Control and protection components

Catalogue

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Schneider Electric

Contents

6 - TeSys protection components: relays and controllers

6

TeSys protection components
Protection relays and controllers

Applications	Motor protection			Machine protection		Motor and machine protection	
	Thermal motor protection			Protection of slip ring motors and of circuits without current peaks	Protection of resistors, bearings, capacitors	Specific motor protection	
							
Protection	- Motor overload - Stalling - Phase failure			- Strong overcurrent - Stalling	- Frequent starting - Harsh environments	- Overtorque - Mechanical shocks - Locked rotor - Phase failure	- Overtorque - Mechanical shocks
Tripping class	Class 10 A	Classes 10 A and 20	Classes 10 and 20	–			
Communication	–			–			
Used with contactor type	LC1 K, LP1 K	LC1 D	LC1 F	All contactors			
Motor current (In)	0.11…16 A	0.1…150 A	30…630 A	0.7…630 A	Unlimited	0.3…38 A	0.3…60 A
Relay or controller type	**LR2 K**	**LRD, LR2 D and LR9 D**	**LR9 F**	**RM1 XA**	**LT3 S**	**LR97D**	**LT47**
Pages	6/12	6/20 to 6/23	6/34 and 6/35	6/41 and 6/42	6/50	6/58	

Applications	Motor and machine protection	
	Protection and control	
		
Protection	- Thermal overload - Phase imbalance and phase failure - Motor stalling - Long starting times - Earth fault	- Thermal overload - Phase imbalance and phase failure - Locked rotor - Long starting times - Phase reversal - Earth fault
Tripping class	Classes 5 to 30	Classes 5 to 30
Communication	AS-Interface, Modbus, CANopen, Advantys STB	Modbus, CANopen, DeviceNet, Profibus DP, Ethernet TCP/IP
Used with contactor type		
Motor current (In)	0.35…800 A	0.4…810 A
Relay or controller type	**LUTM ●0BL**	**LTM R**
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TeSys protection components
Motor and machine protection

Introduction

Exceeding the operating limits of an electric motor will lead, eventually, not only to destruction of the motor itself but also of the mechanisms it drives.

This type of load can be the cause of electrical or mechanical faults.
- Electrical faults:
  - overvoltage, voltage drop, imbalance and phase failure which cause variations in the current drawn,
  - short-circuits which can cause the current to reach levels capable of destroying the load.
- Mechanical faults:
  - locked rotor,
  - brief or prolonged overload which leads to an increase in the current drawn by the motor, and therefore overheating.

The cost of these faults must take into account loss of production, loss of raw materials, repair of the production tool, poor quality of production and delays in delivery.

These faults can also have dramatic consequences on the safety of persons in direct or indirect contact with the motor.

To prevent these faults, protection measures are necessary. They make it possible to isolate the equipment to be protected from the mains supply by measuring variations in electrical values (voltage, current, etc...).

Each motor starter must therefore have:

- **short-circuit protection**, to detect and break, as quickly as possible, abnormal currents generally greater than 10 times the rated current (In).
- **overload protection**, to detect increases in current up to about 10 In and switch off the starter before overheating of the motor and conductors damages the insulation.

This protection is provided by specific devices such as fuses, circuit-breakers and thermal overload relays, or by more integrated devices offering several types of protection.

TeSys protection components
Motor and machine protection

Causes, effects and consequences of various faults

There are two types of fault:
- Internal faults within the motor.
- External faults: these are located outside the electric motor but their consequences can lead to damage inside the motor.

Faults	Causes	Effects	Consequences on the motor and on the machine
Short-circuit	Contact between several phases, or between one phase and neutral or between several turns of the same phase.	■ Current peak ■ Electrodynamic forces on the conductors	Destruction of windings
Overvoltage	■ Lightning ■ Electrostatic discharge ■ Operation	Dielectric breakdown in the windings	Destruction of the windings due to loss of insulation
Phase imbalance and phase failure	■ Opening of a phase ■ Single-phase load upstream of the motor ■ Short-circuit between the turns of the same winding	■ Reduction of usable torque, efficiency and speed ■ Increase in losses ■ Starting impossible if phase failure	Overheating *(1)*
High starting frequency	■ Failure of the automation system ■ Too many manual control operations ■ Numerous fault trips	High stator and rotor temperature rise due to the frequent start current	Overheating *(1)* Consequences on the process
Voltage variations	■ Instability of the mains voltage ■ Connection of heavy loads	■ Reduction of usable torque ■ Increase in losses	Overheating *(1)*
Harmonics	■ Pollution of the mains supply by variable speed drives, inverters, etc...	■ Reduction of usable torque ■ Increase in losses	Overheating *(1)*
Long starting time	■ Resistive torque too high (load too heavy) ■ Voltage drop	Increase in starting time	Overheating *1)*
Jamming	■ Mechanical problem (crusher) ■ Seizures	Overcurrent	Overheating *(1)* Consequences on the process
No-load running	■ Pump running empty ■ Mechanical break in drive to the load	Drop in current drawn	Consequences on the process
Frequency fluctuations	■ Overload of a supply powered by limited independent sources ■ Faulty alternator speed regulator	■ Increase in losses ■ Interferes with synchronous devices (clock, recorder, ...)	–
Overload	■ Increase in resistive torque ■ Voltage drop ■ Drop in power factor	Increase in current consumption	Overheating *(1)*
Loss of machine excitation	■ Significant drop in excitation current ■ Break in rotor winding	■ Increase in active power ■ Drop in power factor	Significant overheating of rotor and cage
Phase-Earth fault	■ Accidental Phase-Earth contacts ■ Accidental Phase-machine casing contacts (casing connected to earth)	■ Overvoltage developed in the mains supply ■ Rise in earth potential (safety of persons)	Consequences on safety of persons

(1) Then, in the longer or shorter term, depending on the seriousness of the fault and/or its frequency, short-circuit and destruction of the windings.

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Protection functions

Short-circuit protection

General

A short-circuit results in a very rapid rise in current which can reach several hundred times the value of the operational current. The consequences of a short-circuit are dangerous to both equipment and persons. It is therefore imperative to use protection devices to detect the fault and very quickly break the circuit.

Two types of protection are commonly used:
- fuses (cutout) which break the circuit by melting, which then requires their replacement,
- magnetic trip circuit-breakers, often more simply called "magnetic circuit-breakers", which only require re-setting to put them back into service.

Short-circuit protection can also be built-into multifunction devices such as motor circuit-breakers and contactor-breakers.

The main characteristics of short-circuit protection devices are:
- their breaking capacity: this is the highest prospective short-circuit current value that a protection device can break at a given voltage.
- their making capacity: this is the highest current value that the protection device can make at its rated voltage in specified conditions.

The making capacity is equal to k times the breaking capacity.

LS1 D32
fuse carrier

GS2 N3
switch disconnectors

Fuses (cutouts)

Fuses provide individual phase protection (single-pole), with a high breaking capacity in a compact size:
- mounted either in fuse carriers,
- or in isolators, replacing the original links or shunt bars.

For motor protection, aM type fuses are used. Their design characteristics allow them to conduct the high magnetising currents that occur when motors are switched on. They are therefore unsuitable for overload protection (unlike gG type fuses). This is why an overload relay must be included in the motor power supply circuit.

Magnetic circuit-breakers

These circuit-breakers protect installations against short-circuits, within the limit of their breaking capacity.
Magnetic circuit-breakers provide omnipole breaking as standard.
For relatively low short-circuit currents, the operation of a circuit-breaker is faster than that of fuses.
This protection conforms to standard IEC 60947-2.
The thermal and electrodymanic effects are also limited, therefore ensuring better protection of cables and equipment.

GV2 L
magnetic circuit-breraker

TeSys U LUB 12 starter with LUCA●● control unit

LRD 02
thermal overload relay

LRD 365
thermal overload relay

RM4 JA current measurement relay

TeSys U starter with "thermal overload alarm" function module

Protection functions (continued)

Overload protection

General

An overload condition is the most frequently encountered fault. The symptoms are a rise in the current drawn by the motor and thermal effects. A rapid return to normal operating conditions is important.
The actual operating conditions (ambient temperature, operating altitude and type of standard duty) are essential to determine the operating values of the motor (power, current) and to be able to select effective overload protection. These operational values are given by the motor manufacturer.

According to the level required, protection can be provided by:
- overload relays and thermal overload relays (bi-metallic or electronic type) which protect motors in the event of:
  - overload, by monitoring the current drawn by each phase,
  - phase imbalance or failure, by their differential mechanism.
- relays with PTC thermistor probes (Positive Temperature Coefficient).
- overtorque relays,
- multifunction relays.

Overload relays

These relays protect motors against overload. They must allow the temporary overload that occurs on starting and must only trip if the starting time is abnormally long.
The overload relay will be selected according to the length of the starting time (tripping class) and the motor rating.
These relays have a thermal memory (except for certain electronic overload relays, indicated by their manufacturers) and can be connected:
- either in series with the load,
- or to current transformers placed in series with the load.

Bi-metallic thermal overload relays

Combined with a contactor, these relays protect the line and the equipment against small and prolonged overloads. They must be protected against strong overcurrent by a circuit-breaker or fuses.
These relays may be used on an a.c. or d.c. system and are generally:
- 3-pole,
- compensated, i.e. insensitive to ambient temperature variations,
- with manual or automatic reset,
- graduated with a "motor FLC" scale: allowing direct setting to the full load current as shown on the motor rating plate.

They can also be sensitive to phase failure: this is known as 'differential'. This function conforms to standards IEC 60947-4-1 and 60947-6-2
This type of relay is extremely reliable and is a relatively low cost device.

Electronic thermal overload relays

Electronic thermal overload relays have the advantage of electronics which allow a more complex thermal image of the motor to be created.
They can be combined with products having complementary functions, such as:
- temperature sensing via PTC probes,
- protection against jamming and overtorque,
- protection against phase reversal,
- earth fault protection,
- protection against no-load running,
- alarm function.

LT3 S relays for use with thermistor probes

LR97 D07 instantaneous electronic overcurrent relays

TeSys U LUB 32 starter with multifunction control unit LUC M

TeSys U controller LUTM 20BL

TeSys T controller LTM R08MBD

Protection functions (continued)

Overload protection (continued)

Relays for use with PTC thermistor probes

With direct sensing of the stator windings, these relays can be used to protect motors against:
- overload,
- a rise in ambient temperature,
- a ventilation circuit fault,
- a high starting frequency,
- mechanical shocks, etc...

Overload (or overtorque) relays

These relays protect the drive line in the event of a locked rotor, seizure or mechanical shocks. This is an additional protection.
Unlike thermal overload relays, these relays do not have a thermal memory. They have definite time characteristics (adjustable current threshold and time delay).
The overtorque relay can be used as overload protection for motors with long starting times or very frequent starting (for example, lifting hoists).

Multifunction relays

- Overcurrent relays are limited when it is necessary to take into account problems associated with voltage, temperature or special applications. New production or maintenance management needs have prompted manufacturers to offer products which provide not only adaptable protection, but also complete management of the motor and its load.

They incorporate:
- current and voltage sensors (TeSys T controllers),
- hybrid analog and digital electronic technology,
- the use of communication buses for data exchange and control,
- powerful motor modelling algorithms,
- integrated application programs whose parameters can be set.

These products make it possible to reduce installation and operating costs by reducing maintenance and downtime.

TeSys U starters:
The multifunction relay is incorporated in the motor starter.
This solution is very compact with reduced wiring. It is limited to 32 A.

TeSys U controllers:
The multifunction relay is separate from the power line and reuses the function blocks from the TeSys U solution. It can be used in conjunction with a contactor up to 810 A.

TeSys T controllers:
The multifunction relay is separate from the power line and incorporates inputs and outputs. It can be used in conjunction with a contactor up to 810 A.

