Logic relays
Product group picture

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Logic relays
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Logic relays

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Logic relays
System overview

Concept

CL range logic relays are suitable for small and medium-sized control tasks and are able to substitute logic wiring in a quick and simple manner.
They can be used for applications in control as well as for timing functions, e. g.

- in buildings, lighting systems, air-conditioning systems, general control functions,
- in small machines and systems or
- as stand-alone control module for small applications.

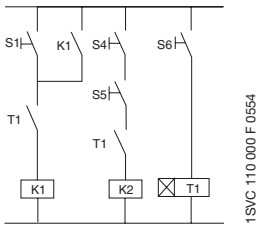
Steps to the application of CL range

- CL range can be used easily, rapidly and comfortably without any time-consuming planning and programming.
- The user can discover the advantages and the benefit of these logic relays in no time at all.
- CL range provides for the control statements according to a simple circuit diagram.
- Setup, storage, simulation and documentation are performed using the compact and user-friendly CL-SOFT software (CL-LAS.PS002).

Software characteristics (CL-SOFT)

- display on a PC monitor according to IEC, ANSI
- different languages to choose from
- easy installation on all Microsoft Windows™ operating systems

Logic links instead of wiring



Documentation (download from the internet)

Logic relay manual	1SVC 440 795 M0100
Remote display manual	1SVC 440 795 M2100
Display system manual	1SVC 440 795 M1100

Technical Data overview

Logic relays

- 8 or 12 digital inputs
- 4 or 6 digital relay outputs
- optionally with 4 or 8 transistor outputs
- 128 rungs
- 3 contacts as n/o or n/c contacts in series plus 1 coil per rung
- optionally with 2 or 4 analog inputs (not 100-240 V AC version)
- power flow display for checking the circuit diagram (devices with display)
- expansions for local or remote level
- enclosure color RAL 7035
- DIN rail mounting

Display system

- useable as compact HMI logic relay
- fully graphic, backlit display module
- 12 digital inputs
- 4 digital relay outputs
- optionally with 4 transistor outputs
- 256 rungs
- 4 contacts as n/o or n/c contacts in series plus 1 coil per rung
- optionally with 4 analog inputs (not 100-240 V AC version)
- networking-compatible via CL-NET
- front panel mounting
- expansion for local

Remote display

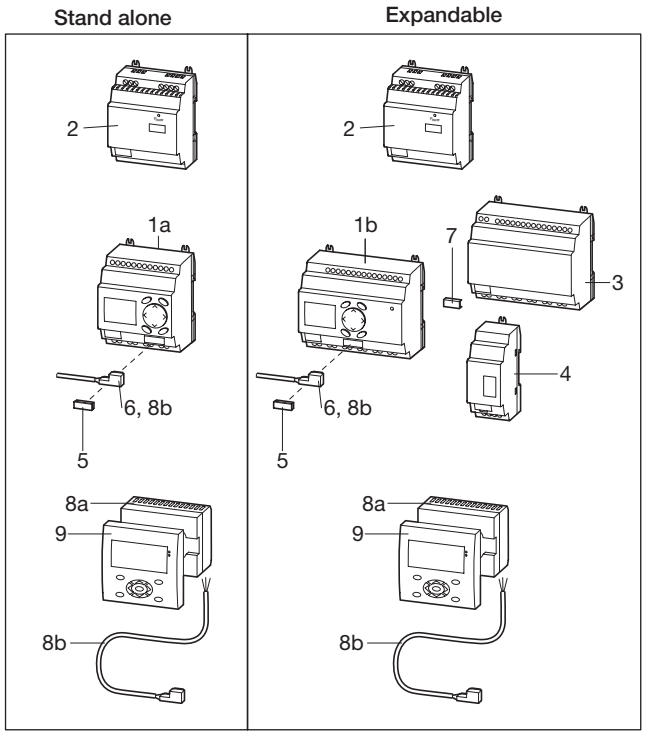
- Remote display up to a distance of 5 m
- Illustration of text and status displays
- Remote adjustment via keypad
- Front panel mounting

Software

- 16 timing relays 0.01-99:59 h
- 16 counting relays for up-, down counting
- 8 weekly timer, 8 annual timers
- 16 analog value comparators
- 16 freely editable display texts
- 32 markers or auxiliary relays

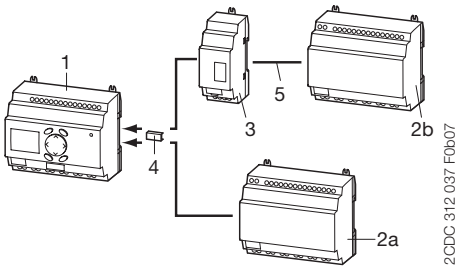
Logic relays
System overview

Logic relays



1a Logic relay CL-LS..
1b Expandable logic relay CL-LM..
2 Power supply CP-D...
3 I/O expansion CL-LER.., CL-LET.. for logic relays CL-LM..
4 Coupler unit CL-LEC.. for remote expansion of logic relays CL-LM..
5 Memory module CL-LAS.MD003 for logic relays CL-LS.., CL-LM..
6 Connecting cable CL-LAS.TK001, CL-LAS.TK002 to connect PC
7 CL-LINK plug CL-LAS.TK011
to connect expansion to logic relays CL-LM..
8a Remote display connection module CL-LDC.S..
8b Connecting cable CL-LAD.TK007
to connect a remote displays to a logic relay
9 Display module CL-LDD..

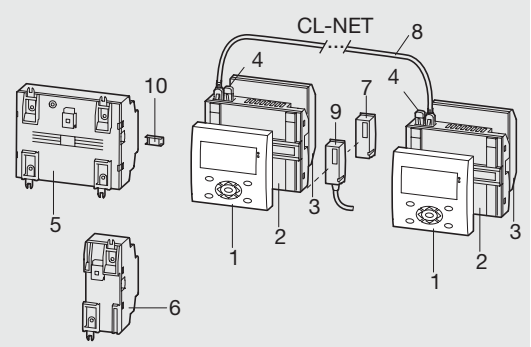
Expansion of logic relays*



1 Logic relay CL-LM..
2 I/O expansion CL-LER.., CL-LET..
2a local expansion
2b remote expansion
3 Coupler unit CL-LEC.. for remote expansion of logic relays CL-LM..
4 CL-LINK plug CL-LAS.TK011 for expansion of logic relays CL-LM..
5 up to 30 m

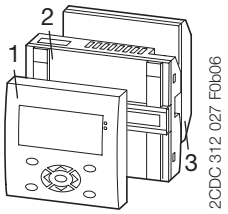
* max. 1 expansion per logic relay

Display system → Compact HMI logic relay



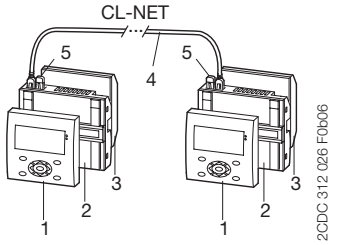
1 Display module CL-LDD..
2 Display base module CL-LDC.LN..
3 Display I/O module CL-LDR.., CL-LDT..
4 Termination resistor CL-LAD.TK009
5 I/O expansion CL-LER.., CL-LET..
6 Coupler unit CL-LEC.. for remote expansion
7 Memory module CL-LAD.MD004 for display base module
8 Connecting cable CL-LAD.TK002, CL-LAD.TK003, CL-LAD.TK004
9 Connecting cable CL-LAD.TK001, CL-LAD.TK011 to connect PC
10 CL-LINK plug CL-LAS.TK011 for expansion of logic relays CL-LM..
■ e.g. door of switchgear cabinet

