with Load Control Switches

LCS

a) For Load Control Switches with independent terminals, other voltages may be specified.

b) Values of rated operating current have been taken from IEC 60898-1:2015, 5.3.2 except the 2 A value. Other values may be agreed on by the manufacturer and the supplier.

6.9.8.5 Load Control Switches

The requirements for Load Control Switches are summarised in Table 23.
Meters, tariff and Load Control devices may have zero or more Load Control Switches. When built into meters, Load Control Switches may be connected in series with (a) current circuit(s) or may have independent terminals. The rated operational current of a load switch may be lower than the maximum current of the meter. Load Control Switches shall be able to:

- carry, make and break currents up to their rated operational current I_e;
- carry short circuit currents.

NOTE
A Load Control Switch is not intended to provide isolation function.
A Load Control Switch shall be designed for uninterrupted duty.
A Load Control Switch is intended for infrequent use: up to 1 operating cycle per hour.
In all applications, Load Control Switches are protected by the downstream (load side) protection of the installation.

Short circuits may occur on the wires – rated to carry the current of the Load Control Switch(es) – between the Load Control Switch and the downstream protection, although the probability of such an event is very low. Such faults are cleared then by the supply side protection.

Test sequence for Load Control Switches

LCS

Load Control Switches are considered an integral part of the meter and each test on such a switch is to be performed on the complete unit.

IEC 62052-31:2015 © IEC 2015

Test Number	Test Clause		LCS Sample				
			1	2	3	4	5
1	6.10.7.2	Pre-conditioning	■	■	■	■	■
2/1	6.10.7.3	Endurance / Number of operating cycles Test 2/1	■				
2/2	6.10.7.3	Endurance / Number of operating cycles Test 2/2		■			
2/3	6.10.7.3	Endurance / Number of operating cycles Test 2/3			■		
3	6.10.10.4	Verification of the ability to carry the rated safe short-time withstand current (I_{cssw})				■	
4	6.10.7.5	Verification of the ability to carry the rated operational short-time withstand current (I_{cosw})					■
5	6.10.7.6	Power consumption (pass / fail criterion)	■	■	■	■	■
6	6.10.7.7	Dielectric test (pass / fail criterion)	■	■	■	■	■

Table 28 - Test sequence and sample plan for load control switches

The ■ in the table indicates that the particular test should be performed on the particular LCS sample.

LCS sample 5 might not be required, depending on the result of test 3 on LCS sample 4. Test 5 and 6 on LCS sample 4 has to be carried out only if the switch remains operational after test 3.

