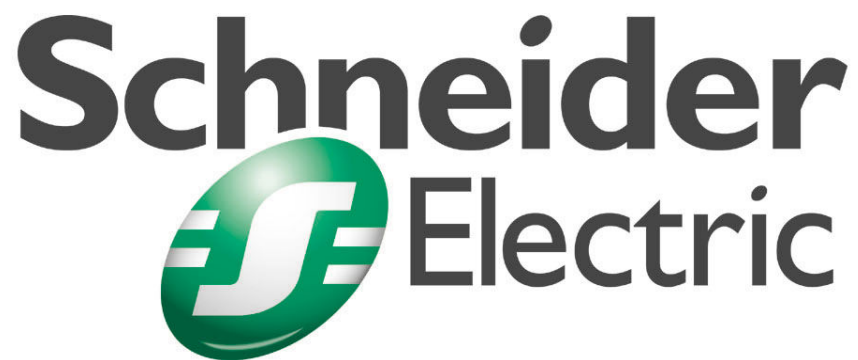


DATA SHEET



LR-D OVERLOAD RELAYS

Protection components

Motor protection

Operating conditions

There are many possible causes of electric motor failure. One of the most common, and which is often accidental, is the utilisation of motors beyond the operating limits defined by the manufacturer or in abnormal ambient conditions.

A statistical survey carried out in Britain, covering 9000 incidents of motor failure, gave the following results:

Overloads	30 %
Pollution (example: corrosive atmosphere)	19 %
Phase failure	14 %
Bearing failure	13 %
Ageing (example: ambient temperature too high)	10 %
Rotor faults	5 %
Miscellaneous	9 %

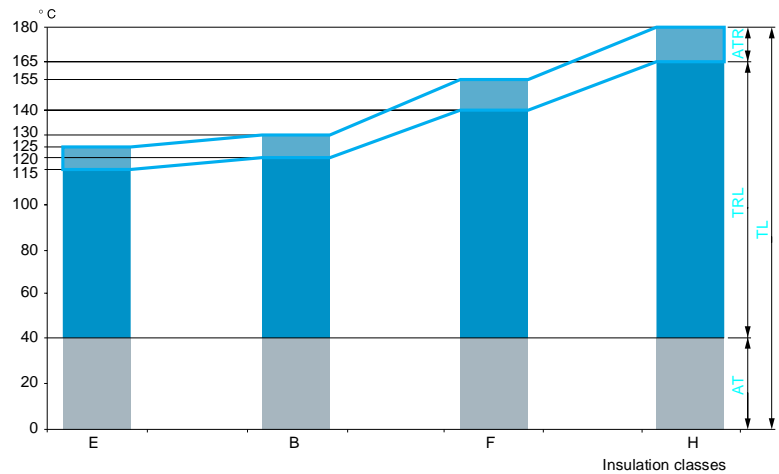
These faults are related to motors with a power rating of 37 kW or more.

An examination of the above results shows that, in more than 50 % of cases, the fault is due to the effects of heating.

Leaving aside the replacement of wearing parts, such as bearings, slip rings, brushes, etc., the life of a rotating machine is linked to that of its insulation. Provided that the temperature rise limit is not exceeded, the life expectancy of insulating materials is extremely long. It is decreased by approximately one half for an excess temperature rise of 10 °C.

The operating temperature limit **TL** of an insulating material depends on the type of material and is the sum of the ambient air temperature **AT** (cooling air), the temperature rise limit **TRL** and an additional temperature rise value **ATR** considered necessary because the measurement of winding resistance variation does not determine the temperature of the hottest part of the motor winding, but only gives an average value for temperature rise.

The diagram below defines the standardised limits for different classes of insulation. In all cases, the normal ambient cooling air temperature is fixed at 40 °C.



Protection components

Motor protection

The rated power of a motor corresponds to its temperature rise limit for an ambient temperature of 40 °C. The standard temperature rise limits for the different parts of a machine are given in the following table, which is an extract from publication IEC 60034-1.

	Temperature rise limit in °C		
	Insulation class		
	B	F	H
Insulated winding (measurement by resistance)	80	100	125
Commutators and slip-rings	80	90 (1)	100 (1)
Bearings	60	60 (2)	60 (2)

When a motor is used at an ambient air temperature other than the normal value, its temperature rise limit should be modified in order to maintain the same maximum temperature limit. The result is that the motor operational power is no longer the same as its rated power.

Also, the altitude of the installation, if this is above 1000 m, affects the cooling and increases the temperature rise.

The following table gives the ratio between operational power and rated power, according to the operating conditions, for a given ambient temperature. It corresponds to insulation class B.

Altitude m	Operational power / Rated power in watts						
	Ambient temperature						
	30 °C	35 °C	40 °C	45 °C	50 °C	55 °C	60 °C
1000	1.07	1.04	1.00	0.96	0.92	0.87	0.82
1500	1.04	1.01	0.97	0.93	0.89	0.84	0.79
2000	1.01	0.98	0.94	0.90	0.86	0.82	0.77
2500	0.97	0.95	0.91	0.87	0.84	0.79	0.75
3000	0.93	0.91	0.87	0.84	0.80	0.76	0.71
3500	0.89	0.86	0.83	0.80	0.76	0.72	0.68
4000	0.83	0.81	0.78	0.75	0.72	0.68	0.64

The values shown in the above table are for guidance only. In effect, the derating of a motor depends on its size, insulation class, method of construction (self-ventilated or forced ventilation, degree of protection IP 23, IP 44, etc.), and varies according to the manufacturer.