Stand alone with I/O module



1 Display CL-LDD..
2 Remote display connection module CL-LDC.S.. incl. connecting cable
3 Display base module CL-LDC.L..

Communication via CL-NET



1 Display CL-LDD..
2 Display base module CL-LDC.LN.. for CL-NET
3 Display I/O module CL-LDR.., CL-LDT..
4 Connecting cable CL-LAD.TK002, CL-LAD.TK003, CL-LAD.TK004
5 Termination resistor CL-LAD.TK009

Logic relays
Approvals and marks

■ existing
□ pending

Approvals		Logic relays					Expansions				Display system					Accessories	
		CL-LSR	CL-LST	CL-LMR	CL-LMT		CL-LER	CL-LET	CL-LEC		CL-LDD	CL-LDC	CL-LDR	CL-LDT		CL-LAS	CL-LAD
UL	UL	■	■	■	■		■	■	■		■	■	■	■		■ [1]	■ [2]
CSA	CAN/CSA C22.2 No.14	■	■	■	■		■	■	■		■	■	■	■		■ [1]	■ [2]
CSA	CAN/CSA C22.2 No.213 (hazardous locations)	■	■	■	■		■	■	■		■	■	■	■		■ [1]	■ [2]
GL	GL	■	■	■	■						■	■ [3]	■ [4]	■			
GOST	GOST	■ [5]	■ [5]	■ [5]	■ [5]		■ [5]	■ [5]	■ [5]		■ [5]	■ [5]	■ [5]	■ [5]		■ [5]	■ [5]
Lloyds Register	Lloyds Register	■	■	■	■						■	■ [3]	■ [4]	■			
Marks																	
CE	CE	■	■	■	■		■	■	■		■	■	■	■		■	■
C-Tick	C-Tick	□	□	□	□		□	□	□		□	□	□	□		□	□

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[1] not for: CL-LAS-PS002, CL-LAS.TD001, CL-LAS.FD001, CL-LAS.TK002, CL-LAS.TK011
[2] not for: CL-LAD.TK006, CL-LAD.TK011, CL-LAD.FD002
[3] not for: CL-LDC.SDC2, CL-LDC.SAC2, CL-LDC.LAC2, CL-LDC.LNAC2
[4] not for: CL-LDR.16AC2
[5] May have been replaced by EAC during the availability of this catalog edition

Logic relays
Ordering details - Stand alone logic relays


2CDC 281 034 F0006

CL-LSR


2CDC 281 033 F0006

CL-LST

Ordering details - Logic relays stand alone

Rated operational voltage	Display + Keypad	Timer	Input / Output	Type	Order code	Price 1 pce	Weight (1 pce) kg (lb)
24 V AC	■	■	8 inputs / 4 relay outputs	CL-LSR.C12AC1	1SVR440712R0300		0.20 (0.44)
		■		CL-LSR.CX12AC1	1SVR440712R0200		
100-240 V AC	■			CL-LSR.12AC2	1SVR440713R0100		
	■	■		CL-LSR.C12AC2	1SVR440713R0300		
		■		CL-LSR.CX12AC2	1SVR440713R0200		
12 V DC	■	■		CL-LSR.C12DC1	1SVR440710R0300		
		■		CL-LSR.CX12DC1	1SVR440710R0200		
24 V DC	■			CL-LSR.12DC2	1SVR440711R0100		
	■			CL-LSR.C12DC2	1SVR440711R0300		
		■		CL-LSR.CX12DC2	1SVR440711R0200		
24 V DC	■	■	8 inputs / 4 transistor outputs	CL-LST.C12DC2	1SVR440711R1300		
		■		CL-LST.CX12DC2	1SVR440711R1200		


2CDC 281 028 F0006

CL-LDD.K

Ordering details - Display modules

Rated operational voltage	Description	Type	Order code	Price 1 pce	Weight (1 pce) kg (lb)
-	Graphic display 132 x 64 pixel	CL-LDD.XK	1SVR440839R4500		0.14 (0.30)
-	Graphic display 132 x 64 pixel, with keypad	CL-LDD.K	1SVR440839R4400		0.13 (0.29)
24 V DC	Module to displace the display from the logic relay, incl. connecting cable CL-LAD. TK007, 5m, lenght adaptable	CL-LDC.SDC2	1SVR440841R0000		0.16 (0.36)
100-240 V DC		CL-LDC.SAC2	1SVR440843R0000		0.16 (0.36)


2CDC 281 017 F0007

CL-LDC.S..

Logic relays
Ordering details - Expandable logic relays


2CDC 311 036 F0006

CL-LMR


2CDC 311 037 F0007

CL-LER


2CDC 311 038 F0006

CL-LEC

Ordering details - Logic relays expandable

Rated operational voltage	Display + Keypad	Timer	Input / Output	Type	Order code	Price 1 pce	Weight (1 pce) kg (lb)
24 V AC	■	■	12 inputs / 6 relay outputs	CL-LMR.C18AC1	1SVR440722R0300		0.36 (0.79)
		■		CL-LMR.CX18AC1	1SVR440722R0200		
100-240 V AC	■	■		CL-LMR.C18AC2	1SVR440723R0300		
		■		CL-LMR.CX18AC2	1SVR440723R0200		
12 V DC	■	■		CL-LMR.C18DC1	1SVR440720R0300		
		■		CL-LMR.CX18DC1	1SVR440720R0200		
24 V DC	■	■		CL-LMR.C18DC2	1SVR440721R0300		
		■		CL-LMR.CX18DC2	1SVR440721R0200		
24 V DC	■	■	12 inputs, 8 transistor outputs	CL-LMT.C20DC2	1SVR440721R1300		0.36 (0.79)
		■		CL-LMT.CX20DC2	1SVR440721R1200		

Ordering details - Expansions

Rated operational voltage	Description	Type	Order code	Price 1 pce	Weight (1 pce) kg (lb)
-	2 relay outputs	CL-LER.2O	1SVR440709R5000		0.07 (0.15)
100-240 V AC	12 inputs, 6 relay outputs	CL-LER.18AC2	1SVR440723R0000		0.26 (0.57)
24 V DC		CL-LER.18DC2	1SVR440721R0000		0.22 (0.49)
24 V DC	12 inputs, 8 transistor outputs	CL-LET.20DC2	1SVR440721R1000		0.21 (0.46)
-	Coupler unit for remote expansion with a distance of up to 30 m	CL-LEC.CI000	1SVR440709R0000		0.07 (0.15)

Logic relays
Ordering details



2CDC 311 012 F0007

CL-LAS.PS002



2CDC 311 014 F0007

CL-LAS.TK001



2CDC 311 013 F0007

CL-LAS.MD003

Ordering details - CL-LA...