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Protection relay selection table

	Motor protection		Machine protection	Motor and machine protection	
Relay type	**Thermal overload relay** **LR2 K, LRD, LRD 3, LR9 F, LR9 D** *(1)*	**Relays for use with PTC probes** **LT3 S**	**Overtorque relays** **LR97 D, LT47**	**TeSys U controller** **LUT M**	**TeSys T controller** **LTM R**
Causes of overheating	*(2)*		*(2)*	*(2)*	*(3)*
Slight overload	■	■	□	■	■
Locked rotor	■	□	■	■	■
No-load running				■	■
Supply phase failure	■	□	LR9 7D	■	
Ventilation fault		■			With probes
Abnormal temperature rise	□	■			With probes
Shaft bearing seizure	□	■	□	□	With probes
Insulation fault	□			■	■
Protracted starting time	■	□	■	■	■
Severe duty	□	■	■	□	With probes
Voltage variation	□	□	□	□	■
Frequency fluctuations	□				■
Loss of machine excitation					■

■ Ideally suited
□ Possible solution
Not suitable (no protection)

(1) for motor circuit-breaker type GV2ME.
(2) Protection based on current.
(3) Protection based on current and voltage.

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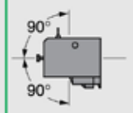
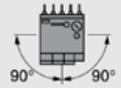
Environment

Conforming to standards			IEC 60947, NF C 63-650, VDE 0660, BS 4941
Product certifications			UL, CSA
Protective treatment	Conforming to IEC 60068 (DIN 50016)		"TC" (Klimafest, Climateproof)
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact
Ambient air temperature around the device	Storage	°C	- 40...+ 70
	For normal operation (IEC 60947)	°C	- 20...+ 55 (without derating)
	Operating limit	°C	- 30...+ 60 (with derating) *(1)*
Maximum operating altitude	Without derating	m	2000
Operating positions			**Vertical axis**  Without derating — **Horizontal axis**  With derating *(1)*
Flame resistance	Conforming to UL 94		Self-extinguishing material V1
	Conforming to NF F 16-101 and 16-102		Conforming to requirement 2
Shock resistance, hot state (1/2 sine wave, 11 ms)	Conforming to IEC 60068, N/C contact		10 gn
	Conforming to IEC 60068, N/O contact		10 gn
Vibration resistance, hot state 5 to 300 Hz	Conforming to IEC 60068, N/C contact		2 gn
	Conforming to IEC 60068, N/O contact		2 gn
Safe separation of circuits	Conforming to VDE 0106 and IEC 60536		VLSV *(2)*, up to 400 V

Cabling Screw clamp terminals			**Minimum**	**Maximum**	**Maximum to IEC 60947**
	Solid cable	mm²	1 x 1.5	2 x 4	1 x 4 + 1 x 2.5
	Flexible cable without cable end	mm²	1 x 0.75	2 x 4	2 x 2.5
	Flexible cable with cable end	mm²	1 x 0.34	1 x 1.5 + 1 x 2.5	1 x 1.5 + 1 x 2.5

Tightening torque	Philips head n° 2 - Ø 6	N.m	0.8
Mounting			Directly under the contactor or reversing contactor
Connections			Made automatically when mounted under the contactor, as follows : ■ contactor terminal A2 connected to overload relay terminal 96 on all products, ■ contactor terminal 14 connected to overload relay terminal 95 on products with 3 P + N/O. When using 3 P + N/C, or 4 P contactors, or the N/O auxiliary contact marked 13-14, at a voltage other than the coil voltage, break off the link marked 14.

Auxiliary contact characteristics

Number of contacts			1 N/C + 1 N/O						
Conventional thermal current		A	6						
Short-circuit protection	Conforming to IEC 60947, VDE 0660. gG fuse or circuit-breaker **GB2 CB●●**	A	6 max.						
Maximum power of the controlled contactor coils (sealed) (Occasional operating cycles of contact 95-96)	a.c.	V	24	48	110	220/230	400	415/440	600/690
		VA	100	200	400	600	600	600	600
	d.c.	V	24	48	110	220	250	–	–
		W	100	100	50	45	35	–	–
Maximum operational voltage	a.c., category AC-15	V	690						
	d.c., category DC-13	V	250						

(1) Please consult your Regional Sales Office.
(2) Very low safety voltage.

References : page 6/12
Dimensions : page 6/13
Schemes : page 6/13

Electrical characteristics of the power circuit

Rated operational voltage (Ue)	Up to	V	690
Rated insulation voltage (Ui)	Conforming to BS 4941	V	690
	Conforming to IEC 60947	V	690
	Conforming to VDE 0110 group C	V	750
	Conforming to CSA C 22-2 n° 14	V	600
Rated impulse withstand voltage (Uimp)		kV	6
Frequency limits of the operational current		Hz	Up to 400
Power dissipated per pole		W	2

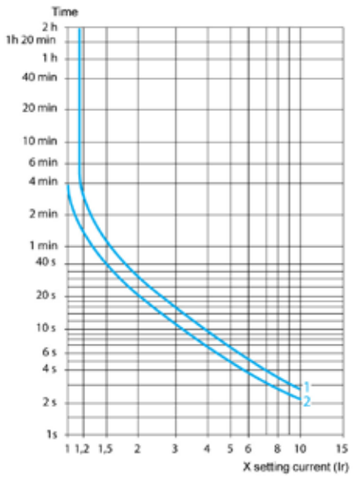
Operating characteristics

Sensitivity to phase failure	Conforming to IEC 60947		Yes
Reset	Manual or automatic		Selected by means of a lockable and sealable switch on the front of the relay
Signalling	On front of relay		Trip indicator
Reset-Stop function			Pressing the Reset-Stop button : - actuates the N/C contact - has no effect on the N/O contact
Test function	By pushbutton		Pressing the Test button enables : - checking of the control circuit wiring - simulation of overload tripping (actuation of both N/C and N/O contacts, and of the trip indicator)
Short-circuit protection and coordination			See pages 1/18 and 1/28

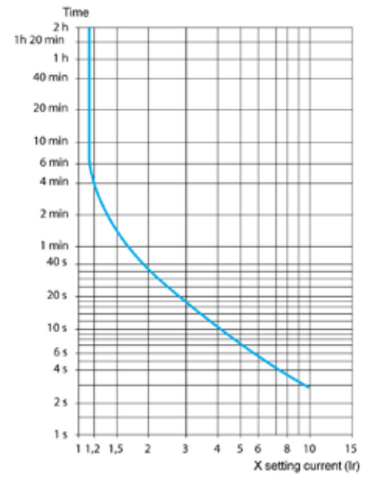
Tripping curves

Average operating time related to multiples of the current setting (Class 10 A)

Balanced 3-phase operation, from cold state



Balanced operation with 2 phases only, from cold state



1 Setting : at lower end of scale
2 Setting : at upper end of scale

References : page 6/12
Dimensions : page 6/13
Schemes : page 6/13

TeSys protection components
TeSys K thermal overload relays,
adjustable from 0.11 to 16 A


LR2 K0307

3-pole relays with screw clamp terminals

These overload relays are designed for the protection of motors. They are compensated and phase failure sensitive. Resetting can either be manual or automatic.
Direct mounting: under the contactor for versions with screw clamp terminals only; pre-wired terminals, see pages 6/10 and 6/13.
Separate mounting: using terminal block LA7 K0064 (see below).
On the front face of the overload relay:
- selection of reset mode: Manual (marked H) or Automatic (marked A),
- red pushbutton: Trip Test function,
- blue pushbutton: Stop and manual Reset,
- yellow trip flag indicator: overload relay tripped.

Protection by magnetic circuit-breaker GV2 LE, see pages 1/18 and 1/28.

Class 10 A (the standard specifies a tripping time of between 2 and 10 seconds at 7.2 In)

Relay setting range	Fuses to be used with selected relay Maximum rating Type			Reference	Weight
	aM	gG	BS88		
A	A	A	A		kg
0.11…0.16	0.25	0.5	–	**LR2 K0301**	0.145
0.16…0.23	0.25	0.5	–	**LR2 K0302**	0.145
0.23…0.36	0.5	1	–	**LR2 K0303**	0.145
0.36…0.54	1	1.6	–	**LR2 K0304**	0.145
0.54…0.8	1	2	–	**LR2 K0305**	0.145
0.8…1.2	2	4	6	**LR2 K0306**	0.145
1.2…1.8	2	6	6	**LR2 K0307**	0.145
1.8…2.6	4	8	10	**LR2 K0308**	0.145
2.6…3.7	4	10	16	**LR2 K0310**	0.145
3.7…5.5	6	16	16	**LR2 K0312**	0.145
5.5…8	8	20	20	**LR2 K0314**	0.145
8…11.5	10	25	20	**LR2 K0316**	0.145
10…14	16	32	25	**LR2 K0321**	0.145
12…16	20	40	32	**LR2 K0322**	0.145

Overload relays for unbalanced loads

Class 10 A: To order, replace the prefix **LR2** by **LR7** in the references selected from above (only applicable to overload relays **LR2 K0305** to **LR2 K0322**).
Example: **LR7 K0308**.

Accessory


LA7 K0064

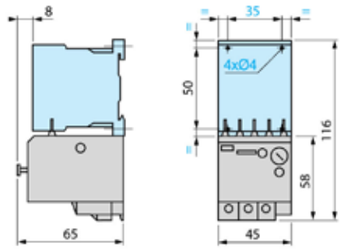
Description	Type of connection	Reference	Weight kg
Terminal block for separate clip-on mounting of the overload relay on 35 mm ⎓ rail	Screw clamp	**LA7 K0064**	0.100

TeSys protection components
TeSys K thermal overload relays,
adjustable from 0.11 to 16 A

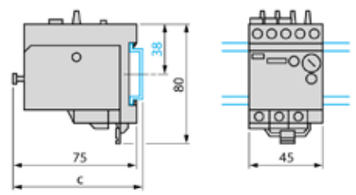
Dimensions, mounting

LR2 K

Direct mounting beneath the contactor



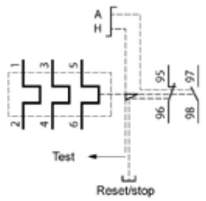
Separate mounting with terminal block LA7 K0064 on 35 mm ⎓ rail
(AM1 DP200 or AM1 DE200)



AM1	c
DP200	78.5
DE200	86

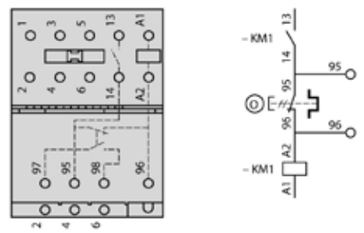
Schemes

LR2 K

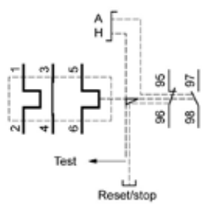


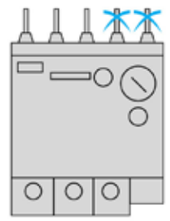
LR2 K + LC● K

Pre-wiring scheme



LR7 K





Note : *If pre-wiring is not required, break off the 2 links located on the thermal overload relay.*

TeSys protection components
3-pole thermal overload relays
TeSys D

Presentation

LRD 08

LRD 365

EverLink®

LRD 33●●

TeSys D thermal overload relays are designed to protect a.c. circuits and motors against:
- overloads,
- phase failure,
- excessively long starting times,
- prolonged stalled rotor condition.

Power connection

LRD 01 to LRD 35

LRD 01 to 35 relays are designed for connection by screw clamp terminals.
They can be supplied for connection by spring terminals or by lugs *(1)*.

LRD 313 to LRD 365

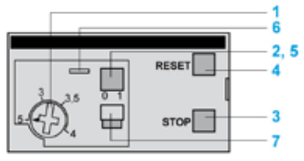
LRD 313 to 365 relays are for connection by BTR screw connectors (hexagon socket head).
The screws are tightened by means of a size 4, insulated Allen key.
This type of connection uses the **Ever**Link® system with creep compensation *(2)* (Schneider Electric patent).
This technique makes it possible to achieve accurate and durable tightening torque.

These relays are also available for connection by lugs *(1)*.

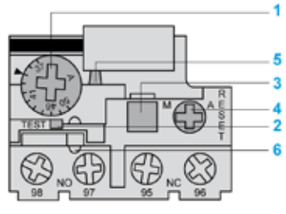
LRD 3361 to 4369, LR2 D3561 to D3563

LRD 3361 to 4369 and LR2 D3561 to D3563 relays are designed for connection by screw clamp terminals. They can be supplied for connection by lugs *(1)*.

Description



LRD 01…35 and LRD 313…LRD 365



LRD 3361…4369, LR2 D3561…3563

TeSys D 3-pole thermal overload relays are designed to protect a.c. circuits and motors against overloads, phase failure, long starting times and prolonged stalling of the motor.