Also, in addition to the normal ambient conditions, the rated power of a motor is defined by the manufacturer for continuous duty S1. This covers continuous operation of sufficient duration to enable the motor to reach a steady temperature. It is this value of rated power that is normally shown on the motor plate.

There are other standardised types of duty, such as temporary duty S2, or intermittent periodic duty type S3, S4 and S5, for which the motor manufacturer defines an operational power appropriate to each and different from the rated power.

(1) For temperature rise limits of 90 °C and 100 °C the brushes must be selected with the agreement of the motor manufacturer.

(2) These limit values may be exceeded, depending on the quality of the grease used and the applied loads.

Protection components

Motor protection

Selection of thermal protection

To optimise the life of a motor, it is important to select the appropriate thermal protection which will prevent operation under abnormal heating conditions, whilst ensuring maximum continuity in the operation of the driven machine or associated plant by avoiding unnecessary stoppages.

It is essential to know the real operating conditions:

- ambient temperature,
- operating altitude,
- type of standard duty,

in order to determine the operational values for the motor (power, current) and to be able to select efficient thermal protection.

These operational values are given by the motor manufacturer.

Various types of thermal protection devices are available:

- thermal overload relays or thermal-magnetic motor circuit-breakers,
- thermistor protection relays, with PTC thermistor probes (1)
- multifunction relays.

Protection by thermal overload relay

A conventional thermal overload relay protects the motor in the following two cases:

- overload, by monitoring the current drawn by each phase,
- phase imbalance or failure, by its differential mechanism.

It therefore covers 44% of the cases of motor failure. This type of protection relay is widely used, is extremely reliable and is a relatively low cost device. It is particularly recommended if there is a risk of rotor locking.

Nevertheless, it has the disadvantage of not taking into account, with sufficient accuracy, the thermal state of the motor.

The operating principle of this type of device is, in fact, based on the bending of bimetal strips caused by the current drawn by the motor. As the thermal inertias of the overload relay and motor are different, in some cases it may be possible to restart the motor following an overload trip even though its temperature is still too high.

Protection by instantaneous electronic over current relays

LR97 D and LT47 electronic over current relays have been developed to satisfy machine protection requirements.

By monitoring the current through the current transformers with which they are equipped, they provide protection against:

- overtorque or mechanical shock,
- locked rotor (mechanical locking under steady state conditions),
- phase failure.

These relays are particularly recommended for providing mechanical protection on machines with:

- high resistive torque,
- high inertia,
- and with strong probability of locking under steady state conditions.

They do not incorporate a thermal overload memory and can therefore be used to provide motor protection in severe duty applications, such as:

- long starting times,
- frequent starting.

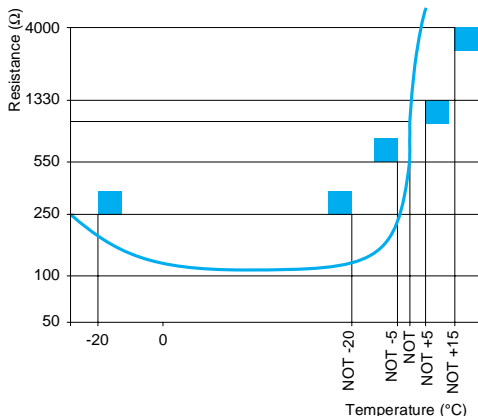
These relays have definite time characteristics: current threshold and time based function

Because of their two separate time settings "D-Time" (starting time) and "O-Time" (trip time during steady state), these over current relays can be combined with the motor-starter function.

(1) PTC: Positive Temperature Coefficient

Protection components

Motor protection



■ Markings complied with by universal probes "Mark A" (standard EC 60034-11-1A)

Protection by PTC thermistor relay

Better monitoring of the internal motor temperature can be provided by PTC thermistor probes, embedded in the motor windings during manufacture, associated with a thermistor protection relay (type LT3 S).

PTC probes are resistors with a positive temperature coefficient. Their resistance value increases very rapidly when their temperature reaches the Nominal Operating Temperature threshold, indicated by NOT on the curve opposite.

Their small size means that they have a low thermal inertia and can rapidly follow the temperature variations of their surroundings.

This is the only solution for motor protection in applications involving severe starting/stopping (duties S3, S4, S5) and, likewise, for applications where the motor could be inadvertently overcooled.

Problems other than those due to thermal effect can also arise: earth fault, abnormal overheating of bearings, etc.

More comprehensive protection can be obtained:

- either by associating several types of protection device (example: thermal overload relay + thermistor protection relay + earth fault relay),
- or by using a multifunction protection relay type LT6.