Description	Type	Order code	Price 1 pce	Weight (1 pce) kg (lb)
Software for programming and control of CL range devices. Installation CD-ROM for Microsoft Windows™.	CL-LAS.PS002	1SVR440799R8000		0.10 (0.21)
Memory module for logic relays Memory size: 32 kB	CL-LAS.MD003	1SVR440799R7000		0.02 (0.04
Cable with serial interface to connect PC and logic relay. Length: 2 m	CL-LAS.TK001	1SVR440799R6000		0.10 (0.22)
Cable with USB interface to connect PC and logic relay. Length: 2 m	CL-LAS.TK002	1SVR440799R6100		0.06 (0.13)
Cable for point-to-point connection of remote-display connection module and logic relay, length: 5m, adaptable	CL-LAD.TK007	1SVR440899R6600		0.20 (0.44)
Fixing brackets for screw mounting of logic relay, expansion, display base module	CL-LAS.FD001	1SVR440799R5000		0.01 (0.01)
Spare plug (CL-LINK) for connection of logic relay to expansion	CL-LAS.TK011	1SVR440799R5100		0.10 (0.22)
Primary switch mode power supplies, Rated input voltage: 100-240 V AC Rated output voltage/current: 24 V DC / 0.42 A	CP-D 24/0.42[1)]	1SVR427041R0000		0.06 (0.13)
Primary switch mode power supplies, Rated input voltage: 100-240 V AC Rated output voltage/current: 24 V DC / 1.3 A	CP-D 24/1.3[2)]	1SVR427043R0100		0.19 (0.41)

[1)] replaces CL-LAS.SD001, technical data see chapter “Primary switch mode power supplies”
[2)] replaces CL-LAS.SD002, technical data see chapter “Primary switch mode power supplies”

Logic relays
Ordering details - Display systems



2CDC 311 028 F0006

CL-LDD.K


2CDC 311 031 F0006

CL-LDC.LN..



2CDC 311 018 F0007

CL-LAD.MD004


2CDC 311 019 F0007

CL-LAD.TK001


2CDC 311 020 F0006

CL-LAD.TK002

Ordering details - Display systems

Rated operational voltage	Description	Type	Order code	Price 1 pce	Weight (1 pce) kg (lb)
-	Display module Graphic display 132 x 64 pixel	CL-LDD.XK	1SVR440839R4500		0.14 (0.30)
-	Display module Graphic display 132 x 64 pixel, with keypad	CL-LDD.K	1SVR440839R4400		0.13 (0.29)
24 V DC	Display base module CPU / power supply	CL-LDC.LDC2	1SVR440821R0000		0.16 (0.36)
100-240 V AC		CL-LDC.LAC2	1SVR440823R0000		
24 V DC	Display base module CPU / power supply, networking-compatible (CL-NET)	CL-LDC.LNDC2	1SVR440821R1000		0.17 (0.38)
100-240 V AC		CL-LDC.LNAC2	1SVR440823R1000		
100-240 V AC	Display I/O module 12 inputs, 4 relay outputs	CL-LDR.16AC2	1SVR440853R0000		0.17 (0.38)
24 V DC		CL-LDR.16DC2	1SVR440851R0000		
24 V DC	Display I/O module 12 inputs, 4 relay outputs, 1 analog output	CL-LDR.17DC2	1SVR440851R2000		0.17 (0.38)
24 V DC	Display I/O module 12 inputs, 4 transistor outputs	CL-LDT.16DC2	1SVR440851R1000		0.14 (0.30)
24 V DC	Display I/O module 12 inputs, 4 transistor outputs, 1 analog output	CL-LDT.17DC2	1SVR440851R3000		0.14 (0.30)

Ordering details - CL-LAD...

Description	Type	Order code	Price 1 pce	Weight (1 pce) kg (lb)
Memory module for display base modules Memory size: 256 kB	CL-LAD.MD004	1SVR440899R7000		0.02 (0.03)
Cable with serial interface to connect PC and display base module	CL-LAD.TK001	1SVR440899R6000		0.11 (0.23)
Cable with USB interface to connect PC and display base module	CL-LAD.TK011	1SVR440899R6700		
Network cable (CL-NET) to connect 2 display base modules Length: 0.3 m	CL-LAD.TK002	1SVR440899R6100		0.05 (0.12)
Network cable (CL-NET) to connect 2 display base modules Length: 0.8 m	CL-LAD.TK003	1SVR440899R6200		0.07 (0.14)
Network cable (CL-NET) to connect 2 display base modules Length: 1.5 m	CL-LAD.TK004	1SVR440899R6300		0.08 (0.18)
Cable for point-to-point connection of remote display connection modules and display base module, length adaptable, Length: 5 m	CL-LAD.TK005	1SVR440899R6400		0.20 (0.44)
Cable for point-to-point connection of 2 display base modules, length adaptable. Length: 5 m	CL-LAD.TK006	1SVR440899R6500		0.12 (0.26)
Termination resistor, content: 2 pieces	CL-LAD.TK009	1SVR440899R6900		0.01 (0.02)
Protective cover, transparent, for harsh environmental conditions and application in the food industry	CL-LAD.FD001	1SVR440899R1000		0.03 (0.07)
Protective cover, transparent and sealable	CL-LAD.FD011	1SVR440899R2000		0.03 (0.07)
Assembly tool for mounting of display modules	CL-LAD.FD002	1SVR440899R3000		

Logic relays
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LSR.C...12DC1	CL-LSR....12DC2 CL-LST.C...12DC2	CL-LSR.C...12AC1	CL-LSR...12AC2
Input circuit - supply circuit					
Rated operational voltage U_e		12 V DC	24 V DC	24 V AC	100-240 V AC
Rated operational voltage tolerance		-15...+30 %	-15...+20 %	-15...+10 %	
Operational voltage range		10.2-15.6 V DC	20.4-28.8 V DC	20.4-26.4 V AC	85-264 V AC
Rated frequency		0 Hz		50/60 Hz	
Rated frequency tolerance		-		±5 %	
Residual ripple		≤ 5 %		-	
Input current	at 12 V DC	typ. 140 mA	-	-	-
	at 24 V DC	-	typ. 80 mA	-	-
	at 24 V AC	-	-	typ. 200 mA	-
	at 115/120 V AC (60 Hz)	-	-	-	typ. 40 mA
	at 230/240 V AC (50 Hz)	-	-	-	typ. 20 mA
Power failure buffering (IEC/EN 61131-2)		10 ms		20 ms	
Power dissipation	at 12 V DC	typ. 2 W	-	-	-
	at 24 V DC	-	typ. 2 W	-	-
	at 24 V AC	-	-	typ 5 VA	-
	at 115/120 V AC	-	-	-	typ. 5 VA
	at 230/240 V AC	-	-	-	typ. 5 VA

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Type		CL-LMR.C...18DC1	CL-LMR.C...18DC2 CL-LMT.C...20DC2	CL-LMR.C...18AC1	CL-LMR.C...18AC2
Input circuit - supply circuit					
Rated operational voltage U_e		12 V DC	24 V DC	24 V AC	100-240 V AC
Rated operational voltage tolerance		-15...+30 %	-15...+20 %	-15...+10 %	
Operational voltage range		10.2-15.6 V DC	20.4-28.8 V DC	20.4-26.4 V AC	85-264 V AC
Rated frequency		0 Hz		50/60 Hz	
Rated frequency tolerance		-		±5 %	
Residual ripple		≤ 5 %		-	
Input current	at 12 V DC	typ. 200 mA	-	-	-
	at 24 V DC	-	typ. 140 mA	-	-
	at 24 V AC	-	-	typ. 300 mA	-
	at 115/120 V AC (60 Hz)	-	-	-	typ. 70 mA
	at 230/240 V AC (50 Hz)	-	-	-	typ. 35 mA
Power failure buffering (IEC/EN 61131-2)		10 ms		20 ms	
Power dissipation	at 12 V DC	typ. 3.5 W	-	-	-
	at 24 V DC	-	typ. 3.5 W	-	-
	at 24 V AC	-	-	typ. 7 VA	-
	at 115/120 V AC	-	-	-	typ. 10 VA
	at 230/240 V AC	-	-	-	typ. 10 VA