1 Adjustment dial Ir.
2 Test button.
Operation of the Test button allows:
- checking of control circuit wiring,
- simulation of relay tripping (actuates both the N/O and N/C contacts).

3 Stop button. Actuates the N/C contact; does not affect the N/O contact.
4 Reset button.
5 Trip indicator.
6 Setting locked by sealing the cover.
7 Selector for manual or automatic reset.

LRD 01 to 35 and LRD 313 to LRD 365 relays are supplied with the selector in the manual position, protected by a cover. Deliberate action is required to move it to the automatic position.

(1) Connection by lugs meets the requirements of certain Asian markets and is suitable for applications subject to strong vibration, such as railway transport.
(2) Creep: normal crushing phenomenon of copper conductors, that is accentuated over time.

References: pages 6/20 to 6/22
Dimensions, mounting : pages 6/26 to 6/28
Schemes: page 6/29

TeSys protection components
3-pole thermal overload relays
TeSys D

Environment

Conforming to standards			IEC/EN 60947-4-1, IEC/EN 60947-5-1, UL 508, CSA C22.2 n° 14. ATEX directive 94/9/EC *(1)*
Product certifications			UL, CSA, CCC, GOST ATEX INERIS *(1)*. GL, DNV, RINA, BV, LROS *(2)*.
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact IP 2X
Protective treatment	Conforming to IEC 60068		"TH"
Ambient air temperature around the device	Storage	°C	- 60…+ 70
	Normal operation, without derating (IEC 60947-4-1)	°C	- 20…+ 60
	Minimum /maximum operating temperatures (with derating)	°C	- 40…+ 70
Operating positions without derating	In relation to normal vertical mounting plane		Any position. When mounting on a vertical rail, use a stop.
Flame resistance	Conforming to UL 94		V1
	Conforming to IEC 60695-2-1	°C	850
Shock resistance	Permissible acceleration conforming to IEC 60068-2-7		15 gn - 11 ms
Vibration resistance *(3)*	Permissible acceleration conforming to IEC 60068-2-6		6 gn
Dielectric strength at 50 Hz	Conforming to IEC 60255-5	kV	6
Surge withstand	Conforming to IEC 60801-5	kV	6

Electrical characteristics of power circuit

Relay type			**LRD 01 …16, LR3 D01 …16**	**LRD 1508 …1532**	**LRD 21 …35, LR3 D21 …35**	**LRD 313 …365 LR3 D313 …365**	**LRD 313L …365L**	**LRD 3322 …33696 LR3 D3322 … 33696**	**LR2 D3522 … 3563**	**LRD 4365 …4369**
Tripping class	Conforming to UL 508, IEC 60947-4-1		10 A	20	10 A	10 A	20	10 A	20	10 A
Rated insulation voltage (Ui)	Conforming to IEC 60947-4-1	V	690					1000		
	Conforming to UL, CSA	V	600							600 except **LRD 4369**
Rated impulse withstand voltage (Uimp)		kV	6							
Frequency limits	Of the operating current	Hz	0…400							
Setting range	Depending on model	A	0.1…13	2.5…32	12…38	9…65	9…65	17…140	17…80	80…140

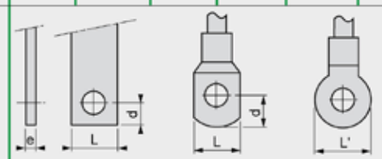
Auxiliary contact characteristics

Conventional thermal current		A	5					
Max. sealed consumption of the operating coils of controlled contactors (Occasional operating cycles of contact 95-96)	a.c. supply, AC-15	V	120	240	380	480	500	600
		A	3	1.5	0.95	0.75	0.72	0.12
	d.c. supply, DC-13	V	125	250	440			
		A	0.22	0.1	0.06			
Protection against short-circuits	By gG, BS fuses. Maximum rating or by **GB2**	A	5					

(1) For relays LRD01 to LRD365.
(2) Pending for relays LRD313 to LRD365.
(3) For relays LRD 313 to LRD 365: 6 gn only with independent plate mounting and 4 gn when mounted beneath the contactor.

References: pages 6/20 to 6/22
Dimensions, mounting : pages 6/26 to 6/28
Schemes: page 6/29

Power circuit connection characteristics

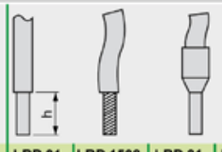
Relay type			LRD 01 …16, LR3 D01 …16	LRD 1508 …1532	LRD 21 …35, LR3 D21 …35	LRD 313 …365 LR3 D313 …365	LRD 313L …365L	LRD 3322 …33696 LR3 D3322 … 33696	LR2 D3522 …3563	LRD 4365 …4369
Connection to screw clamp terminals										
Flexible cable without cable end	1 conductor	mm²	1.5…10		1.5…10	1…35	1…35	4…35		4…50
Flexible cable with cable end	1 conductor	mm²	1…4		1…6 except **LRD 21:** 1…4	1…35	1…35	4…35		4…35
Solid cable without cable end	1 conductor	mm²	1…6		1.5/10 except **LRD 21:** 1/6	1…35	1…35	4…35		4…50
Tightening torque		N.m	1.7	1.85	2.5	1…25 : 5 35 : 8	1…25 : 5 35 : 8	9	9	9
Connection to spring terminals (Min/max c.s.a.)										
Flexible cable without cable end	1 conductor	mm²	1.5…4	–	1.5…4	–	–	–	–	–
Flexible cable with cable end	1 conductor	mm²	1.5…4	–	1.5…4	–	–	–	–	–
Connection by bars or lugs										

Relay type			LRD 016 … 166	LRD 216 … 356	LRD 3136 … 3656	LRD 313L6 … 365L6	LRD 3322A66 … 3365A66
Pitch	Without spreaders	mm	14.5	17.5	17.5	17.5	21.5
Bars or cables with lugs	**e**	N.m	⩽ 6	⩽ 6	⩽ 6	⩽ 6	⩽ 6
	L	mm	⩽ 8	⩽ 8	⩽ 13.5	⩽ 13.5	⩽ 16
	L'	mm	⩽ 9.5	⩽ 10	⩽ 16.5	⩽ 16.5	⩽ 16
	d		⩽ 7	⩽ 7	⩽ 10	⩽ 10	⩽ 12
Screws			M4	M4	M6	M6	M10
	Tightening torque	N.m	2.3	2.3	6	6	11.3

Control circuit connection characteristics

Connection to screw clamp terminals or spring terminals

Bare cables



Relay type			LRD 01 …16, LR3 D01 …16	LRD 1508 … 1532	LRD 21 …35, LR3 D21 …35	LRD 313 …365 LR3 D313 …365	LRD 313L …365L	LRD 3322 …33696 LR3 D3322 … 33696	LR2 D3522 … 3563	LRD 4365 …4369
Connection to screw clamp terminals *(1)*	Solid cable without cable end	mm²	2 x 1…2.5							
	Flexible cable without cable end	mm²	2 x 1…2.5							
	Flexible cable with cable end	mm²	2 x 1…2.5							
Tightening torque		N.m	1.7							
Connection to spring terminals (Min/max c.s.a.)	Solid cable	mm²	1…2.5	–	1…2.5			–		
	Flexible cable without cable end	mm²	1…2.5	–	1…2.5			–		

*(1) For relays LRD 313 to 365: BTR hexagon socket head screws, **Ever**Link® system. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LAD ALLEN4**, see page 5/85).*

References: pages 6/20 to 6/22
Dimensions, mounting : pages 6/26 to 6/28
Schemes: page 6/29

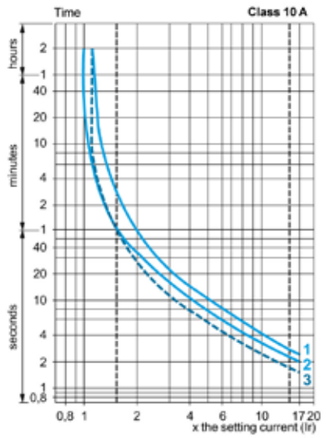
Operating characteristics

Relay type			LRD 01 …16, LR3 D01 …16	LRD 1508 … 1532	LRD 21 …35, LR3 D21 …35	LRD 313 …365 LR3 D313 …365	LRD 313L …365L	LRD 3322 …33696 LR3 D3322 … 33696	LR2 D3522 … 3563	LRD 4365 …4369
Temperature compensation		°C	- 20…+ 60							
Tripping threshold	Conforming to IEC 60947-4-1	A	1.14 ± 0.06 Ir							
Sensitivity to phase failure	Conforming to IEC 60947-4-1		Tripping current I 30 % of Ir on one phase, the others at Ir.							

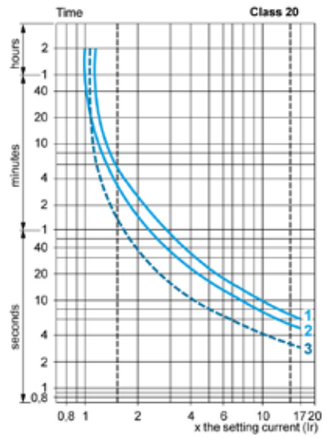
Tripping curves

Average operating time related to multiples of the setting current

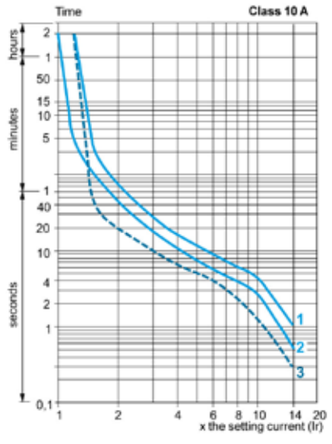
LRD 01 to LRD 35, LR2 D and LRD 3322 to LRD 4369



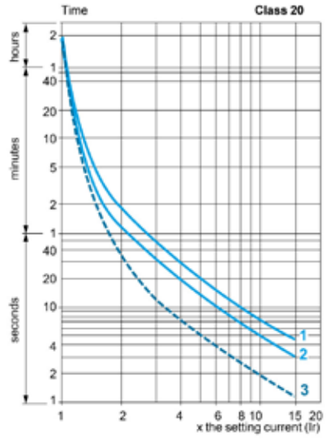
LRD 1508 to LRD 32 and LR2 D3522 to LR2 D3563



LRD 313 to LRD 365



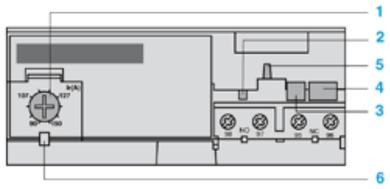
LRD 313L to LRD 365L



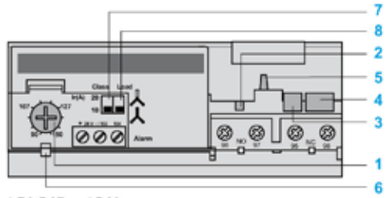
1 Balanced operation, 3-phase, without prior current flow (cold state).
2 2-phase operation, without prior current flow (cold state).
3 Balanced operation, 3-phase, after a long period at the set current (hot state).

References: pages 6/20 to 6/22
Dimensions, mounting : pages 6/26 to 6/28
Schemes: page 6/29

Description



LR9 D5367…D5569



LR9 D67 and D69

LR9 D electronic thermal overload relays are designed for use with contactors LC1 D115 and D150.

In addition to the protection provided by TeSys D thermal overload relays (see page 6/14), they offer the following special features:
- protection against phase imbalance,
- choice of starting class,
- protection of unbalanced circuits,
- protection of single-phase circuits,
- alarm function to avoid tripping by load shedding.