Protection relays

Relay type	Thermal overload (1) LR2 K, LRD, LR9 F	Over current LR97D	Over current LT47	For use with PTC probes LT3	Multifunction LT6
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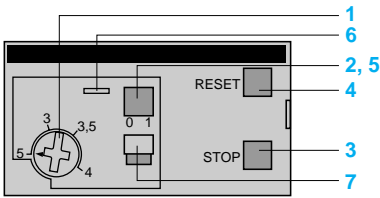
Causes of overheating

Slight overload	■	■	■	■	■
Locked rotor	■	■	■	■	■
Underload	■	■	■	■	■
Supply phase failure	■	■	■	■	■
Ventilation fault	■	■	■	■	■ With PTC probes
Abnormal rise in ambient temperature	■	■	■	■	■ With PTC probes
Shaft bearing seizure	■	■	■	■	■ With PTC probes
Insulation fault	■	■	■	■	■
Protracted starting time	■	■	■	■	■
Severe duty	■	■	■	■	■ With PTC probes

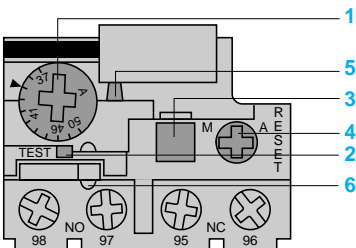
- Ideally suited
- Possible solution
- Not suitable (no protection)

(1) Or motor circuit-breaker type GV2 ME, for example.

Description



LRD 01...35



LRD 3322...4369, LR2 D

Model 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 I_r .

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

Environment

Conforming to standards			IEC 60947-1, IEC 60947-4-1, NF C 63-650 VDE 0660, BS 4941
Product certifications			CSA, UL, Sichere Trennung, PTB except LAD 4: UL, CSA.
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 and maximum operating temperatures (with derating)	°C	- 40...+ 70
Operating positions without derating	In relation to normal vertical mounting plane		Any position
Shock resistance	Permissible acceleration conforming to IEC 60068-2-7		15 gn - 11 ms
Vibration resistance	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

Auxiliary contact characteristics

Conventional thermal current		A	5					
Maximum sealed current 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
	d.c. supply	VA	100	200	400	600	600	600
Short-circuit protection	By gG, BS fuses. Maximum rating or by GB2 circuit-breaker	V	24	48	110	220	440	–
		W	100	100	50	45	25	–
Connection to screw clamp terminals (Min/max c.s.a.)								
Flexible cable without cable end	1 or 2 conductors	mm ²	1/2.5					
Flexible cable with cable end	1 or 2 conductors	mm ²	1/2.5					
Solid cable without cable end	1 or 2 conductors	mm ²	1/2.5					
Tightening torque		N.m	1.7					
Connection to spring terminals (Min/max c.s.a.)								
Flexible cable without cable end	1 or 2 conductors	mm ²	1/2.5					
Flexible cable with cable end	1 or 2 conductors	mm ²	1/2.5					

TeSys protection components

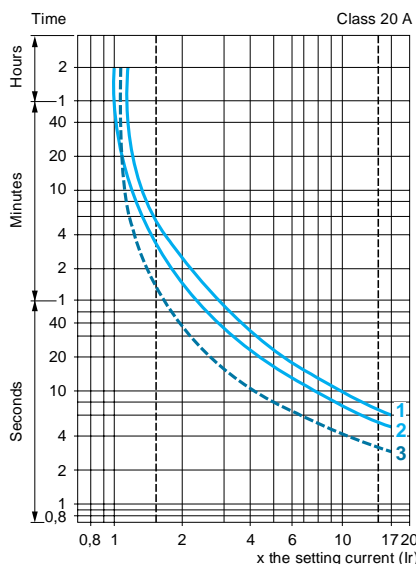
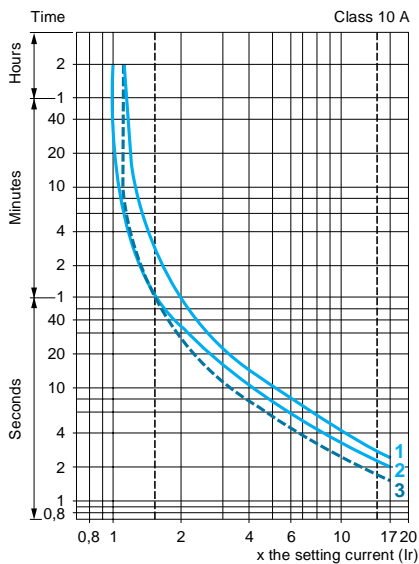
3-pole thermal overload relays, model d

Relay type	LRD 01 ...16, LR3 D01 ...D16	LR D15●●	LRD 21 ...35, LR3 D21 ...D35	LRD 3322 ...33696 LR3 D3322 ...D33696	LR2 D35●●	LRD 4365 ...4369
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Electrical characteristics of power circuit								
Tripping class	Conforming to UL 508, IEC 60947-4-1		10 A	20	10 A	10 A	20	10 A
Rated insulation voltage (Ui)	Conforming to IEC 60947-4-1	V	690		690	1000		1000
	Conforming to UL, CSA	V	600		600	600		600 except LRD 4369
Rated impulse withstand voltage (Uimp)		kV	6		6	6		6
Frequency limits	Of the operating current	Hz	0...400		0...400	0...400		0...400
Setting range	Depending on model	A	0.1...13		12...38	17...104		80...140
Connection to screw clamp terminals (Min/max c.s.a.)								
Flexible cable without cable end	1 conductor	mm ²	1.5/10		1.5/10	4/35		4/50
Flexible cable with cable end	1 conductor	mm ²	1/4		1/6 except LRD 21: 1/4	4/35		4/35
Solid cable without cable end	1 conductor	mm ²	1/6		1.5/10 except LRD 21: 1/6	4/35		4/50
Tightening torque		N.m	1.7	1.85	2.5	9		9
Connection to spring terminals (Min/max c.s.a.)								
Flexible cable without cable end	1 conductor	mm ²	1.5/4	–	1.5/4	–	–	–
Solid cable without cable end	1 conductor	mm ²	1.5/4	–	1.5/4	–	–	–