Electrical tests on Load Control Switches

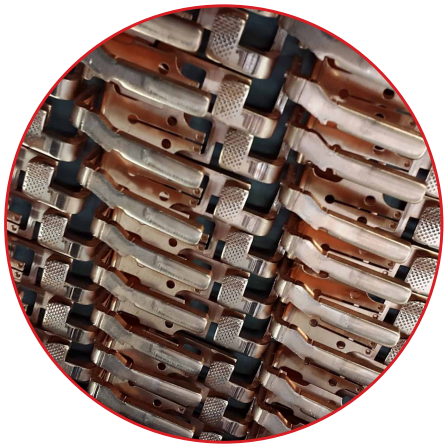
LCS

Test sequence and sample plan	6.10.7.1	This defines the sequence to which the test sequences should be conducted.
Pre-conditioning	6.10.7.2	**A pre conditioning for all sample tests described** The defined nominal voltage and maximum meter current is set with a resistive load and the switch operated 3 times. Switches must operate at the first attempt and with no evidence of sticking.
Endurance / number of operating cycles	6.10.7.3	**This tests the rated Making and Breaking capacity of the Load Control Switch (LCS) in the meter** Test 1, Sample 1: 30000 cycles at rated current with resistive load (PF=1) Test 2, Sample 2: 30000 cycles at rated current with inductive load (PF=0.4) Test 3, Sample 3: 75000 cycles without load PASS/FAIL criterion are defined in 6.10.7.2, 6.10.7.6 and 6.10.7.7 which must be passed.
Verification of the ability to carry the rated safe short-time current	6.10.7.4	**“Stay safe” - This tests the ability of the LCS to remain safe under short circuit current tests** For example, the test requires the switch to withstand 7000Amps until the fist zero crossing of the voltage. The test is performed 3 times on the same sample. The LCS passes the test on completion of the Pass/Fail criteria 6.10.7.6 and 6.10.7.7. If the switch remains operational after the test and fulfils PASS/FAIL criteria, then 6.10.7.5 does not need to be performed.
Verification of the ability to carry the rated conditional operational short circuit current	6.10.7.5	**“Stay Operational” - This tests the ability of the LCS to withstand short circuits and remain operational.** The switch must remain operational after being subjected to 3000A until first zero crossing of voltage and meet the pass/fail criteria specified in 6.10.7.6 and 7.
Power consumption (pass/ fail criterion)	6.10.7.6	**Post test for all samples** This test verifies that the LCS has not exceeded the allowable Power Consumption values defined in the standard.
Dielectirc test (pass/ fail criterion)	6.10.7.7	**Post test for all samples** This test verifies that the SCS can withstand a 1KV r.m.s AC voltage for 1 minute after testing.

Success Tips!

Tip 1

'Self Heating' is directly affected by Load Switch choice and hardware integration into the meter. Mechanical fixings, riveted joints and semi-shears used on current conductors impede current flow and increase temperature in the meter.



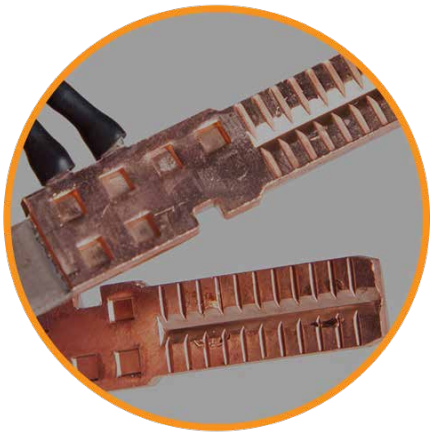
Work with your Load Switch supplier to optimise integration. Redbourn's Load Switch range uses electron beam welding of current conductors to eliminate inefficient joints.

Tip 2

Redbourn's "Increased Surface Area" technology for current conductors provides meter manufacturers with additional benefits. By increasing surface area, the current conductors act like radiators to dissipate heat quickly. This helps to reduce the heat rise effect in the meter.

Inspired Innovation

Performance advantage
for our customers



Redbourn Lab

Redbourn's Design and Development Centre in the UK has a dedicated lab facility for Load switch-in meter testing. This service is available for all customers in order to validate new meter platforms prior to submission to external laboratories. This avoids unnecessary cost and reduces project risk. We work closely with you to ensure our load switches are integrated as optimally as possible with your meter. We can offer you test reports for all tests undertaken to provide you with full confidence that tests are conducted as closely as possible to the standard. For some specific tests in the standard, we have collaborations with external partners, but the Test and Validation process is fully managed by Redbourn.

Redbourn is also able to project manage external testing of meters to the standard through ILAC registered test houses.

Contact Redbourn

For more information on how we can support your Meter Test and Validation program

redbourn.com
connect@redbourn.com

Redbourn Products for the Grid

Unique Features

- Superior low-heating performance for your meter
- Industry leading 'contact settling' for long lifetime reliability
- Fast operation to enable complete optimisation of your meter power supply

	Now UC3 Compliant!  REL80C	 REL100S	 REL120E
Footprint	38mm x 30mm x 17mm	43mm x 37mm x22mm	43mm x 37mm x 22mm
REL Platform	C-Series	S-Series	E-Series
Rating	276V, 63A, 50Hz	230V, 100A, 50Hz	276V, 120A, 50Hz
IEC62052-31 Compliance	UC3	UC3	UC3 + LINKY (France) SMETS2 (UK) and Austrailian (NMI) standard
Contact Resistance	<400 µΩ	<250 µΩ	<250 µΩ
Pulse width requirement	20 milliseconds	20 milliseconds	20 milliseconds