Type		CL-LER.18DC2 CL-LET.20DC2	CL-LER.18AC2		
Input circuit - supply circuit					
Rated operational voltage U_e		24 V DC	100-240 V AC		
Rated operational voltage tolerance		-15...+20 %	-15...+10 %		
Operational voltage range		20.4-28.8 V DC	85-264 V AC		
Rated frequency		0 Hz	50/60 Hz		
Rated frequency tolerance		-	±5 %		
Residual ripple		≤ 5 %	-		
Input current	at 24 V DC	typ. 140 mA	-		
	at 115/120 V AC (60 Hz)	-	typ. 70 mA		
	at 230/240 V AC (50 Hz)	-	typ. 35 mA		
Power failure buffering (IEC/EN 61131-2)		10 ms	20 ms		
Power dissipation	at 24 V DC	typ. 3.4 W	-		
	at 115/120 V AC	-	typ. 10 VA		
	at 230/240 V AC	-	typ. 10 VA		

Logic relays
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LSR.C...12DC1	CL-LSR....12DC2 CL-LST.C...12DC2	CL-LSR.C...12AC1	CL-LSR.C...12AC2
Input circuit - Digital inputs		**12 V DC**	**24 V DC**	**24 V AC**	**115 / 230 V AC**
Number		8			
Inputs can be used as analog inputs		2 (I7, I8)			-
Indication of operational states		LCD-Display (if existing)			
Electrical isolation	from voltage supply	no			
	between digital inputs	no			
	from the outputs	yes			
Rated operational voltage U_e		12 V DC	24 V DC	24 V AC	
	U_e on „0“ signal	4 V DC (I1-I8)	< 5 V DC (I1-I8)	0-6 V AC (sinusoidal)	0-40 V AC (sinusoidal)
	U_e on „1“ signal	8 V DC (I1-I8)	> 15 V DC (I1-I6), > 8 V DC (I7, I8)	> 9,5 V DC, 14-26,4 V AC (sinusoidal) (I1-I6), > 7 V AC (sinusoidal) (I7,I8)	79-264 V AC (sinusoidal)
Rated frequency		-		50-60 Hz	
Input current on „1“ signal		3.3 mA (at 12 V DC, I1-I6), 1.1 mA (at 12 V DC, I7, I8)	3.3 mA (at 24 V DC, I6-I7), 2.2 mA (at 24 V DC, I7, I8)	4 mA (at 24 V AC, 50 Hz, I1-I6), 2 mA (at 24 V AC, 50 Hz, I7,I8), 2 mA (at 24 V DC, I7, I8)	6x0.25 mA (at 115 V AC, 60 Hz, I1-I6), 6x0.5 mA (at 230 V AC, 50 Hz, I1-I6) 2x4 mA (at 115 V AC, 60 Hz, I7, I8), 2x6 mA (at 230 V AC, 50 Hz, I7, I8)
Time delay from „0“ to „1“	debounce ON	20 ms		80 ms (at 50 Hz), 66 $^2/_3$ ms (at 60 Hz)	
	debounce OFF	typ. 0.3 ms (I1-I6), typ. 0.35 ms (I7, I8)	typ. 0,25 ms (I1-I8)	20 ms (at 50 Hz), 16 $^2/_3$ ms (at 60 Hz)	
Time delay from „1“ to „0“	debounce ON	20 ms		80 ms (at 50 Hz, 66 $^2/_3$ ms (at 60 Hz)	80 ms (at 50 Hz, I1-I6), 66 $^2/_3$ ms (at 60 Hz, I1-I6) 160 ms (at 50 Hz, I7, I8), 150 ms (at 60 Hz, I7, I8)
	debounce OFF	typ. 0.3 ms (I1-I6), typ. 0.15 ms (I7, I8)	-	20 ms (at 50 Hz), 16 $^2/_3$ ms (at 60 Hz)	20 ms (at 50 Hz, I1-I6), 16 $^2/_3$ ms (at 60 Hz, I1-I6) 100 ms (at 50 Hz, I7. I8), 100 ms (at 60 Hz, I7, I8)
Cable length (unshielded)		100 m		-	-
Maximum cable length per input		-		40 m	40 m (I1-I6), 100 m (I7, I8)
Frequency counter	Number	2 (I3, I4)		-	-
	counting frequency	< 1 kHz		-	-
	pulse shape	square-wave		-	-
	pulse / pause ratio	1:1		-	-
Rapid counter inputs	Number	2 (I1, I2)		-	-
	counting frequency	< 1 kHz		-	-
	pulse shape	square-wave		-	-
	pulse / pause ratio	1:1		-	-
Cable length (shielded)		< 20 m		-	-
Input circuit - Analog inputs					
Number		2 (I7, I8)			-
Electrical isolation	from voltage supply	no			-
	from the digital inputs	no			-
	from the outputs	yes			-
	from PC interface, memory module, CL-NET, CL-LINK	no			-
Input type		DC voltage			-
Signal range		0-10 V DC			-
Resolution	analog	0.01 V			-
	digital	0.01 V; 10 Bit (value 1-1023)			-
Input impedance		11.2 kΩ			-
Accuracy of the actual value	two CL devices	±3 %			-
	within one device	±2 %, ±0.12 V			-
Conversion time analog/digital	Input delay ON	20 ms			-
	Input delay OFF	each cycle			-
Input current		< 1 mA			-
Cable length (shielded)		< 30 m			-

Logic relays
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LMR.C...18DC1	CL-LMR.C...18DC2 CL-LMT.C...20DC2	CL-LMR.C...18AC1	CL-LMR.C...18AC2
Input circuit - Digital inputs		**12 V DC**	**24 V DC**	**24 V AC**	**115 / 230 V AC**
Number		12			
Inputs can be used as analog inputs		4 (I7, I8, I11, I12)			-
Indication of operational states		LCD-Display (if existing)			
Electrical isolation	from voltage supply	no			
	between digital inputs	no			
	from the outputs	yes			
	from PC interface, memory module, CL-NET, CL-LINK	no			yes
Rated operational voltage U_e		12 V DC	24 V DC	24 V AC	
	U_e on „0“ signal	4 V DC (I1-I12)	< 5 V DC (I1-I12, R1-R12)	0-6 V AC (sinusoidal)	0-40 V AC (sinusoidal)
	U_e on „1“ signal	8 V DC (I1-I12)	> 15 V DC (I1-I6, I9, I10) > 8 V DC (I7, I8, I11, I12)	> 9.5 V DC, 14-26.4 V AC (sinusoidal) (I1-I6, I9, I10) > 7 V AC (sinusoidal) (I7,I8; I11, I12)	79-264 V AC (sinusoidal)
Rated frequency		-		50-60 Hz	
Input current on „1“ signal		3.3 mA (at 12 V DC, I1-I6, I9-I12), 1.1 mA (at 12 V DC, I7, I8)	3.3 mA (at 24 V DC, I1-I6, I9, I10), 2.2 mA (at 24 V DC, I7, I8, I11, I12)	4 mA (at 24 V AC, 50 Hz, I1-I6, I9, I10), 2 mA (at 24 V AC, 50 Hz, I7, I8, I11, I12), 2 mA (at 24 V DC, I7, I8, I11, I12)	6x0.25 mA (at 115 V AC, 60 Hz, I1-I6), 6x0.5 mA (at 230 V AC, 50 Hz, I1-I6) 2x4 mA (at 115 V AC, 60 Hz, I7, I8), 2x6 mA (at 230 V AC, 50 Hz, I7, I8), 4x0.25 mA (at 115 V AC, 60 Hz, I9-I12), 4x0.5 mA (at 230 V AC, 50 Hz, I9-I12)
Time delay from „0“ to „1“	debounce ON	20 ms		80 ms (at 50 Hz), 66 2/3 ms (at 60 Hz)	
	debounce OFF	typ. 0.3 ms (I1-I6, I9, I10), typ. 0.35 ms (I7, I8, I11, I12)	typ. 0.25 ms	20 ms (at 50 Hz), 16 2/3 ms (at 60 Hz)	
Time delay from „1“ to „0“	debounce ON	20 ms		80 ms (at 50 Hz), 66 2/3 ms (at 60 Hz)	
	debounce OFF	typ. 0.4 ms (I1-I6, I9, I10), typ. 0.35 ms (I7, I8, I11, I12)	-	20 ms (at 50 Hz), 16 2/3 ms (at 60 Hz)	
Cable length (unshielded)		100 m			
Maximum cable length per input				max. 40 m, typ. 40 m (I9, I10)	typ. 40 m (I1-I6, I9-I12), typ. 100 m (I7, I8)
Frequency counter	number	2 (I3, I4)		-	-
	counting frequency	< 1 kHz		-	-
	pulse shape	square-wave		-	-
	pulse / pause ratio	1:1		-	-
Rapid counter inputs	number	2 (I1, I2)		-	-
	counting frequency	< 1 kHz		-	-
	pulse shape	square-wave		-	-
	pulse / pause ratio	1:1		-	-
Cable length (shielded)		< 20 m		-	-
Input circuit - Analog inputs					
Number		4 (I7, I8, I11, I12)			-
Electrical isolation	from voltage supply	no			-
	from the digital inputs	no			-
	from the outputs	yes			-
	from PC interface, memory module, CL-NET, CL-LINK	no			-
Input type		DC voltage			-
Signal range		0-10 V DC			-
Resolution	analog	0.01 V			-
	digital	0.01 V; 10 Bit (value 1-1023)			-
Input impedance		11.2 kΩ			-
Accuracy of the actual value	two CL devices	±3 %			-
	within one device	±2 %, ±0.12 V			-
Conversion time analog/digital	Input delay ON	20 ms			-
	Input delay OFF	each cycle			-
Input current		< 1 mA			-
Cable length (shielded)		< 30 m			-