Operating characteristics							
Temperature compensation		°C	- 20...+ 60	- 30...+ 60	- 30...+ 60	- 20...+ 60	- 20...+ 60
Tripping threshold	Conforming to IEC 60947-4-1	A	1.14 ± 0.06 In				
Sensitivity to phase failure	Conforming to IEC 60947-4-1		Tripping current 30 % of In on one phase, the others at In				

Average operating times related to multiples of the setting current

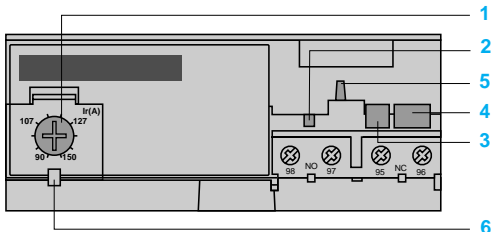


- 1 Balanced operation, 3-phase, from cold state.
- 2 2-phase operation, from cold state.
- 3 Balanced operation, 3-phase, after a long period at the set current (hot state).

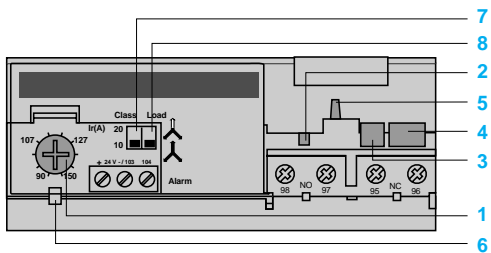
TeSys protection components

3-pole electronic thermal overload relays, model LR9 D

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 model d thermal overload relays (see page 6/12) 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 I_r
- 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 60068-2-27		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 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
Resistance to radio-frequency conducted disturbance	Conforming to IEC 61000-4-3 and NF C 46-022	V/m	10
Resistance to fast transient currents	Conforming to IEC 61000-4-4	kV	2
Electromagnetic compatibility	Draft EN 50081-1 and 2, EN 50082-2		Meet requirements

Electrical characteristics of auxiliary contacts

Conventional thermal current		A	5					
Maximum sealed current 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	–
Short-circuit protection	By gG or BS fuses or by circuit-breaker GB2	A	5					
Connection Flexible cable without cable end	1 or 2 conductors	mm²	Minimum c.s.a.: 1 Maximum c.s.a.: 2.5					
	Tightening torque	N.m	1.2					

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

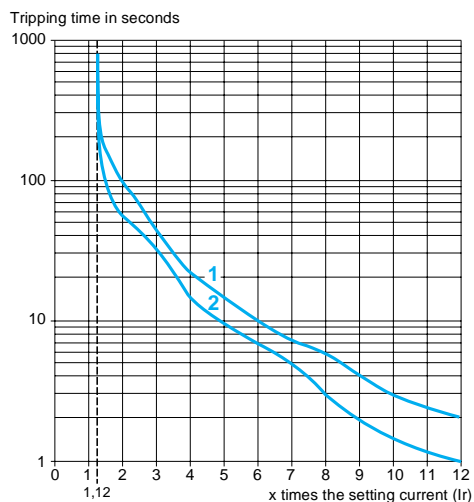
TeSys protection components

3-pole electronic thermal overload relays,
model LR9 D

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)		kV	8
Frequency limits	Of the operating current	Hz	50...60. For other frequencies, please consult your Regional Sales Office (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
	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
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 applications involving the use of these overload relays with soft starters or variable speed drives, please consult your Regional Sales Office.

LR9 D tripping curve



Average operating times related to multiples of the setting current.

- 1 Cold state curve
- 2 Hot state curve

TeSys protection components

3-pole thermal overload relays, model d

810464



LRD 08●●

810465



LRD 21●●

810466



LRD 33●●

533573



LRD 083●●

Differential thermal overload relays for use with fuses

- 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			For use with contactor LC1	Reference	Weight kg
	aM (A)	gG (A)	BS88 (A)			
Class 10 A (1) with 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
17...25	25	50	50	D40...D95	LRD 3322	0.510
23...32	40	63	63	D40...D95	LRD 3353	0.510
30...40	40	100	80	D40...D95	LRD 3355	0.510
37...50	63	100	100	D40...D95	LRD 3357	0.510
48...65	63	100	100	D50...D95	LRD 3359	0.510
55...70	80	125	125	D50...D95	LRD 3361	0.510
63...80	80	125	125	D65...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) with spring terminal connections (only for direct mounting on 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 (1) with connection by lug-clamps

Select 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, ■ A66 for relays LRD 3322 to LRD 3365.

The remaining references are suitable, as standard, for use with lug-clamps.

Thermal overload relays for use with unbalanced loads

Class 10 A (1) with connection by screw clamp terminals

In the references selected above, change LRD (except LRD 4●●●) to LR3 D. Example: LRD 01 becomes LR3 D01.