1 Adjustment dial Ir.
2 Test button.
3 Stop button.
4 Reset button.
5 Trip indicator.
6 Setting locked by sealing the cover.
7 Class 10/class 20 selector switch.
8 Selector for balanced load /unbalanced load

Environment

Conforming to standards			IEC 60947-4-1, 255-8, 255-17, VDE 0660 and EN 60947-4-1
Product certifications			UL 508 , CSA 22-2
Degree of protection	Conforming to IEC 60529 and VDE 0106		IP 20 on front panel with protective covers **LA9 D11570●** or **D11560●**
Protective treatment	Standard version		"TH"
Ambient air temperature around the device (Conforming to IEC 60255-8)	Storage	°C	- 40…+ 85
	Normal operation	°C	- 20…+ 55 *(1)*
Maximum operating altitude	Without derating	m	2000
Operating positions without derating	In relation to normal vertical mounting plane		Any position
Shock resistance	Permissible acceleration conforming to IEC 60068-2-7		13 gn - 11 ms
Vibration resistance	Permissible acceleration conforming to IEC 60068-2-6		2 gn - 5…300 Hz
Dielectric strength at 50 Hz	Conforming to IEC 60255-5	kV	6
Surge withstand	Conforming to IEC 61000-4-5	kV	6
Resistance to electrostatic discharge	Conforming to IEC 61000-4-2	kV	8
Immunity to radiated radio-frequency disturbances	Conforming to IEC 61000-4-3 and NF C 46-022	V/m	10
Immunity to fast transient currents	Conforming to IEC 61000-4-4	kV	2
Electromagnetic compatibility	Draft EN 50081-1 and 2, EN 50082-2		Meets requirements

Electrical characteristics of auxiliary contacts

Conventional thermal current			A	5				
Max. sealed consumption of the operating coils of controlled contactors (Occasional operating cycles of contact 95-96)	a.c. supply	V	24	48	110	220	380	600
		VA	100	200	400	600	600	600
	d.c. supply	V	24	48	110	220	440	–
		W	100	100	50	45	25	–
Protection against short-circuits	By gG or BS fuses or by circuit-breaker **GB2**	A	5					
Cabling Flexible cable without cable end	1 or 2 conductors	mm²	Minimum c.s.a.: 1 Maximum c.s.a.: 2.5					
	Tightening torque	Nm	1.2					

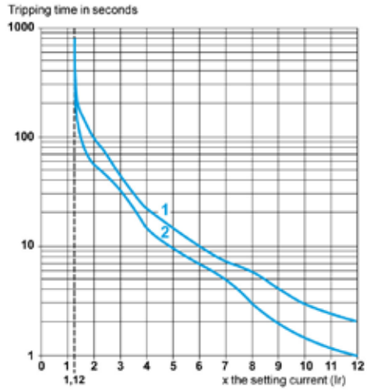
(1) For operating temperatures up to 70 °C, please consult your Regional Sales Office.

References: pages 6/20 to 6/21
Dimensions, mounting : pages 6/26 to 6/28
Schemes: page 6/29

Relay type			LR9 D
Electrical characteristics of power circuit			
Tripping class	Conforming to UL 508, IEC 60947-4-1	A	10 or 20
Rated insulation voltage (Ui)	Conforming to IEC 60947-4-1	V	1000
	Conforming to UL, CSA	V	600
Rated impulse withstand voltage (Uimp)		Hz	8
Frequency limits	Of the operating current	Hz	50…60 *(1)*
Setting range	Depending on model	A	60…150
Power circuit connections	Width of terminal lug	mm	20
	Clamping screw		M8
	Tightening torque	N.m	18
Operating characteristics			
Temperature compensation		°C	- 20…+ 70
Tripping thresholds	Conforming to IEC 60947-4-1		
	Alarm	A	1.05 ± 0.06 In
	Trip	A	1.12 ± 0.06 In
Sensitivity to phase failure	Conforming to IEC 60947-4-1		Tripping in 4 s ± 20 % in the event of phase failure
Alarm circuit characteristics			
Rated supply voltage	d.c. supply	V	24
Supply voltage limits		V	17…32
Current consumption	No-load	mA	≤ 5
Switching capacity		mA	0…150
Protection	Short-circuit and overload		Self protected
Voltage drop	Closed state	V	≤ 2.5
Cabling	Flexible cable without cable end	mm²	0.5…1.5
Tightening torque		N.m	0.45

(1) For other frequencies and for applications involving the use of these overload relays with soft starters or variable speed drives, please consult your Regional Sales Office.

LR9 D tripping curves



Average operating time related to multiples of the setting current

1 Cold state curve
2 Hot state curve

References: pages 6/20 to 6/22
Dimensions, mounting : pages 6/26 to 6/28
Schemes: page 6/29

LRD ●●

LRD 3●●

LRD 33●●

LRD 3●●6

Differential thermal overload relays

for use with fuses or magnetic circuit-breakers GV2 L and GV3 L

- Compensated relays with manual or automatic reset,
- with relay trip indicator,
- for a.c. or d.c.

Relay setting range (A)	Fuses to be used with selected relay aM (A)	gG (A)	BS88 (A)	For use with contactor LC1	Reference	Weight kg
Class 10 A *(1)* for connection by screw clamp terminals or connectors						
0.10…0.16	0.25	2	–	D09…D38	**LRD 01**	0.124
0.16…0.25	0.5	2	–	D09…D38	**LRD 02**	0.124
0.25…0.40	1	2	–	D09…D38	**LRD 03**	0.124
0.40…0.63	1	2	–	D09…D38	**LRD 04**	0.124
0.63…1	2	4	–	D09…D38	**LRD 05**	0.124
1…1.6	2	4	6	D09…D38	**LRD 06**	0.124
1.6…2.5	4	6	10	D09…D38	**LRD 07**	0.124
2.5…4	6	10	16	D09…D38	**LRD 08**	0.124
4…6	8	16	16	D09…D38	**LRD 10**	0.124
5.5…8	12	20	20	D09…D38	**LRD 12**	0.124
7…10	12	20	20	D09…D38	**LRD 14**	0.124
9…13	16	25	25	D12…D38	**LRD 16**	0.124
12…18	20	35	32	D18…D38	**LRD 21**	0.124
16…24	25	50	50	D25…D38	**LRD 22**	0.124
23…32	40	63	63	D25…D38	**LRD 32**	0.124
30…38	40	80	80	D32 and D38	**LRD 35**	0.124
Class 10 A *(1)* for connection by EverLink® BTR screw connectors *(3)*						
9…13	16	25	25	D40A…D65A	**LRD 313**	0.375
12…18	20	32	35	D40A…D65A	**LRD 318**	0.375
23…32	40	63	63	D40A…D65A	**LRD 332**	0.375
30…40	40	80	80	D40A…D65A	**LRD 340**	0.375
37…50	63	100	100	D40A…D65A	**LRD 350**	0.375
48…65	63	100	100	D50A and D65A	**LRD 365**	0.375
Class 10 A *(1)* for connection by screw clamp terminals or connectors						
17…25	25	50	50	D80 and D95	**LRD 3322**	0.510
23…32	40	63	63	D80 and D95	**LRD 3353**	0.510
30…40	40	100	80	D80 and D95	**LRD 3355**	0.510
37…50	63	100	100	D80 and D95	**LRD 3357**	0.510
48…65	63	100	100	D80 and D95	**LRD 3359**	0.510
55…70	80	125	125	D80 and D95	**LRD 3361**	0.510
63…80	80	125	125	D80 and D95	**LRD 3363**	0.510
80…104	100	160	160	D80 and D95	**LRD 3365**	0.510
80…104	125	200	160	D115 and D150	**LRD 4365**	0.900
95…120	125	200	200	D115 and D150	**LRD 4367**	0.900
110…140	160	250	200	D150	**LRD 4369**	0.900
80…104	100	160	160	*(2)*	**LRD 33656**	1.000
95…120	125	200	200	*(2)*	**LRD 33676**	1.000
110…140	160	250	200	*(2)*	**LRD 33696**	1.000

Class 10 A *(1)* for connection by lugs

Select the appropriate overload relay with screw clamp terminals or connectors from the table above and add one of the following suffixes:

- figure **6** for relays LRD 01 to LRD 35 and relays LRD 313 to LRD 365.
- **A66** for relays LRD 3322 to LRD 3365.

Relays LRD 43●● are suitable, as standard, for use with lug-clamps.

Thermal overload relays for use with unbalanced loads

Class 10 A *(1)* for connection by screw clamp terminals or lugs

In the references selected above, change the prefix **LRD** (except **LRD 4●●●**) to **LR3 D**.
Example: **LRD 01** becomes **LR3 D01**.
Example with **Ever**Link®connectors: **LRD 340** becomes **LR3 D340**.
Example with lugs: **LRD 3406** becomes **LR3 D3406**.

(1) Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current I_R:
class 10 A: between 2 and 10 seconds
(2) Independent mounting of the contactor.
*(3) BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LAD ALLEN4**, see page 5/85).*

Characteristics: pages 6/14 to 6/17
Dimensions: pages 6/26 to 6/28
Schemes: page 6/29

LRD ●●3

Differential thermal overload relays

for use with fuses or magnetic circuit-breakers GV2 L and GV3 L

- Compensated relays with manual or automatic reset,
- with relay trip indicator,
- for a.c. or d.c.

Relay setting range (A)	Fuses to be used with selected relay aM (A)	gG (A)	BS88 (A)	For use with contactor LC1	Reference	Weight kg
Classes 10 A *(1)* for connection by spring terminals (only for direct mounting beneath the contactor)						
0.10…0.16	0.25	2	–	D09…D38	**LRD 013**	0.140
0.16…0.25	0.5	2	–	D09…D38	**LRD 023**	0.140
0.25…0.40	1	2	–	D09…D38	**LRD 033**	0.140
0.40…0.63	1	2	–	D09…D38	**LRD 043**	0.140
0.63…1	2	4	–	D09…D38	**LRD 053**	0.140
1…1.6	2	4	6	D09…D38	**LRD 063**	0.140
1.6…2.5	4	6	10	D09…D38	**LRD 073**	0.140
2.5…4	6	10	16	D09…D38	**LRD 083**	0.140
4…6	8	16	16	D09…D38	**LRD 103**	0.140
5.5…8	12	20	20	D09…D38	**LRD 123**	0.140
7…10	12	20	20	D09…D38	**LRD 143**	0.140
9…13	16	25	25	D12…D38	**LRD 163**	0.140
12…18	20	35	32	D18…D38	**LRD 213**	0.140
16…24	25	50	50	D25…D38	**LRD 223**	0.140
Class 10 A with connection by EverLink® BTR screw connectors *(2)* and control by spring terminals						
9…13	16	25	25	D40A…D65A	**LRD 3133**	0.375
12…18	20	32	35	D40A…D65A	**LRD 3183**	0.375
17…25	25	50	50	D40A…D65A	**LRD 3253**	0.375
23…32	40	63	63	D40A…D65A	**LRD 3323**	0.375
30…40	40	80	80	D40A…D65A	**LRD 3403**	0.375
37…50	63	100	100	D40A…D65A	**LRD 3503**	0.375
48…65	63	100	100	D50A and D65A	**LRD 3653**	0.375

Thermal overload relays for use with unbalanced loads

Classes 10 A *(1)* for connection by BTR screw connectors *(2)* and control by spring terminals

In the references selected above, replace **LRD 3** with **LR3 D3**.
Example: **LRD 3653** becomes **LR3 D3653**.

Thermal overload relays for use on 1000 V supplies

Classes 10 A *(1)* for connection by screw clamp terminals

For relays LRD 06 to LRD 35 only, for an operating voltage of 1000 V, and only for independent mounting, the reference becomes **LRD 33●●A66**.
Example: **LRD 12** becomes **LRD 3312A66**.
Order an **LA7 D3064** terminal block separately, see page 6/25.

(1) Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current I_R:
class 10 A: between 2 and 10 seconds
*(2) BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LAD ALLEN4**, see page 5/85).*

LRD 15●●

LRD 3●●L

LR2 D35●●

Differential thermal overload relays
for use with fuses or magnetic circuit-breakers GV2 L and GV3 L

- Compensated relays with manual or automatic reset,
- with relay trip indicator,
- for a.c. or d.c.