Logic relays
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LER.18DC2 CL-LET.20DC2	CL-LER.18AC2
Input circuit - Digital inputs		**24 V DC**	**115 / 230 V AC**
Number		12	
Inputs can be used as analog inputs		-	
Indication of operational states		-	
Electrical isolation	from voltage supply	no	
	between digital inputs	no	
	from the outputs	yes	
	from PC interface, memory module, CL-NET, CL-LINK	no	
Rated operational voltage U_e		24 V DC	
	U_e on „0“ signal	< 5 V DC (I1-I12, R1-R12)	0-40 V AC (sinusoidal)
	U_e on „1“ signal	-	79-264 V AC (sinusoidal)
Rated frequency		-	50-60 Hz
Input current on „1“ signal		3.3 mA (at 24 V DC, R1-R12)	12x0.25 mA (at 115 V AC, 60 Hz, R1-R12), 12x0.5 mA (at 230 V AC, 50 Hz, R1-R12)
Time delay from „0“ to „1“	debounce ON	20 ms	80 ms (at 50 Hz, I1-I12, R1-R12), 66 2/3 ms (at 60 Hz, I1-I12, R1-R12)
	debounce OFF	typ. 0.25 ms (R1-R12)	20 ms (at 50 Hz, I1-I12, R1-R12), 16 2/3 ms (at 60 Hz, I1-I12, R1-R12)
Time delay from „1“ to „0“	debounce ON	20 ms	80 ms (at 50 Hz, I1-I12, R1-R12), 66 2/3 ms (at 60 Hz, I1-I12, R1-R12)
	debounce OFF	-	20 ms (at 50 Hz, I1-I12, R1-R12), 16 2/3 ms (at 60 Hz, I1-I12, R1-R12)
Cable length (unshielded)		100 m	-
Maximum cable length per input		-	typ. 40 m (I1-I6, I9-I12, R1-R12), typ. 100 m (I7, I8)

Logic relays
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LSR...	CL-LMR... CL-LER...	CL-LER.2O
Output circuit - Relay outputs				
Number		4	6	2
Outputs in groups of		1		2
Parallel switching of outputs to increase capacity		not permissible		
Fusing of the output relay		circuit-breaker B16 or fuse 8 A (slow-acting)		
Electrical isolation	from voltage supply	yes		
	from the inputs	yes		
	from PC interface, memory module, CL-NET, CL-LINK	no		
	protective separation	300 V AC		
	basic isolation	600 V AC		
Mechanical lifetime		$10x10^6$ switching cycles		
Rung	conventional thermal current (10 A UL)	8 A		
	recommended for load 12 V AC/DC	> 500 mA		
	short-circuit proof cos φ = 1; characteristic B16 at 600 A	16 A		
	short-circuit proof cos φ = 0,5 up to 0,7; characteristic B16 at 900 A	16 A		
	Rated impulse withstand voltage U_{imp} contact-coil	6 kV		
	Rated operational voltage U_e	250 V AC		
Rated insulation voltage U_i		250 V AC		
Protective separation (EN 50178)	between coil and contact	300 V AC		
	between two contacts	300V AC		
Making capacity	AC15, 250 V AC, 3 A (600 ops./h)	300.000 switching cycles		
	DC13, L/R ≤ 150 ms, 24 V DC, 1 A (500 ops./h)	200.000 switching cycles		
Breaking capacity	AC15, 250 V AC, 3 A (600 ops./h)	300.000 switching cycles		
	DC13, L/R ≤ 150 ms, 24 V DC, 1 A (500 ops./h)	200.000 switching cycles		
Incandesent lamp load	1000 W at 230/240 V AC	25.000 switching cycles		
	500 W at 115/120 V AC	25.000 switching cycles		
Fluorescent lamp load	10 x 58 W at 230/240 V AC with electrical control gear	25.000 switching cycles		
	10 x 58 W at 230/240 V AC uncompensated	25.000 switching cycles		
	1 x 58 W at 230/240 V AC conventional compensated	25.000 switching cycles		
Switching frequency	mechanical operations	$10x10^6$		
	switching frequency	10 Hz		
	resistive load / lamp load	2 Hz		
	inductive load	0.5 Hz		
UL/CSA				
Continuous current at 240 V		10 A AC		
Continuous current at 24 V		8 A DC		
AC	Utilization catagory (Control Circuit Rating Codes)	B 300 Light Pilot Duty		
	max. rated operational voltage	300 V AC		
	max. continuous thermal current cos φ = 1 at B 300	5 A		
	max. making / breaking apparent power (Make/Break) cos φ ≠ 1 at B 300	3600/360 VA		
DC	Utilization catagory (Control Circuit Rating Codes)	R 300 Light Pilot Duty		
	max. rated operational voltage	300 V DC		
	max. continuous thermal current at R 300	1 A		
	max. making / breaking apparent power (Make/Break) at R 300	28/28 VA		