Thermal overload relays for use on 1000 V supplies

Class 10 A (1) with 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 12.

(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

TeSys protection components

3-pole thermal overload relays, model d

810468



LRD 15

810470



LR2 D35

Differential thermal overload relays for use with fuses

- 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			For use with contactor LC1	Reference	Weight
	aM (A)	gG (A)	BS88 (A)			
Class 20 (1) with 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
17...25	32	50	50	D40...D95	LR2 D3522	0.535
23...32	40	63	63	D40...D95	LR2 D3553	0.535
30...40	50	100	80	D40...D95	LR2 D3555	0.535
37...50	63	100	100	D50...D95	LR2 D3557	0.535
48...65	80	125	100	D50...D95	LR2 D3559	0.535
55...70	100	125	125	D65...D95	LR2 D3561	0.535
63...80	100	160	125	D80 and D95	LR2 D3563	0.535

Electronic differential thermal overload relays for use with fuses

- Compensated relays, with relay trip indicator,
- for a.c.,
- for direct mounting on contactor or independent mounting (2).

Relay setting range (A)	Fuses to be used with selected relay		For direct mounting beneath contactor LC1	Reference	Weight
	aM (A)	gG (A)			
Class 10 or 10A (1) with 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
Class 20 (3) with 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		For direct mounting beneath contactor LC1	Reference	Weight
	aM (A)	gG (A)			
Class 10 or 20 (1) selectable with 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) 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: between 6 and 20 seconds.

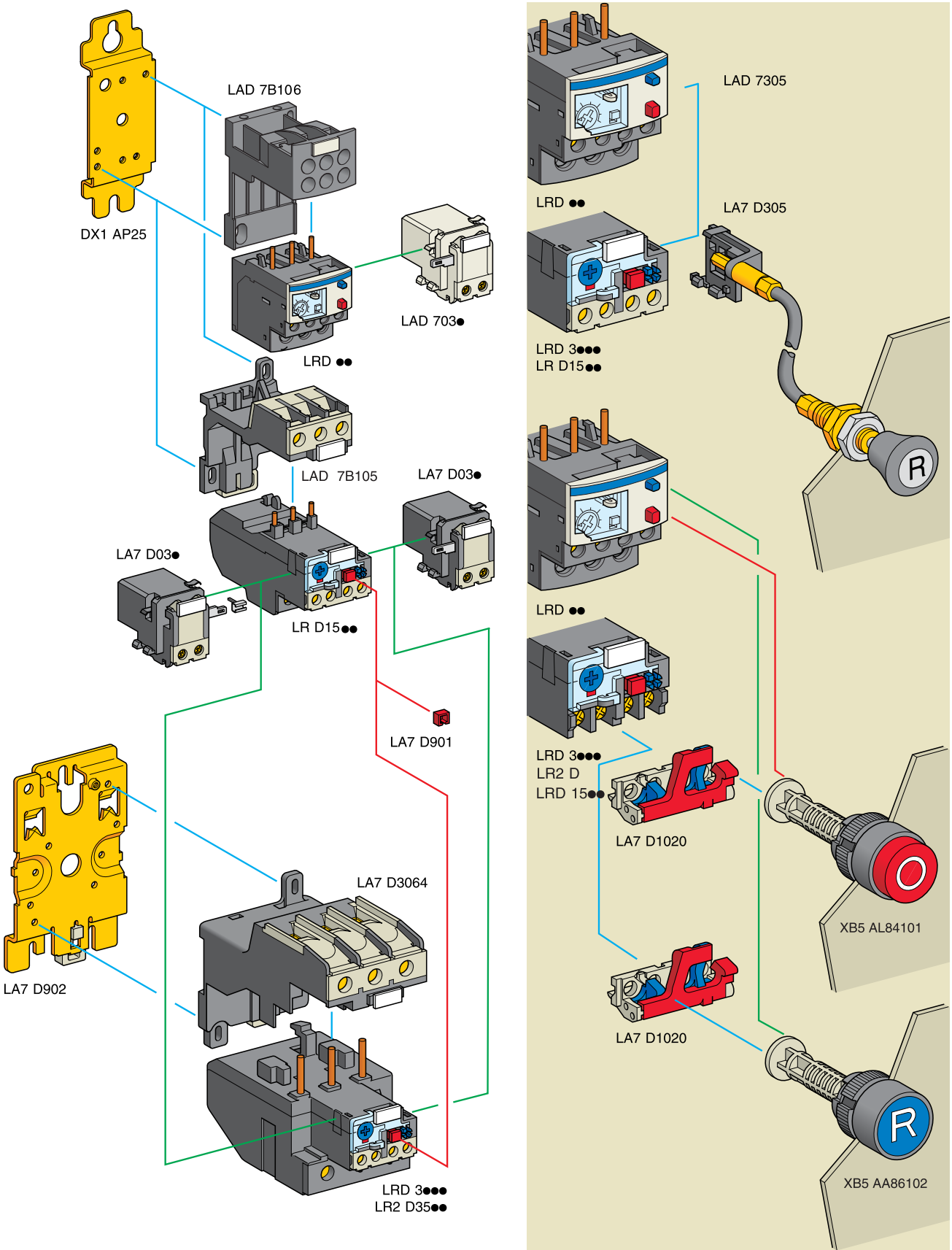
(2) Power terminals can be protected against direct finger contact by the addition of shrouds and/or insulated terminal blocks, to be ordered separately.