Relay setting range (A)	Fuses to be used with selected relay aM (A)	gG (A)	BS88 (A)	For use with contactor LC1	Reference	Weight kg
Classes 20 *(1)* for connection by screw clamp terminals						
2.5…4	6	10	16	D09…D32	**LRD 1508**	0.190
4…6	8	16	16	D09…D32	**LRD 1510**	0.190
5.5…8	12	20	20	D09…D32	**LRD 1512**	0.190
7…10	16	20	25	D09…D32	**LRD 1514**	0.190
9…13	16	25	25	D12…D32	**LRD 1516**	0.190
12…18	25	35	40	D18…D32	**LRD 1521**	0.190
17…25	32	50	50	D25 and D32	**LRD 1522**	0.190
23…28	40	63	63	D25 and D32	**LRD 1530**	0.190
25…32	40	63	63	D25 and D32	**LRD 1532**	0.190
Class 20 *(1)* for connection by EverLink® BTR screw connectors *(2)*						
9…13	20	32	35	D40A…D65A	**LRD 313L**	0.375
12…18	25	40	40	D40A…D65A	**LRD 318L**	0.375
17…25	32	50	50	D40A…D65A	**LRD 325L**	0.375
23…32	40	63	63	D40A…D65A	**LRD 332L**	0.375
30…40	50	80	80	D40A…D65A	**LRD 340L**	0.375
37…50	63	100	100	D40A…D65A	**LRD 350L**	0.375
48…65	80	125	125	D50A and D65A	**LRD 365L**	0.375
Classes 20 *(1)* for connection by screw clamp terminals						
17…25	32	50	50	D80 and D95	**LR2 D3522**	0.535
23…32	40	63	63	D80 and D95	**LR2 D3553**	0.535
30…40	40	100	80	D80 and D95	**LR2 D3555**	0.535
37…50	63	100	100	D80 and D95	**LR2 D3557**	0.535
48…65	80	125	100	D80 and D95	**LR2 D3559**	0.535
55…70	100	125	125	D80 and D95	**LR2 D3561**	0.535
63…80	100	160	125	D80 and D95	**LR2 D3563**	0.535

(1) Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current I_R:
class 20: between 6 and 20 seconds
*(2) BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LAD ALLEN4**, see page 5/85).*

References (continued)

TeSys protection components
TeSys D, thermal overload relays

Differential thermal overload relays
for use with fuses or magnetic circuit-breakers NSX

- Compensated relays, with relay trip indicator,
- for a.c.,
- for direct mounting on contactor or independent mounting *(1)*.

Relay setting range (A)	Fuses to be used with selected relay aM (A)	gG (A)	For mounting beneath contactor LC1	Reference	Weight kg
Classes 10 or 10A *(2)* for connection using bars or connectors					
60…100	100	160	D115 and D150	**LR9 D5367**	0.885
90…150	160	250	D115 and D150	**LR9 D5369**	0.885
Classes 20 *(2)* for connection using bars or connectors					
60…100	125	160	D115 and D150	**LR9 D5567**	0.885
90…150	200	250	D115 and D150	**LR9 D5569**	0.885

Electronic thermal overload relays for use with balanced or unbalanced loads

- Compensated relays,
- with separate outputs for alarm and tripping.

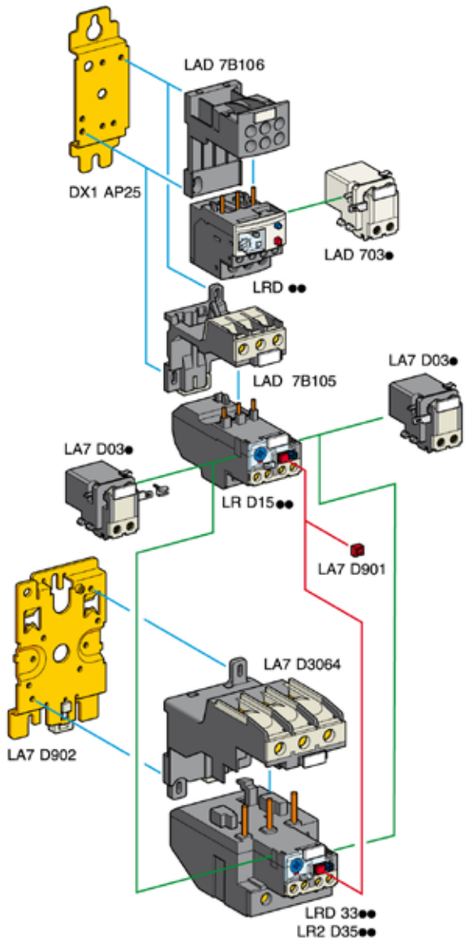
Relay setting range (A)	Fuses to be used with selected relay aM (A)	gG (A)	For mounting beneath contactor LC1	Reference	Weight kg
Classes 10 or 20 *(2)* selectable, for connection using bars or connectors					
60…100	100	160	D115 and D150	**LR9 D67**	0.900
90…150	160	250	D115 and D150	**LR9 D69**	0.900

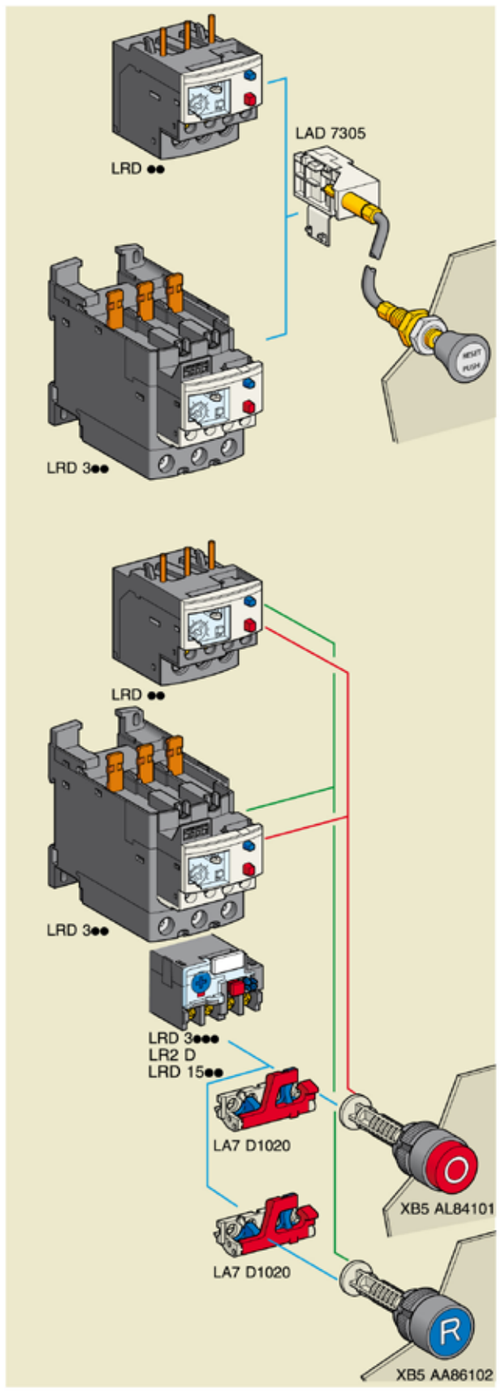
(1) Power terminals can be protected against direct finger contact by the addition of shrouds and/or insulated terminal blocks, to be ordered separately (see page 5/84).
(2) Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current I_R:
class 10: between 4 and 10 seconds,
class 10 A: between 2 and 10 seconds,
class 20 A: between 6 and 20 seconds

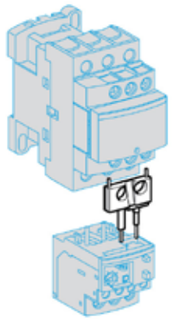
Other versions

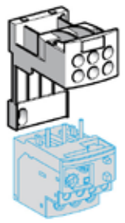
Thermal overload relays for resistive circuits in category AC-1.
Please consult your Regional Sales Office.

TeSys protection components
TeSys D, 3-pole thermal overload relays





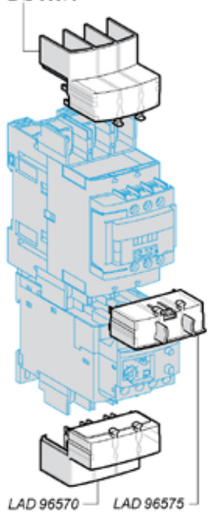

LAD 7C●


LAD 7B106

Separate components for relays

Description	For use with	Sold in lots of	Unit reference	Weight kg
Pre-wiring kit allowing direct connection of the N/C contact of relay LRD 01…35 or LR3 D01…D35 to the contactor	LC1 D09…D18	10	**LAD 7C1** *(1)*	0.002
	LC1 D25…D38	10	**LAD 7C2** *(1)*	0.003
Terminal block *(2)* for clip-on mounting on 35 mm rail (AM1 DP200) or screw fixing; for fixing centres, see pages 6/26 to 6/28	LRD 01…35 and LR3 D01…D35	1	**LAD 7B106**	0.100
	LRD 1508…32	1	**LAD 7B105**	0.100
	LRD 33●●●, LR3 D33●●●, LR2 D35●●	1	**LA7 D3064** *(3)*	0.370
EverLink® terminal block for independent mounting	LRD 3●●, LRD 3●●L and LR3 D3●●	1	**LAD 96560**	0.087
Size 4 Allen key, insulated , 1000 V	LRD 3●●, LRD 3●●L and LR3 D3●●	5	**LAD ALLEN4**	0.026
Terminal block adapter for mounting a relay beneath an LC1 D115 or D150 contactor	LRD 3●●, LR3 D3●●●, LRD 35●●	1	**LA7 D3058** *(3)*	0.080
Mounting plates *(4)* for screw fixing on 110 mm centres	LRD 01…35, LR3 D01…D35, LRD 1508…32	10	**DX1 AP25**	0.065
	LRD 3●●●, LR3 D3●●●, LR2 D35●●	1	**LA7 D902**	0.130
Marker holders, snap-in 8 x 18 mm	LRD 3●●	100	**LAD 90**	0.001
	All relays except LRD 01…35, LR3 D01…D35, LRD 3●●, LRD 3●●L and LR3 D3●●	100	**LA7 D903**	0.001
Bag of 400 blank legends (self-adhesive, 7 x 16 mm)	All relays	1	**LA9 D91**	0.001
Stop button locking device	All relays except LRD 01…35, LR3 D01…D35, LR9 D and LRD 313…LRD 365	10	**LA7 D901**	0.005
Remote Stop or electrical reset device *(5)*	LRD 01…35, LR3 D01…D35 and LRD 313…LRD 365	1	**LAD 703●** *(6)* *(7)*	0.090
Remote tripping or electrical reset device *(5)*	All relays except LRD 01…35, LR3 D01…D35, LRD 3●●, LRD 3●●L and LR3 D3●●	1	**LA7 D03●** *(6)*	0.090
Block of insulated terminals	LR9 D	2	**LA9 F103**	0.560
IP 20 cover for lug type terminals for independent mounting	LRD 3136…3656	1	**LAD 96570**	0.021
IP 20 cover for lug type terminals for mounting with contactor LC1 D40A6…D65A6	LRD 3136…3656	1	**LAD 96575**	0.010
Terminal block for lug type terminals for independent mounting	LRD 3136…3656	1	**LAD 96566**	0.010

LAD 96570


LAD 96570 *LAD 96575*

Remote control

"Reset" function

Description	For use with	Sold in lots of	Unit reference	Weight kg
By flexible cable (length = 0.5 m)	LRD 01…35, LR3 D01…D35 and LRD 313…LRD 365	1	**LAD 7305** *(7)*	0.075
	All relays except LRD 01…35, LR3 D01…D35, LRD 3●●, LRD 3●●L and LR3 D3●●	1	**LA7 D305**	0.075

"Stop" and/or "Reset" functions

The terminal protection shroud must be removed and the following 3 products must be ordered separately:

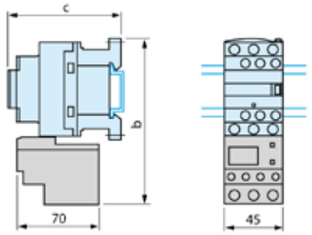
Adapter for door mounting	LRD 33●●, LR2 D and LRD 15●●.		1	**LA7 D1020**	0.005
Operating heads for spring return pushbutton	Stop	All relays	1	**XB5 AL84101**	0.027
	Reset	All relays	1	**XB5 AA86102**	0.027

(1) These pre-wiring kits cannot be used with reversing contactors.
(2) Terminal blocks are supplied with terminals protected against direct finger contact and screws in the open, "ready-to-tighten" position.
(3) To order a terminal block for connection by lugs, the reference becomes ***LA7 D30646****.*
(4) Remember to order the terminal block corresponding to the type of relay.
(5) The time for which the coil of remote tripping or electrical resetting device ***LA7 D03*** *or* ***LAD 703*** *can remain energised depends on its rest time: 1 s pulse duration with 9 s rest time; 5 s pulse duration with 30 s rest time; 10 s pulse duration with 90 s rest time; maximum pulse duration 20 s with a rest time of 300 s. Minimum pulse time: 200 ms.*
(6) Reference to be completed by adding the code indicating the control circuit voltage.
Standard control circuit voltages (for other voltages, please consult your Regional Sales Office) :

Volts	12	24	48	96	110	220/230	380/400	415/440
50/60 Hz	–	B	E	–	F	M	Q	N
Consumption, inrush and sealed: < 100 VA								
⎓	J	B	E	DD	F	M	–	–
Consumption, inrush and sealed: < 100 W.								