Logic relays
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LST...	CL-LMT...	CL-LET...
Output circuit - Transistor outputs				
Number		4	8	
Rated operational voltage U_e		24 V DC		
Operational voltage range		20.4-28.8 V DC		
Residual ripple		≤ 5 %		
Supply current	on „0“ signal	typ. 9 mA / max. 16 mA	typ. 18 mA / max. 32 mA	
	on „1“ signal	typ. 12 mA / max. 22 mA	typ. 24 mA / max. 44 mA	
Reverse voltage protection		yes (Attention: If supply voltage is reversed, applying voltage at the outputs, causes a short circuit.)		
Electrical isolation	from voltage supply	yes		
	from the inputs	yes		
	from PC interface, memory module, CL-NET, CL-LINK	-		
Rated operational current I_e on „1“ signal DC		max. 0.5 A		
Lamp load without R_v		5 W		
Residual current on „0“ signal per channel		< 0.1 mA		
Max. output voltage	on „0“ signal at external load < 10 MΩ	2.5 V		
	on „1“ signal at I_e = 0.5 A	U = U_e - 1 V		
Short-circuit protection		yes, thermal (analysis results from diagnosis input I16, I15; R15, R16)		
Short-circuit tripping current for R_e ≤ 10 mΩ		0.7 A ≤ I_e ≤ 2 A per output		
Total short-circuit current		8 A	16 A	
Peak short-circuit current		16 A	32 A	
Thermal tripping		yes		
Max. switching frequency with constant resistive load R_L < 100 kΩ (depending on active channels and their load)		40.000 switching cycles/h		
Parallel connection of outputs	with resistive load, inductive load with external suppressor, combination within one group	group 1: Q1-Q4	group 1: Q1-Q4, group 2: Q5-Q8	group 1: S1-S4, group 2: S5-S8
	number of outputs	max. 4		
	max. total current	2 A (Attention! Outputs must be actuated simultaneously and for the same length of time.)		
Indication of operational states of the outputs		LCD-Display (if existing)		
Inductive load[1] without external suppressor				
$T_{0.95}$ = 1 ms, R = 48 Ω, L = 16 mH	utilization factor	0.25 g		
	duty time	100 %		
	max. switching frequency f = 0,5 Hz (max. duty time = 50 %)	1500 switching cycles		
DC13, $T_{0.95}$ = 72 ms, R = 48 Ω, L = 1.15 H	utilization factor	0.25 g		
	duty time	100 %		
	max. switching frequency f = 0,5 Hz (max. duty time = 50 %)	1500 switching cycles		
$T_{0.95}$ = 15 ms, R = 48 Ω, L = 0.24 H	utilization factor	0.25 g		
	duty time	100 %		
	max. switching frequency f = 0,5 Hz (max. duty time = 50 %)	1500 switching cycles		
Inductive load[1] with external suppressor				
	demand factor	1 g		
	duty time	100 %		
	max. switching frequency max. duty time	depends on suppressor		

[1] For inductive loading, without external suppression of the transistor outputs, the following applies:
$T_{0.95}$ = time in ms, until 95 % of the steady-state current is achieved. $T_{0.95}$ 3 × $T_{0.65}$ = 3 × L/R.

Data transfer rate in the CL-NET network: bus lengths of 40 m and over only attainable with cables with additional cross-section and connection adapter.

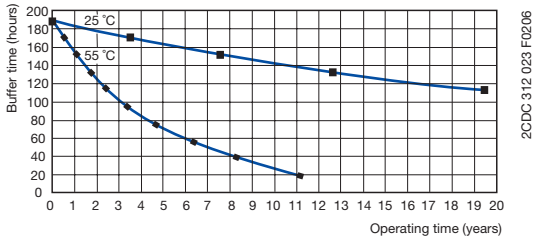
Logic relays
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LSR..., CL-LST...	CL-LMR... CL-LMT.. CL-LET.., CL-LER.18..	CL-LER.2O CL-LEC.CI000
General data				
Dimensions (W x H x D)		71.5 mm x 90 mm x 58 mm (2.81 inch x 3.54 inch x 2.28 inch)	107.5 mm x 90 mm x 58 mm (4.23 inch x 3.54 inch x 2.28 inch)	35.5 mm x 90 mm x 58 mm (1.40 inch x 3.54 inch x 2.28 inch)
Weight		0.2 kg (0.44 lb)	0.3 kg (0.66 lb)	0.07 kg (0.15 lb)
Mounting		DIN rail (IEC/EN 60715), 35 mm or screw mounting with fixing brackets CL-LAS.FD001 (accessories)		
Mounting position		horizontal / vertical		
Electrical connection				
Wire size	rigid	0.2-4 mm² (22–12 AWG)		
	fine-strand with wire end ferrule	0.2-2.5 mm² (22–12 AWG)		
Max. tightening torque		0.6 Nm		
Environmental data				
Ambient temperature range	operation	-25...+55 °C, cold acc. to IEC 60068-2-1, heat acc. to IEC 60068-2-2		
	storage	-40...+70 °C		
LCD-Display (clearly legible)		0...+55 °C		
Condensation		avoid condensation with suitable methods		
Humidity, no condensation (IEC/EN 60068-2-30)		5-95 %		
Air pressure (operation)		795-1080 hPa		
Degree of protection (IEC/EN 60529)		IP20		
Vibration (IEC/EN 60068-2-6)		10-57 Hz (constant amplitude 0.15 mm), 57-150 Hz (constant acceleration 2 g)		
Shock resistance (half-sine 15 g / 11 ms) (IEC/EN 60068-2-27)		18 Shocks		
Drop (IEC/EN 60068-2-31) height of fall		50 mm		
Free fall, packaged (IEC/EN 60068-2-32)		1 m		
Insulation data				
Overvoltage category		II		
Pollution degree (DIN EN 60947)		2		
Rating of air and creepage distances		EN 50178, UL 508, CSA C22.2, No. 142		
Insulation resistance		EN 50178		
Standards				
Standards and directives		EN 55011, EN 55022, IEC/EN 61000-4, IEC 60068-2-6, IEC 60068-2-27		
Electromagnetic compatibility				
Interference immunity				
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (air discharge 8 kV, contact discharge 6 kV)		
electromag. field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m		
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (supply cable 2 kV, signal lines 2 kV)		
powerful impulses (Surge)	IEC/EN 61000-4-5	supply cable symmetrical (AC) 2 kV, Level 2 (supply cable symmetrical (DC) 0.5 kV)		
HF line emission	IEC/EN 61000-4-6	10 V		
Interference suppression (EN 55011, EN 55022)		class B		
Real time clock				
Back-up time		see diagram		-
Accuracy		typ. ±5 (±0.5 h/year)		-
Repeat accuracy of the time relay				
Accuracy (from value)		±1		-
Resolution	range „S“	10 ms		-
	range „M:S“	1 s		-
	range „H:M“	1 min		-
Retention behaviour				
Write cycles of retention memory (minimum)		1.000.000 (10^6)		-