Other versions

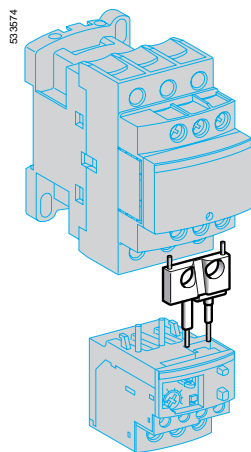
Thermal overload relays for resistive circuits in category AC-1.
Please consult your Regional Sales Office.

TeSys protection components

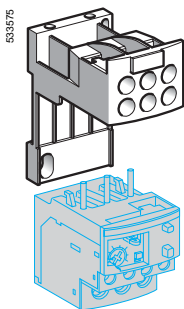
3-pole thermal overload relays, model d



TeSys protection components

3-pole thermal overload relays, model d
Accessories

LAD 7C●



LAD 7B106

Accessories (to be ordered separately)

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 6/20 to 6/22	LRD 01...35 and LR3 D01...D35	1	LAD 7B106	0.100
	LRD 1508...32	1	LAD 7B105	0.100
	LRD 3●●●, LR3 D3●●●, LR2 D35●●	1	LA7 D3064 (3)	0.370
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 holder snap-in	All relays except LRD 01...35 and LR3 D01...D35 (5)	100	LA7 D903	0.001
Bag of 400 labels (blank, self-adhesive, 7 x 16 mm)	–	1	LA9 D91	0.001
Stop button locking device	All relays except LRD 01...35, LR3 D01...D35 and LR9 D	10	LA7 D901	0.005
Remote stop or electrical reset device (6)	LRD 01...35 and LR3 D01...D35	1	LAD 703● (7) (8)	0.090
Remote tripping or electrical reset device (6)	All relays except LRD 01...35 and LR3 D01...D35	1	LA7 D03● (7)	0.090
Block of insulated terminals	LR9 D	2	LA9 F103	0.560

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 and LR3 D01...D35	1	LAD 7305 (8)	0.075
	All relays except LRD 01...35 and LR3 D01...D35	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	All relays except LRD 01...35 and LR3 D01...D35	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) Do not forget to order the terminal block corresponding to the type of relay.

(5) For LRD 01...35.

(6) 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.

(7) Reference to be completed by adding the code indicating 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	–

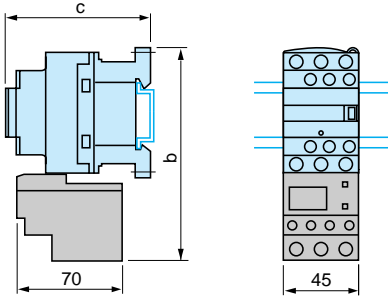
Consumption, inrush and sealed: < 100 W.

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

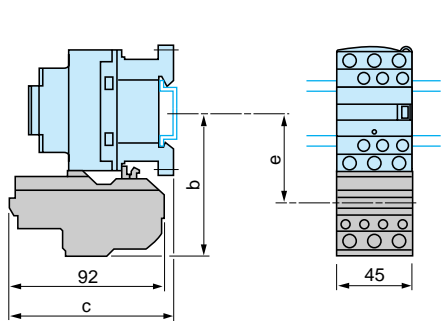
TeSys protection components

Thermal overload relays, model d

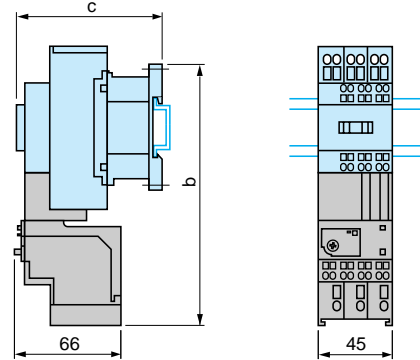
LRD 01...35
Direct mounting beneath contactors with screw clamp connections



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



LRD 013...353
Direct mounting beneath contactors with spring terminal connections

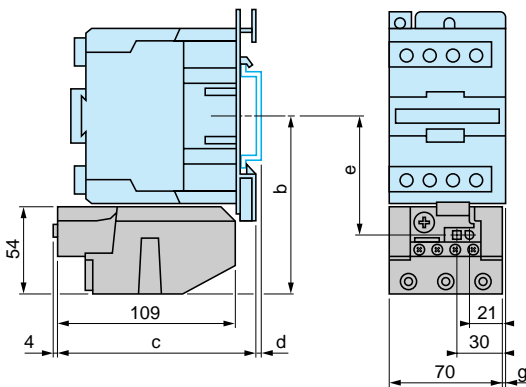


LC1	D09...D18	D25...D38
b	123	137
c	See pages 5/82 and 5/83	

LC1	~ D09 18	~ D25 38	≡ D09 18	≡ D25 38
b	90	97	90	97
c	97	96	107	106
e	53	60	53	60