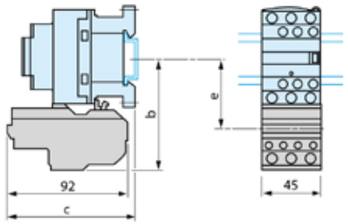
(7) Not compatible with 3-pole relays fitted with spring terminals.

LRD 01…35
Direct mounting beneath contactors with screw clamp connections



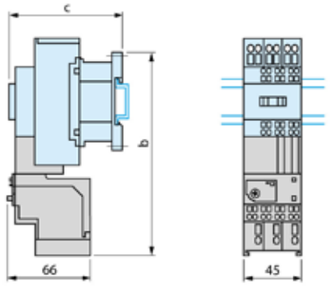
LC1	D09…D18	D25…D38
b	123	137
c	See pages 5/92 and 5/93	

LRD 1508…32
Direct mounting beneath contactors with screw clamp connections



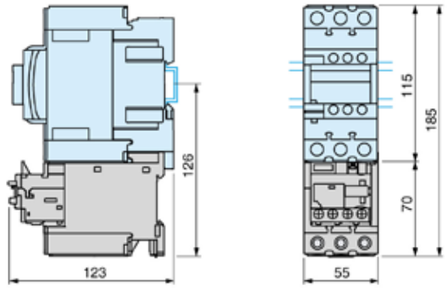
LC1	∼ D09… D18	∼ D25… D38	⎓ D09… D18	⎓ D25… D38
b	90	97	90	97
c	97	96	107	106
e	53	60	53	60

LRD 013…223
Direct mounting beneath contactors with spring terminal connections

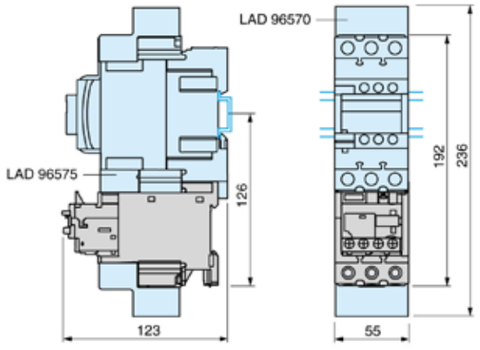


LC1	D093…D253
b	168
c	See pages 5/92 and 5/93

LRD 313 …365
Direct mounting beneath contactors LC1 D40A…D65A with screw clamp connections or EverLink® connectors

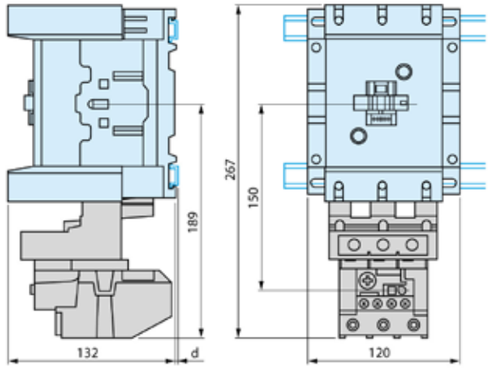


LRD 3136 …3656
Direct mounting beneath contactors LC1 D40A6…D65A6 with lugs



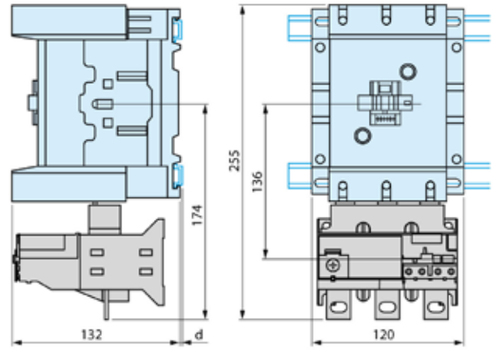
Characteristics : pages 6/14 to 6/17
References : pages 6/20 to 6/22
Schemes : page 6/29

LRD 4●●●
Direct mounting beneath contactors LC 1D115 and D150



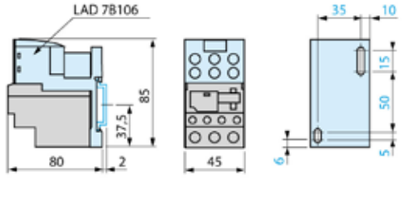
AM1	DL200 and DR200	DE200 and ED●●●
d	2.5	10.5

LR9 D
Direct mounting beneath contactors LC 1D115 and D150

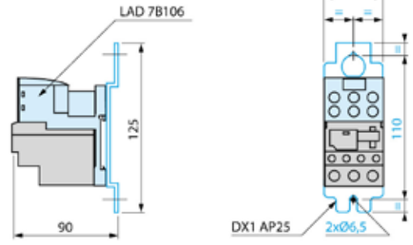


AM1	DP200 and DR200	DE200 and ED●●●
d	2.5	10.5

LRD 01…35
Independent mounting on 50 mm centres or on rail AM1 DP200 or DE200

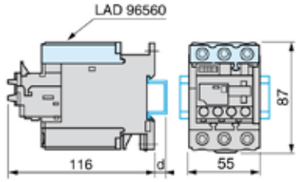


Independent mounting on 110 mm centres



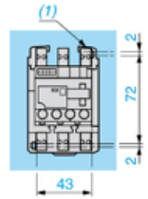
LRD 313 …365

Mounting on rail AM1 D●200 or ED200
With terminal block LAD 96560



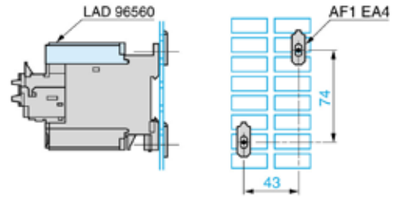
AM1	DP200	DE200	ED200
d	2	9.5	9.5

Panel mounting
Outgoing terminal block not shown

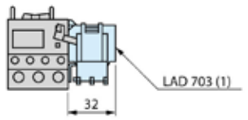


(1) 2 elongated holes Ø 4.2 x 6.

Mounted on plate AM1 P



LRD 01…35 and LRD 313…365
Remote tripping or electrical reset

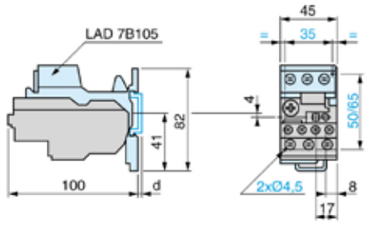


(1) Can only be mounted on RH side of relay LRD01…35 and LRD313…365

Characteristics : pages 6/14 to 6/17
References : pages 6/20 to 6/22
Schemes : page 6/29

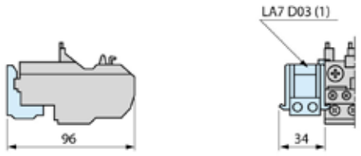
LRD 15●●

Independent mounting on 50 mm centres or on rail AM1 DP200 or DE200



AM1	DP200	DE200
d	2	9.5

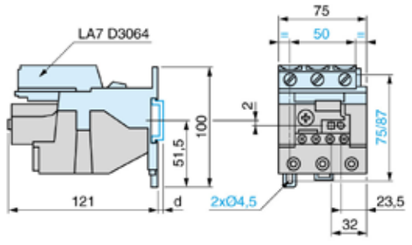
Remote tripping or electrical reset



(1) Can be mounted on RH or LH side of relay LR2 D15.

LRD 3●●● and LR2 D35●●

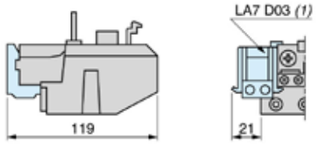
Independent mounting on 50 mm centres or on rail AM1 DP200 or DE200



AM1	DP200	DE200
d	2	9.5

LRD 3●●●, LR2 D35●● and LR9 D

Remote tripping or electrical reset

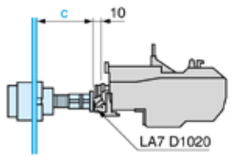


(1) Can be mounted on RH or LH side of relay LRD 3●●●, LR2 D35●● or LR9 D.

LRD 15 and LRD 3●●●

Adapter for door mounted operator

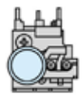
LA7 D1020



c : adjustable from 17 to 120 mm

Stop

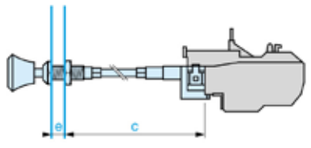
Reset



LRD, LRD 313…365, LRD 15 and LR9 D

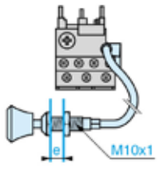
"Reset" by flexible cable

LA7 D305 and LAD 7305
Mounting with cable straight



e : up to 20 mm
c : up to 550 mm

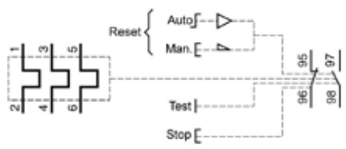
Mounting with cable bent



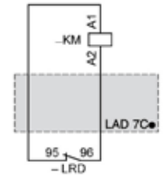
e : up to 20 mm

Characteristics : pages 6/14 to 6/17
References : pages6/20 to 6/22
Schemes : page 6/29

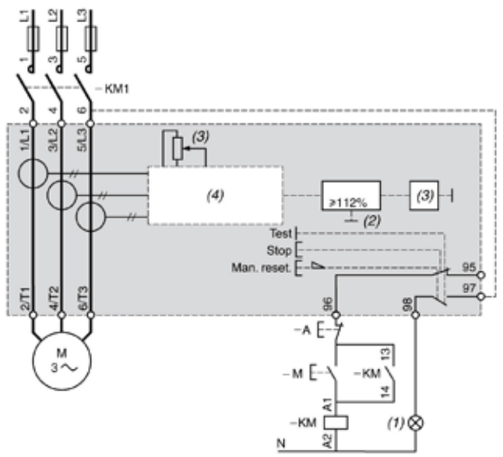
LRD ●●, LRD 3●● and LR2 D●●



Pre-wiring kit LAD 7C1, LAD 7C2

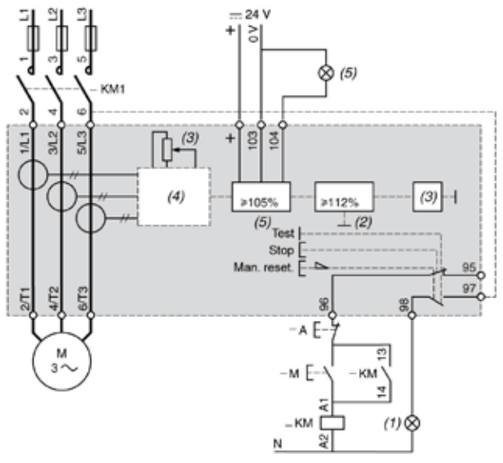


LR9 D5●●●



(1) Tripped.
(2) Overload.
(3) Setting current.
(4) Specialised circuit.

LR9 D67 and LR9 D69



(1) Tripped.
(2) Overload.
(3) Setting current.
(4) Specialised circuit.
(5) Alarm.

Characteristics : pages 6/14 to 6/17
References : pages 6/20 to 6/22
Dimensions : pages 6/26 to 6/28

TeSys protection components
3-pole electronic thermal overload relays, TeSys LR9 F

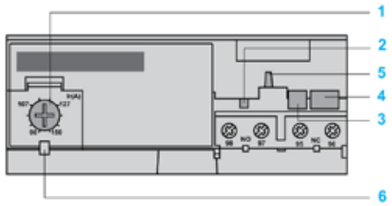
Presentation

TeSys LR9 F electronic protection relays are especially suited to the operating conditions of motors.
They provide protection against:
- thermal overload of 3-phase or single-phase balanced or unbalanced circuits;
- phase failure and large phase unbalance,
- protracted starting times,
- prolonged stalled rotor condition.