Technical diagram

Back-up time of the real time clock



Logic relays
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LDD...
Input circuit - Supply circuit		
Power failure buffering (IEC/EN 61131-2)		10 ms
General data		
Dimensions (W x H x D)		with keypad: 86.5 x 86.5 x 21.5 mm (3.41 x 3.41 x 0.85 inch) without keypad: 86.5 x 86.5 x 20 mm (3.41 x 3.41 x 0.79 inch)
Weight		0.13 kg (0.29 lb)
Mounting		2 x 22.5 mm, with 2 retainers screwed
Mounting position		horizontal / vertical
Environmental data		
Ambient temperature range	operation	-25...+55 °C (cold acc. to IEC 60068-2-1, heat acc. to IEC 60068-2-2)
	storage	-40...+70 °C
LCD-Display (clearly legible)		-5...+50 °C, -10...0 °C (with backlit / continuous operation)
Condensation		avoid condensation with suitable methods
Humidity, no condensation (IEC/EN 60068-2-30)		5-95 %
Air pressure (operation)		795-1080 hPa
Degree of protection (IEC/EN 60529)		IP65
Vibration (IEC/EN 60068-2-6)		10-57 Hz (constant amplitude 0.15 mm), 57-150 Hz (constant acceleration 2 g)
Shock resistance (half-sine 15 g / 11 ms) (IEC/EN 60068-2-27)		18 Shocks
Drop (IEC/EN 60068-2-31) height of fall		50 mm
Free fall, packaged (IEC/EN 60068-2-32)		1 m
Insulation data		
Pollution degree (DIN EN 60947)		3
Rating of air and creepage distances		EN 50178, UL 508, CSA 22.2, No 142
Insulation resistance		EN 50178
Standards		
Standards and directives		EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, IEC 60068-2-6, IEC 60068-2-27
Electromagnetic compatibility		
Interference immunity		
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (air discharge 8 kV, contact discharge 6 kV)
electromag. field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (supply cable 2 kV, signal lines 2 kV)
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 3 (supply cable symmetrical 2 kV, CL-LDC.L...AC2)
		Level 2 (0.5 kV supply cable symmetrical, CL-LDC.L...AC2)
HF line emission	IEC/EN 61000-4-6	10 V
Interference suppression (EN 55011, EN 55022)		class B

Logic relays
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LDC.SDC2	CL-LDC.SAC2	CL-LDC.LDC2	CL-LCD.LAC2	CL-LDC.LNDC2	CL-LDC.LNAC2
Input circuit - Supply circuit							
Rated operational voltage U_e		24 V DC	100-240 V AC	24 V DC	100-240 V AC	24 V DC	100-240 V AC
Rated operational voltage tolerance		-15...+20 %	-15...+10 %	-15...+20 %	-15...+10 %	-15...+20 %	-15...+10 %
Operational voltage range		20.4-28.8 V DC	85-264 V AC	20.4-28.8 V DC	85-264 V AC	20.4-28.8 V DC	85-264 V AC
Frequency		0 Hz	50/60 Hz	0 Hz	50/60 Hz	0 Hz	50/60 Hz
Frequency tolerance		-	± 5 %	-	± 5 %	-	± 5 %
Residual ripple		≤ 5 %	-	≤ 5 %	-	≤ 5 %	-
Input current	at 24 V DC	typ. 185 mA	-	typ. 200 mA	-	typ. 200 mA	-
	at 115/120 V AC (60 Hz)	-	typ. 90 mA	-	typ. 90 mA	-	typ. 90 mA
	at 230/240 V AC (50 Hz)	-	typ. 60 mA	-	typ. 60 mA	-	typ. 60 mA
Power failure buffering (IEC/EN 61131-2)		10 ms					
Power dissipation	at 24 V DC	1.5 W	-	3.4 W	-	3.4 W	-
	at 115/120 V AC	-	typ. 11 VA	-	typ. 11 VA	-	typ. 11 VA
	at 230/240 V AC	-	typ. 15 VA	-	typ. 15 VA	-	typ. 15 VA
Network - point-to-point connection							
Number of stations		1		-			
Data transfer rate	CL-LS..., CL-LM...	9,6 kBaud		-			
	CL-LDD	19,2 kBaud		-			
Distance		max. 5 m		-			
Electrical isolation	to voltage supply	yes		-			
	to connected device	yes		-			
Termination system		spring-type terminal		-			
Network - CL-NET							
Number of stations		max. 1		-		max. 8	
Data transfer rate	6 m	-				1000 kBit/s	
	25 m	-				500 kBit/s	
	40 m	-				250 kBit/s	
	125 m	-				125 kBit/s	
	300 m	-				50 kBit/s	
	700 m	-				20 kBit/s	
	1000 m	-				10 kBit/s	
Electrical isolation	to voltage supply	-				yes	
	to inputs	-				yes	
	to outputs	-				yes	
	to PC interface, memory module, CL-NET, CL-LINK	-				yes	
Bus terminator (first and last station)		-				yes	
Termination system		-				RJ45, 8 pole	
General data							
Dimensions (W x H x D)		75 x 58 x 36.2 mm (2.95 x 2.28 x 1.43 inch)		107.5 x 90 x 30 mm (4.23 x 3.54 x 1.18 inch)			
Weight		0.164 kg (0.36 lb)		0.145 kg (0.32 lb)			
Mounting		plugged onto CL-LDD		plugged onto CL-LDD or on DIN rail (IEC/EN 60715)			
Mounting position							
Electrical connection - Supply circuit							
Wire size	fine-strand with wire end ferrule	0.2 mm² / 2.5 mm² (24-12 AWG)					
	rigid	0.2 mm² / 4 mm² (24-12 AWG)					
Electrical connection - Data cable							
Wire size	fine-strand with wire end ferrule	0.08 mm² / 1.5 mm² (28-12 AWG)		-		0.2 mm² / 2.5 mm² (24-12 AWG)	
	rigid	0.08 mm² / 2.5 mm² (28-12 AWG)		-		0.2 mm² / 4 mm² (24-12 AWG)	
Environmental data							
Ambient temperature range	operation	-25...+55 °C (cold acc. to IEC 60068-2-1, heat acc. to IEC 60068-2-2)					
	storage	-40...+70 °C					
Condensation		avoid condensation with suitable methods					
Humidity, no condensation (IEC/EN 60068-2-30)		5-95 %					
Air pressure (operation)		795-1080 hPa					
Degree of protection (IEC/EN 60529)		IP20					
Vibration (IEC/EN 60068-2-6)		10-57 Hz (constant amplitude 0.15 mm), 57-150 Hz (constant acceleration 2 g)					

Logic relays
Technical data

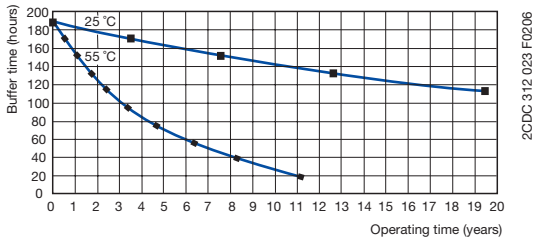
Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LDC.SDC2	CL-LDC.SAC2	CL-LDC.LDC2	CL-LCD.LAC2	CL-LDC.LNDC2	CL-LDC.LNAC2
Shock (half-sine 15 g / 11 ms) (IEC/EN 60068-2-27)		18 Shocks					
Drop (IEC/EN 60068-2-31) height of fall		50 mm					
Free fall, packaged (IEC/EN 60068-2-32)		1 m					
Insulation data							
Degree of protection (DIN EN 60947)		2					
Rating of air and creepage distances		EN 50178, UL 508, CSA 22.2, No 142					
Isolation resistance		EN 50178					
Standards							
Standards and directives		EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, IEC 60068-2-6, IEC 60068-2-27					
Electromagnetical compatibility							
Interference immunity							
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (air discharge 8 kV, contact discharge 6 kV)					
electromag. field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m					
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (supply cable 2 kV, signal lines 2 kV)					
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 3 (supply cable symmetrical 2 kV, CL-LDC.L...AC2)					
		Level 2 (1 kV supply cable symmetrical)		Level 2 (0.5 kV supply cable symmetrical, CL-LDC.L...AC2)			
HF line emission	IEC/EN 61000-4-6	10 V					
Interference suppression (EN 55011, EN 55022)		class B					
Real time clock							
Back-up time		-		see diagram			
Accuracy		-		typ. ± 5 s/day (± 0,5 h/year)			
Repeat accuracy of the time relay							
Accuracy (from value)		-		± 0.02 %			
Resolution	range „S“	-		5 ms			
	range „M:S“	-		1 s			
	range „H:M“	-		1 min			
Retention behaviour							
Write cycles of retention memory (minimum)		-		10^{10} (read/ write cycles)			