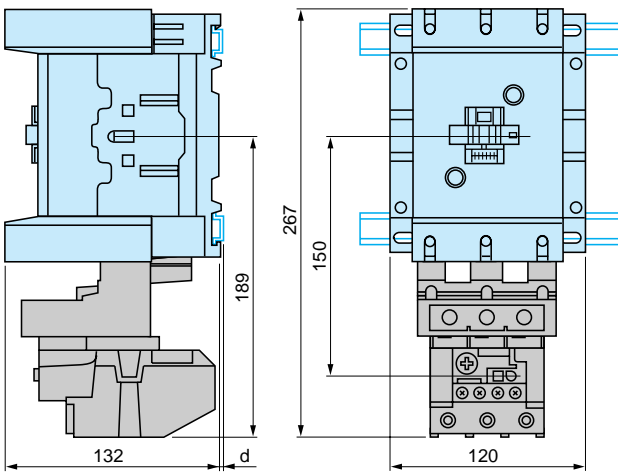
LC1	D03 D383
b	168
c	See pages 5/82 and 5/83

LRD 3●●●
Direct mounting beneath contactors LC1 D40...D95 and LP1 D40...D80



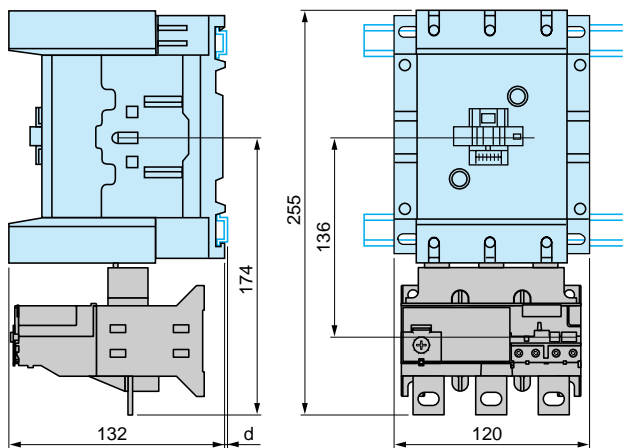
AM1	DL201	DL200					
d	7	17					
			b	c	e	g (3-pole)	g (4-pole)
Control circuit: a.c.							
LC1 D40			111	119	72.4	4.5	13
LC1 D50			111	119	72.4	4.5	-
LC1 D65			111	119	72.4	4.5	13
LC1 D80			115.5	124	76.9	9.5	22
LC1 D95			115.5	124	76.9	9.5	-
Control circuit: d.c.							
LC1 D40, LP1 D40			111	119	72.4	4.5	13
LC1 D50			111	176	72.4	4.5	-
LC1 D65, LP1 D65			111	176	72.4	4.5	13
LC1 D80, D95, LPA D80			115.5	179.4	76.9	9.5	22

LRD 4●●●
Direct mounting beneath contactors LC1 D115 and D150



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

LR9 D
Direct mounting beneath contactors LC1 D115 and D150

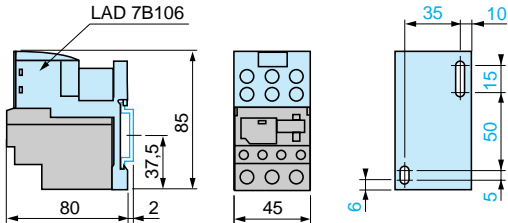


AM1	DP200 and DR200	DE200 and ED●●●
d	2.5	10.5

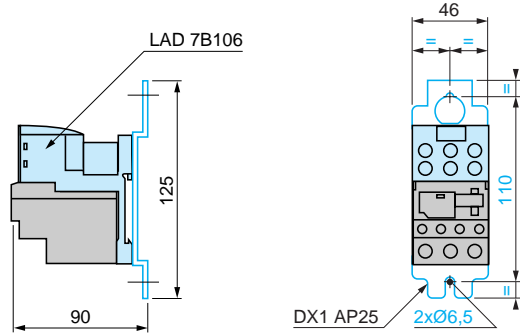
TeSys protection components

Thermal overload relays, model d

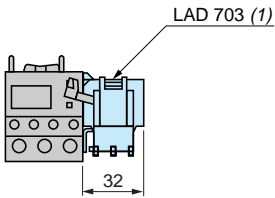
LRD 01...35
Independent mounting on 50 mm centres or on rail AM1 DP200 or DE200



LRD 01...35
Independent mounting on 110 mm centres



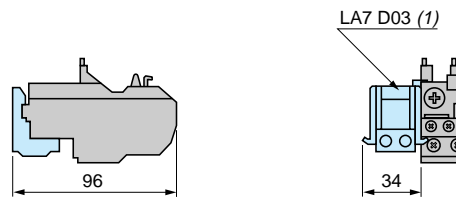
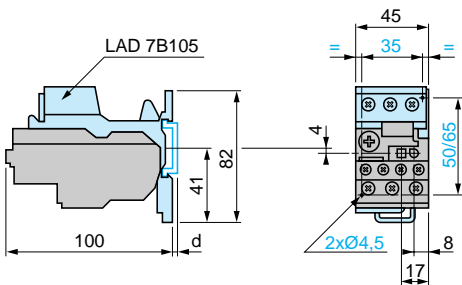
Remote tripping or electrical reset



(1) Can only be mounted on RH side of relay LRD 01...35.