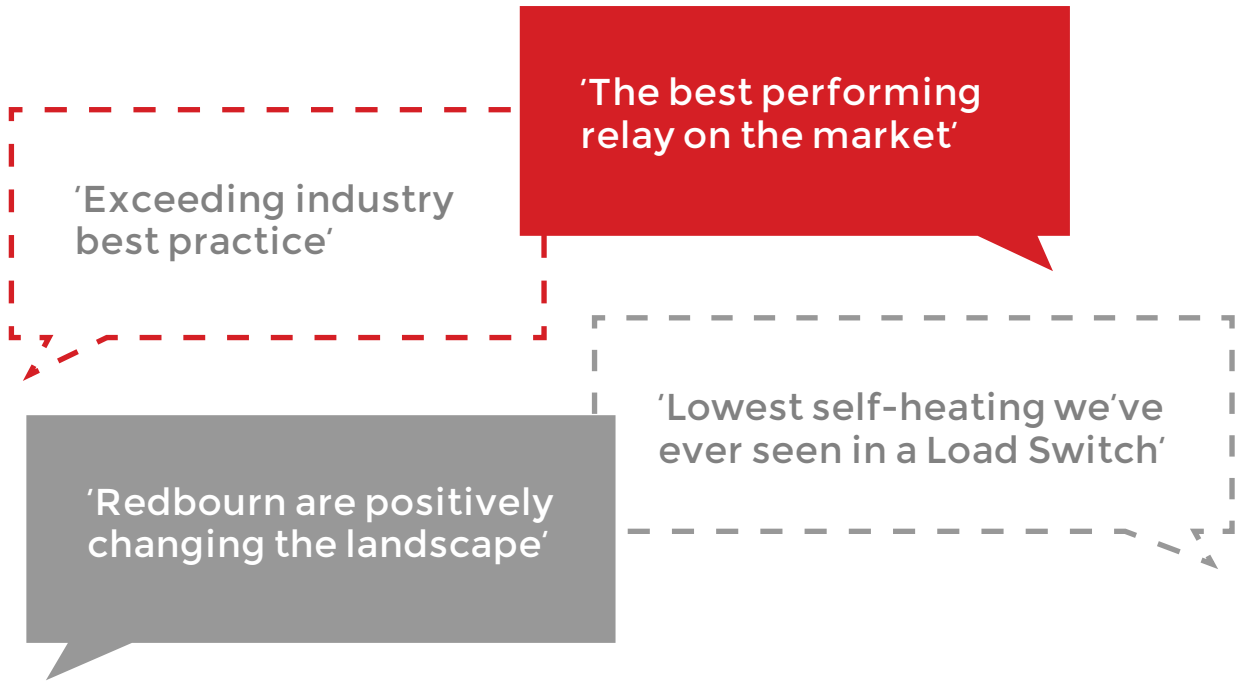
All product platforms are fully customisable to meet specific requirements
Down load our current datasheets at **redbourn.com/resources**

Customer Feedback

The Unique Innovation of Redbourn Devices

Redbourn Load Switches are, as of now, independently certified in over 10 UC3 meter platforms globally, and with more customer projects in development. Our customers are benefiting from the technology we employ in our devices such as:

- Superior low-heating performance for your meter
- Industry leading 'contact settling' for long lifetime reliability
- Fast operation to enable complete optimisation of your meter power supply



In 2015, the mass roll-out of Redbourn devices started. Products are now independently approved in more than 10 meter platforms globally with more on the way throughout 2016.

More information

To find out more, our website contains further information
www.redbourn.com

where you can find out about the entire range of products and services on offer from the Redbourn Group.

Or specifically for smart metering www.redbourn.com/technology

To "Learn More" about how our devices can benefit your meter and why so many meter manufacturers are 'Switching to Redbourn' visit www.redbourn.com/resources-technology to view our current Load Switch range.

Follow Redbourn also on social media to keep updated on latest news

redbourn.com
connect@redbourn.com