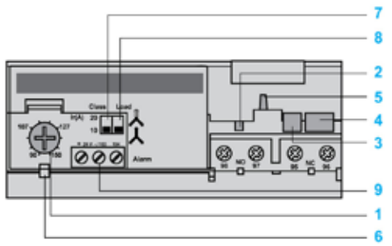
LR9 F electronic protection relays are mounted directly below an LC1 F type contactor. They cover a range from 30 to 630 A, in eight ratings.
The settings can be locked by sealing the transparent protective cover.
A reset button is mounted on the front of the relay.
Two versions are available:
- simplified version: class 10: LR9 F●3●●, class 20: LR9 F●5●●,
- complete version: class 10, 10 A or class 20, selectable, conforming to EN 60947-4-1: LR9 F●●.

This latter version includes an alarm function which makes it possible to forestall tripping by load shedding.

Simplified version: class 10 or 20



Complete version: class 10, 10 A or class 20, selectable, and alarm circuit



1 Ir adjustment dial
2 Test button
3 Stop button
4 Reset button
5 Trip indicator
6 Setting locked by sealing the cover
7 Class 10/class 20 selector switch
8 Selector switch for balanced load /unbalanced load
9 Alarm circuit

TeSys protection components
3-pole electronic thermal overload relays, TeSys LR9 F

Environment

Conforming to standards			IEC 60947-4-1, IEC 60255-8, IEC 60255-17, EN 60947-4-1 and VDE 0660
Product certifications			UL 508, CSA 22-2
Degree of protection	Conforming to VDE 0106		IP 20
	Conforming to IEC 60529		IP 20 on front of relay with accessories **LA9 F103** or **LA7 F70●**, see page 6/37
Protective treatment	Standard version		"TH"
Ambient air temperature around the device (conforming to IEC 60255-8)	Storage	°C	- 40…+ 85
	Normal operation	°C	- 20…+ 55 *(1)*
Maximum operating altitude	Without derating	m	2000
Operating positions without derating	In relation to normal vertical mounting plane		Any position
Shock resistance	Permissible acceleration conforming to IEC 60068-2-7		13 gn - 11 ms
Vibration resistance	Permissible acceleration conforming to IEC 60068-2-6		2 gn - 5 to 300 Hz
Dielectric strength at 50 Hz	Conforming to IEC 255-5	kV	6
Surge withstand	Conforming to IEC 61000-4-5	kV	4
Resistance to electrostatic discharge	Conforming to IEC 61000-4-2	kV	8 (in air) 6 (in indirect mode)
Resistance to radiated radio-frequency disturbance	Conforming to IEC 61000-4-3	V/m	10
Resistance to fast transient currents	Conforming to IEC 61000-4-4	kV	2
Electromagnetic compatibility	EN 50081-1 and 2, EN 50082-2		Conforming

(1) For operating temperatures up to 70 °C, please consult your Regional Sales Office.

Electrical characteristics of power circuit

Relay type			LR9	F5●57, F57	F5●63, F63 F5●67, F67 F5●69, F69	F5●71, F71	F7●75, F75 F7●79, F79	F7●81, F81
Rated insulation voltage (Ui)	Conforming to IEC 60947-4		**V**	1000				
Rated operational voltage (Ue)	Conforming to VDE 0110 gr C		**V**	1000				
Rated impulse withstand voltage (Uimp)	Conforming to IEC 60947-1		**kV**	8				
Rated operational current (Ie)			**A**	30 to 630				
Short-circuit protection and coordination				See pages: 1/18, 1/19, 1/30 and 1/31				
Frequency limits	Of the operating current		**Hz**	50…60. For other frequencies, please consult your Regional Sales Office *(1)*				
Power circuit connections	Width of terminal lug		**mm**	20	25	25	30 **LR9 F7●75** and **LR9 F75** 40 **LR9 F7●79** and **LR9 F79**	40
	Clamping screw			M6	M8	M10	M10	M12
	Tightening torque		**N.m**	10	18	35	35	58

Auxiliary contact electrical characteristics

Conventional thermal current			**A**	5	
Short-circuit protection	By gG or BS fuses or by circuit-breaker **GB2 CD10**		**A**	5	
Control circuit connections	Flexible cable with cable end	1 conductor	**mm²**	**Min.** 1 x 0.75	**Max.** 1 x 2.5
		2 conductors	**mm²**	2 x 1	2 x 1.5
	Flexible cable without cable end	1 conductor	**mm²**	1 x 0.75	1 x 4
		2 conductors	**mm²**	2 x 1	2 x 2.5
	Solid cable	1 conductor	**mm²**	1 x 0.75	1 x 2.5
		2 conductors	**mm²**	2 x 1	–
	Tightening torque		**N.m**	1.2	

Maximum sealed current consumption of the coils of associated contactors (occasional operating cycles of contact 95-96)	a.c. supply	**V**	24	48	110	220	380	600
		VA	100	200	400	600	600	600
	d.c. supply	**V**	24	48	110	220	440	–
		W	100	100	50	45	25	–

(1) For applications involving the use of these overload relays with soft starters or variable speed drives, please consult your Regional Sales Office.

Characteristics (continued)

TeSys protection components
3-pole electronic thermal overload relays,
TeSys LR9 F

Operating characteristics

Tripping class	Conforming to IEC 60947-4-1			10, 10 A and 20
Temperature compensation			**°C**	- 20…+ 70
Reset				Manual on front of relay
Fault indication				On front of relay
Test function				On front of relay
Stop function				Actuation of N/C contact, without affecting N/O contact
Tripping thresholds	Conforming to IEC 60947-4-1	Alarm	**A**	1.05 ± 0.06 In
		Tripping	**A**	1.12 ± 0.06 In
Sensitivity to phase failure	Conforming to IEC 60947-4-1			Tripping in 4 s ± 20 % in the event of phase failure
Adjustment (nominal motor current)				Setting dial on front of relay
Security sealing				Yes

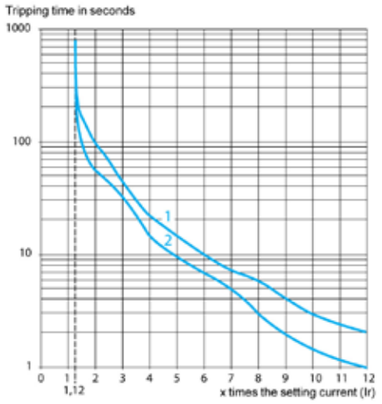
Alarm circuit characteristics

Rated supply voltage	d.c. supply	**V**	24
Supply voltage limits		**V**	17…32
Current consumption	No-load	**mA**	⩽ 5
Switching current		**mA**	0…150
Protection	Short-circuit and overload		Auto-protected
Voltage drop	Closed state	**V**	⩽ 2.5
Connection	Flexible cable without cable end	**mm²**	0.5…1.5
Tightening torque		**N.m**	0.45

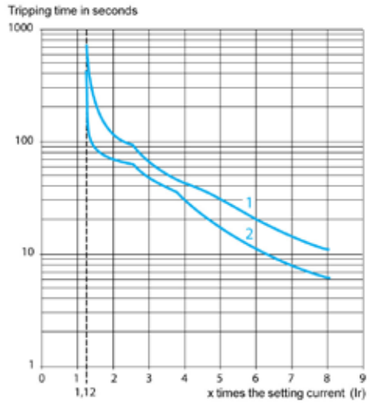
LR9 F tripping curve

Average operating times depending on multiples of the setting current

Class 10



Class 20



1 Cold state curve
2 Hot state curve

TeSys protection components
3-pole electronic thermal overload relays, TeSys LR9 F for motor protection

LR9 F53●●

LR9 F73●●

Compensated and differential overload relays

Thermal overload relays:
- compensated and differential,
- with relay trip indicator,
- for a.c.,
- for direct mounting on contactor or independent mounting *(1)*.

Relay setting range	Fuses to be used with selected relay aM	Fuses to be used with selected relay gG	For direct mounting beneath contactor LC1	Reference	Weight
A	A	A			kg
Class 10 *(2)*					
30…50	50	80	F115…F185	**LR9 F5357**	0.885
48…80	80	125	F115…F185	**LR9 F5363**	0.900
60…100	100	200	F115…F185	**LR9 F5367**	0.900
90…150	160	250	F115…F185	**LR9 F5369**	0.885
132…220	250	315	F185…F400	**LR9 F5371**	0.950
200…330	400	500	F225…F500	**LR9 F7375**	2.320
300…500	500	800	F225…F500	**LR9 F7379**	2.320
380…630	630	800	F400…F630 and F800	**LR9 F7381**	4.160
Class 20 *(2)*					
30…50	50	80	F115…F185	**LR9 F5557**	0.885
48…80	80	125	F115…F185	**LR9 F5563**	0.900
60…100	100	200	F115…F185	**LR9 F5567**	0.900
90…150	160	250	F115…F185	**LR9 F5569**	0.885
132…220	250	315	F185…F400	**LR9 F5571**	0.950
200…330	400	500	F225…F500	**LR9 F7575**	2.320
300…500	500	800	F225…F500	**LR9 F7579**	2.320
380…630	630	800	F400…F630 and F800	**LR9 F7581**	4.160

*(1) When mounting overload relays up to size **LR9 F5371** directly beneath the contactor, they may be additionally supported by a mounting plate (see page 6/37). Above this size it is always necessary to use the mounting plate.*
Power terminals can be protected against direct finger contact by the addition of shrouds and/or insulated terminal blocks, to be ordered separately (see page 6/37).
(2) Standard IEC 60947-4 specifies a tripping time for 7.2 times the setting current In:
- class 10: between 4 and 10 seconds,
- class 20: between 6 and 20 seconds.

TeSys protection components
3-pole electronic thermal overload relays, TeSys LR9 F for motor protection

LR9 F57

Compensated overload relays, class 10 or 20 with alarm

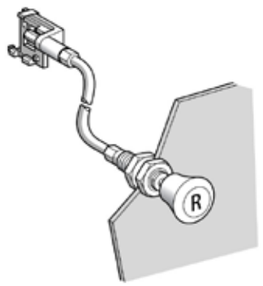
Thermal overload relays:
- compensated,
- with relay trip indicator,
- for a.c.,
- for direct mounting on contactor or independent mounting *(1)*,
- class 10 or 20 by selector switch,
- protection of 3-phase or single-phase circuits by selector switch,
- with alarm function that enables tripping to be forestalled.

Relay setting range	Fuses to be used with selected relay aM	Fuses to be used with selected relay gG	For direct mounting beneath contactor LC1	Reference	Weight
A	A	A			kg
30…50	50	80	F115…F185	**LR9 F57**	0.885
48…80	80	125	F115…F185	**LR9 F63**	0.900
60…100	100	200	F115…F185	**LR9 F67**	0.900
90…150	160	250	F115…F185	**LR9 F69**	0.885
132…220	250	315	F185…F400	**LR9 F71**	0.950
200…330	400	500	F225…F500	**LR9 F75**	2.320
300…500	500	800	F225…F500	**LR9 F79**	2.320
380…630	630	800	F400…F630 and F800	**LR9 F81**	4.160

*(1) When mounting overload relays up to size **LR9 F71** directly beneath the contactor, they may be additionally supported by a mounting plate (see page 6/37). Above this size it is always necessary to use the mounting plate.*
Power terminals can be protected against direct finger contact by the addition of shrouds and/or insulated terminal blocks, to be ordered separately (see page 6/37).