LRD 15●●
Independent mounting on 50 mm centres or on rail AM1 DP200 or DE200

Remote tripping or electrical reset

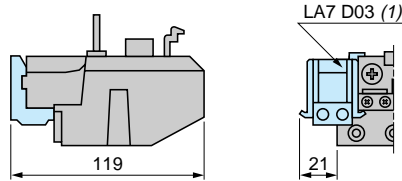
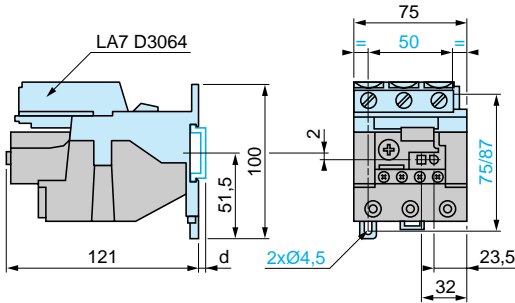


AM1	DP200	DE200
d	2	9.5

(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

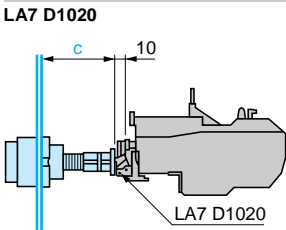
LRD 3●●●, LR2 D35●● and LR9 D
Remote tripping or electrical reset



	AM1 DP200	AM1 DE200
d	2	9.5

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

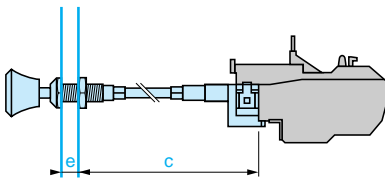
LRD 15 and LRD 3●●●
Adapter for door mounted operator



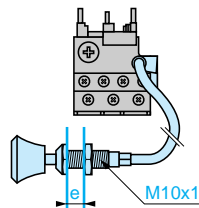
c : adjustable from 17 to 120 mm
LRD, LRD 15 and LR9 D

“Reset” by flexible cable

LA7 D305 and LAD 7305
Mounting with cable straight



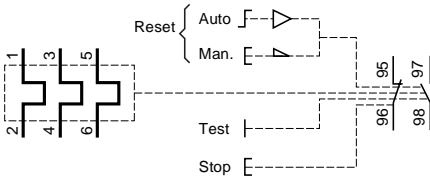
Mounting with cable bent



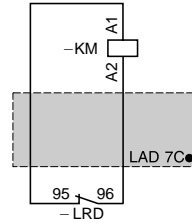
c : up to 550 mm
e : up to 20 mm

e : up to 20 mm

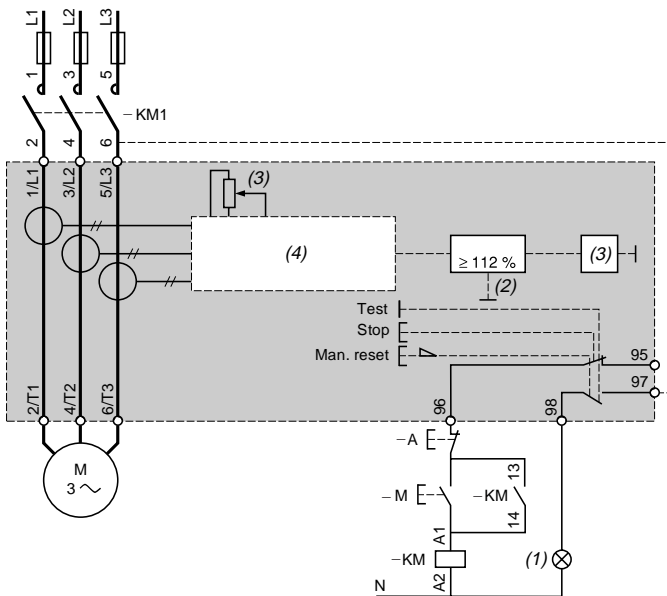
LRD, LR2 D and LR3 D



Pre-wiring kit LAD 7C1, LAD 7C2

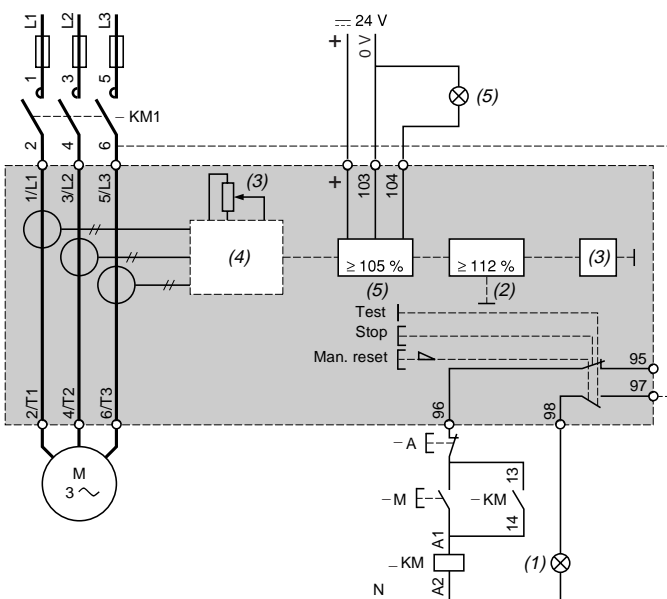


LR9 D5



- (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.