TeSys protection components
3-pole electronic thermal overload relays, TeSys LR9 F
Accessories (to be ordered separately)

LA7 D03•



LA7 D305

Control accessories

Description		Sold in lots of	Unit reference	Weight kg
Remote electrical reset device *(1)*		1	**LA7 D03•** *(2)*	0.090
Remote Reset function control by flexible cable (length = 0.5 m)		1	**LA7 D305**	0.075
Remote Stop and/or Reset function control	Adapter for door mounted operator	1	**LA7 D1020**	0.005
	Rod (snap-off end to obtain required length, between 17 and 120 mm)	10	**ZA2 BZ13**	0.100
	Operating head for spring return pushbutton	1	**ZA2 B••••** *(3)*	0.012

Connection accessories

For mounting an LR9 F5•71 thermal overload relay together with an LC1 F185 contactor

Description	Reference	Weight kg
Set of 3 busbars	**LA7 F407**	0.160

For mounting a thermal overload relay beneath a reversing contactor or star-delta contactors

Application		Width of terminal lug	Set of 3 busbars Reference	Weight
For relay	For contactor			
		mm		kg
LR9 F5•57, F5•63, F5•67, F5•69, F69, F71	LC1 F115	15	**LA7 F401**	0.110
LR9 F5•57, F5•63	LC1 F150, F185	20	**LA7 F402**	0.110
LR9 F5•71, LR9 F71	LC1 F185	25	**LA7 F407**	0.160
LR9 F5•71, LR9 F71	LC1 F225, F265	25	**LA7 F403**	0.160
LR9 F7•75, F7•79, LR9 F75, F79	LC1 F225...F400	25	**LA7 F404**	0.160
LR9 F7•81, LR9 F81	LC1 F400	25	**LA7 F404**	0.160
LR9 F7•75, F7•79, F7•81, LR9 F75, F79, F81	LC1 F500	30	**LA7 F405**	0.270
LR9 F7•81, LR9 F81	LC1 F630, F800	40	**LA7 F406**	0.600

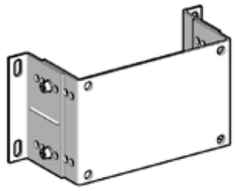
(1) The time for which the coil of remote electrical reset device ***LA7 D03*** *can remain energised depends on its rest time: 1 s pulse duration with 9 s rest time; 5 s pulse duration with 30 s rest time; 10 s pulse duration with 90 s rest time. Maximum pulse duration of 20 s with rest time of 300 s. Minimum pulse time: 200 ms.*

(2) Reference to be completed by adding the coil voltage code.
Standard control circuit voltages,
(for other voltages, please consult your Regional Sales Office):

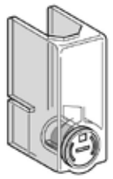
Volts	12	24	48	96	110	220/230	380/400	415/440
~ 50/60 Hz	–	B	E	–	F	M	Q	N
Consumption, inrush and sealed: < 100 VA								
⎓	J	B	E	DD	F	M	–	–
Consumption, inrush and sealed: < 100 W.								

(3) Stop: ***ZA2 BL432*** *and Reset:* ***ZA2 BL639****.*

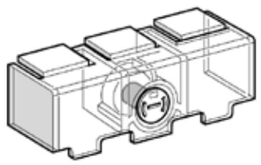
TeSys protection components
3-pole electronic thermal overload relays, TeSys LR9 F
Accessories (to be ordered separately)



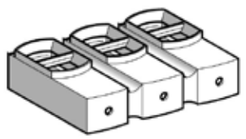
LA7 F90•



LA9 F70•



LA7 F70•



LA9 F103

Mounting plates for overload relay

For use with relays	Reference	Weight kg
LR9 F5•57, F5•63, F5•67, F5•69, F5•71, LR9 F57, F63, F67, F69, F71	**LA7 F901**	0.100
LR9 F7•75, F7•79, F7•81, LR9 F75, F79, F81	**LA7 F902**	0.100

Sets of power terminal protection shrouds, single-pole

For use with relays	Number of shrouds per set	Set reference	Weight kg
LR9 F5•57, LR9 F57	6	**LA9 F701**	0.015
LR9 F5•63, F5•67, F5•69, LR9 F63, F67, F69	6	**LA9 F702**	0.015
LR9 F5•71, LR9 F71	6	**LA9 F705**	0.015
LR9 F7•75, F7•79, F7•81, LR9 F75, F79, F81	6	**LA9 F703**	0.015

Power terminal protection shrouds, 3-pole

For use with relays	Reference	Weight kg
LR9 F5•57, F5•63, F5•67, F5•69, LR9 F57, F63, F67, F69	**LA7 F701**	0.030
LR9 F5•71, LR9 F71	**LA7 F702**	0.030
LR9 F7•75, F7•79, F7•81, LR9 F75, F79, F81	**LA7 F703**	0.030

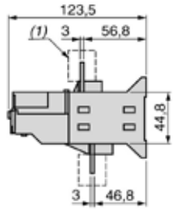
Insulated terminal blocks

For use with relays	Set of 2 blocks Reference	Weight kg
LR9 F5•57, F5•63, F5•67, F5•69, LR9 F57, F63, F67, F69	**LA9 F103**	0.560

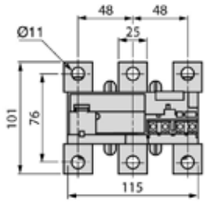
Marking accessories

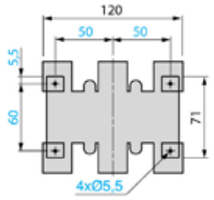
Description	Sold in lots of	Unit reference	Weight kg
Clip-in marker holder	100	**LA7 D903**	0.001
Bag of 400 blank self-adhesive legends 7 x 16 mm	1	**LA9 D91**	0.001

Common side view

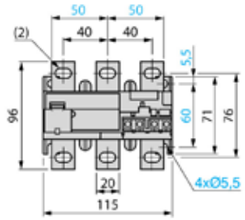


LR9 F5●71, F71





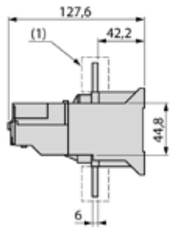
LR9 F5●57, F5●63, F5●67, LR9 F5●69, F57, F63, F67, F69



*(1) Terminal shroud **LA9 F70●***

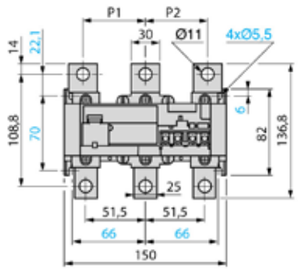
*(2) 6.5 x 13.5 for **LR9 F5●57** and **F57**. 8.5 x 13.5 for **LR9 F5●63, F5●67, F5●69, F63, F67, F69***

Common side view



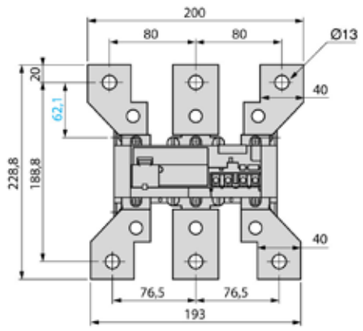
*(1) Terminal shroud **LA9 F70●***

LR9 F7●75, F7●79, F7●81, LR9 F75, F79, F81

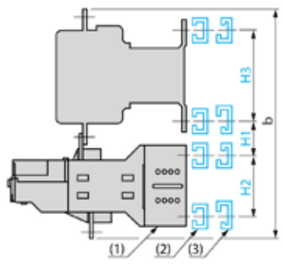


	P1	P2
LR9 F7●75, F75	48	48
LR9 F7●79, F7●81, F79, F81	55	55

LR9 F7●81 (for mounting beneath LC1 F630 and F800), LR9 F81



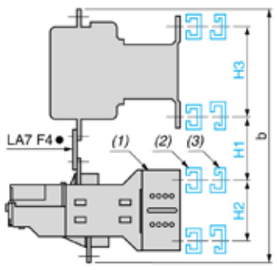
Direct mounting beneath contactor LC1 F



Contactors LC1	With LR9 relays	b	H1	H2	H3
F115	F5●57, F5●63, F5●67, F5●69, F57, F63, F67, F69	240	30	50	120
F150	F5●57, F5●63, F5●67, F5●69 F57, F63, F67, F69	246	30	50	120
F185	F5●57, F5●63, F5●67, F5●69 F57, F63, F67, F69	250	30	50	120
F225	F5●71, F71	273	40	50	120
	F7●75, F7●79, F75, F79	308	50	58	120
F265	F5●71, F71	279	40	50	120
	F7●75, F7●79, F75, F79	314	60	58	120
F330	F7●75, F7●79, F75, F79	317	60	58	120
F400	F7●75, F7●79, F7●81, F75, F79, F81	317	60	58	180
F500	F7●75, F7●79, F7●81, F75, F79, F81	346	70	58	180
F630, F800	F7●81, F81	510	110	58	180

*(1) Relay mounting plate **LA7 F90●**, see page 6/37*
*(2) **AM1 EC** or **AM1 DF** for **LC1 F115** to **F630** and **LC1 F800***

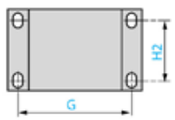
Mounting beneath contactors: reversing LC2 F or star-delta LC3 F



Contactors LC1	With LR9 relays	b	H1	H2	H3
F115	F5●57, F5●63, F5●67, F5●69, F57, F63, F67, F69	279	60	50	120
F150	F5●57, F5●63, F5●67, F5●69 F57, F63, F67, F69	283	60	50	120
F185	F5●57, F5●63, F5●67, F5●69 F57, F63, F67, F69	285	60	50	120
F225	F5●71, F71				
	F7●75, F7●79, F75, F79	360	100	58	120
F265	F5●71, F71	332	90	50	120
	F7●75, F7●79, F75, F79	363	100	58	120
F330	F7●75, F7●79, F75, F79	364	100	58	120
F400	F7●75, F7●79, F7●81, F75, F79, F81	364	100	58	180
F500	F7●75, F7●79, F7●81, F75, F79, F81	390	110	58	180
F630, F800	F7●81, F81	509	120	58	180

*(3) **DZ5 MB** for **LC1 F115** to **F400***

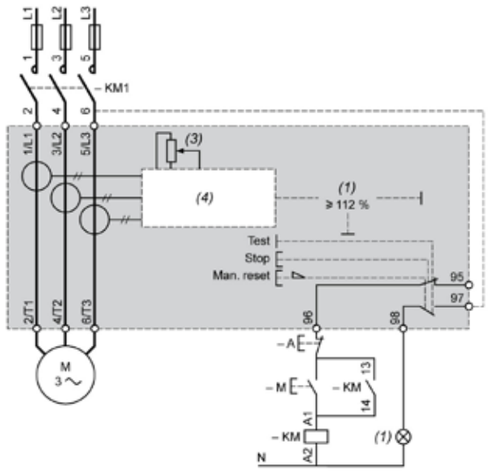
Mounting plate for LR9 F



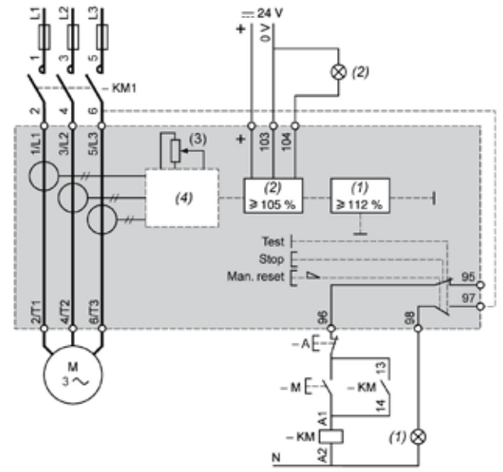
LA7	G
F901	145
F902	190

Schemes

LR9 F5●57…F7●81



LR9 F57…F81 (with alarm)

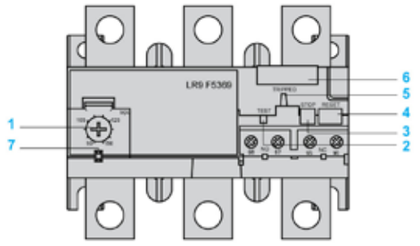


(1) Tripped on thermal overload
(2) Overheating alarm
(3) Setting current
(4) Specialised circuit

Setting-up the special functions of TeSys LR9 F thermal overload relays

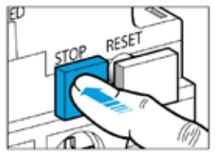
Setting the relay

- Lift the transparent cover 7 to gain access to the various settings.
- Adjustment is achieved by turning dial 1 which is graduated directly in Amperes.
- The setting can be locked by sealing the cover 7.



"Stop" function 3

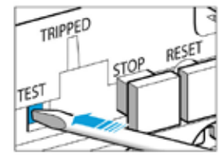
Stop



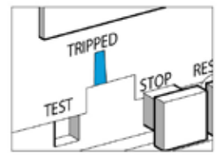
- The "Stop" function is obtained by pressing the red "STOP" button 3.
- Pressing the Test button:
  - actuates the N/C contact,
  - has no effect on the N/O contact.
- The "STOP" button can be locked by fitting a "U" clip (reference: **LA7 D901**).

"Test" function 2

Test



Trip indicator



- The "Test" function is obtained by pressing the red "TEST" button 2 with a screwdriver.
- Operation of the "TEST" button simulates tripping of the relay and:
  - actuates both the N/O and N/C contacts,
  - actuates the trip indicator 5.