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Technical diagram

Back-up time of the real time clock



Logic relays
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LD...16DC2	CL-LD...17DC2	CL-LDR.16AC2
Input circuit - Digital inputs		24 V DC		115/230 V
Number		12		
Inputs can be used as analog inputs		4 (I7, I8, I11, I12)		-
Indication of operational states		-		LCD-Display (if existing)
Electrical isolation	from supply voltage	no		
	from digital inputs	no		
	from the outputs	yes		
	from PC interface, memory module, CL-NET, CL-LINK	yes		
Rated operational voltage U_e		24 V DC		-
	U_e on „0“ signal	< 5 V DC (I1-I6, I9, I10), < 8 V DC (I7, I8, I11, I12)		0-40 V AC (sinusoidal)
	U_e on „1“ signal	> 15 V DC (I1-I6, I9, I10), > 8 V DC (I7, I8, I11, I12)		79-264 V AC (sinusoidal)
Rated frequency		0 Hz		50-60 Hz
Input current on „1“ signal		3.3 mA (at 24 V DC, I1-I6, I9, I10), 2.2 mA (at 24 V DC, I7, I8, I11, I12)		12x0.2 mA (at 115 V AC, 60 Hz, I1-I12), 12x0.5 mA (at 230 V AC, 50 Hz, I1-I12)
Time delay from „0“ to „1“	debounce ON	20 ms		10 ms (at 50 Hz), 100 ms (at 60 Hz)
	debounce OFF	typ. 0.1 ms (I1-I4), typ. 0.25 ms (I5-I12)		10 ms (at 50 Hz), 100 ms (at 60 Hz)
Time delay from „1“ to „0“	debounce ON	20 ms		10 ms (at 50 Hz), 100 ms (at 60 Hz)
	debounce OFF	typ. 0.1 ms (I1-I4), typ. 0.4 ms (I5, I6, I9, I10), typ. 0.2 ms (I7, I8, I11, I12)		10 ms (at 50 Hz), 100 ms (at 60 Hz)
Cable length (unshielded)		100 m		-
Maximum cable length per input		-		typ. 60 m
Frequency counter	number	4 (I1, I2, I3, I4)		-
	counting frequency	< 3 kHz		-
	pulse shape	square-wave		-
	pulse / pause ratio	1:1		-
Incremental counter	number	2 (I1 + I2, I3 + I4)		-
	counting frequency	< 3 kHz		-
	pulse shape	square-wave		-
	signal offset	90°		-
	pulse / pause ratio	1:1		-
Rapid counter inputs	number	4 (I1, I2, I3, I4)		-
	counting frequency	< 3 kHz		-
	pulse shape	square-wave		-
	pulse / pause ratio	1:1		-
Cable length (shielded)		< 20 m		-
Input circuit - Analog inputs				
Number		4 (I7, I8, I11, I12)		-
Electrical isolation	to voltage supply	no		-
	to digital inputs	no		-
	to outputs	yes		-
	to PC interface, memory modul, CL-NET, CL-LINK	yes		-
Input type		DC voltage		-
Signal range		0-10 V DC		-
Resolution	analog	0.01 V		-
	digital	0.01 V; 10 Bit (value 0-1023)		-
Input impedance		11.2 kΩ		-
Accuracy of the actual value	two CL-LD... devices	± 3 %		-
	within one device	± 2 %		-
Conversion time analog/digital		each cycle		-
Input current		< 1 mA		-
Cable length (shielded)		< 30 m		-

Logic relays
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type			CL-LD...16DC2	CL-LD...17DC2	CL-LDR.16AC2
Output circuit - Analog outputs					
Number			-	1	-
Electrical separation		from voltage supply	-	no	-
		from the digital inputs	-	no	-
		from the digital outputs	-	yes	-
		from PC interface, memory module, CL-NET, CL-LINK	-	yes	-
Output type			-	DC voltage	-
Signal range			-	0-10 V DC	-
Max. output current			-	0.01 A	-
Burden resistance			-	1 kΩ	-
Overload and short-circuit protection			-	yes	-
Resolution		analog	-	0.01 V DC	-
		digital	-	10 Bit, (value: 0-1023)	-
Setting time			-	100 ms	-
Accuracy		-25...+55 °C	-	2 %	-
		25 °C	-	1 %	-
Conversion time			-	each CPU cycle	-
General data					
Dimensions (W x H x D)			CL-LDR: 89 x 90 x 44 mm (3.5 x 3.54 x 1.73 inch)		89 x 90 x 44 mm
			CL-LDT (build-in): 89 x 90 x 25 mm (3.5 x 3.54 x 0.98 inch)		(3.5 x 3.54 x 1.73 inch)
Weight			CL-LDR: 0.15 kg (0.33 lb) / CL-LDT: 014 kg (0.31 lb)		0.15 kg (0.33 lb)
Mounting			snap-on power supply unit		
Mounting position			horizontal / vertical		
Electrical connection					
Wire size		fine-strand with wire end ferrule	0.2 mm² / 2.5 mm² (24-12 AWG)		
		rigid	0.2 mm² / 4 mm² (24-12 AWG)		
Electrical connection - Data cable					
Wire size		fine-strand with wire end ferrule	0.08 mm² / 1.5 mm² (28-12 AWG)		
		rigid	0.08 mm² / 2.5 mm² (28-12 AWG)		
Environmental data					
Ambient temperature range		operation	-25...+55 °C (cold acc. to IEC 60068-2-1, heat acc. to IEC 60068-2-2)		
		storage	-40...+70 °C		
Condensation			avoid condensation with suitable methods		
Humidity, no condensation (IEC/EN 60068-2-30)			5-95 %		
Atmospheric pressure (operation)			795-1080 hPa		
Degree of protection (IEC/EN 60529)			IP20		
Vibration (IEC/EN 60068-2-6)			10-57 Hz (constant amplitude 0.15 mm), 57-150 Hz (constant acceleration 2 g)		
Shock (half-sine 15 g / 11 ms) (IEC/EN 60068-2-27)			18 Shocks		
Drop (IEC/EN 60068-2-31) height of fall			50 mm		
Free fall, packaged (IEC/EN 60068-2-32)			1 m		
Insulation data					
Pollution degree			2		
Rating of air and creepage distances			EN 50178, UL 508, CSA C22.2, No. 142		
Isolation resistance			EN 50178		
Standards					
Standards and directives			EN 61000-6-1/-2/-3/-4, IEC/EN 61000-4, IEC 60068-2-6, IEC 60068-2-27		
Electromagnetic compatibility					
electrostatic discharge (ESD)	IEC/EN 61000-4-2		Level 3 (air discharge 8 kV, contact discharge 6 kV)		
electromag. field (HF radiation res.)	IEC/EN 61000-4-3		10 V/m		
fast transients (Burst)	IEC/EN 61000-4-4		Level 3 (supply cable 2 kV, signal cable 2 kV)		
powerful impulses (Surge)	IEC/EN 61000-4-5		2 kV (supply cable symmetrical), Level 2 (0.5 kV supply cable symmetrical)		
HF line emission	IEC/EN 61000-4-6		10 V		
Interference suppression (EN 55011, EN 55022)			class B		

Logic relays
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LDR...
Output circuit - Relay outputs		
Number		4
Outputs in groups of		-
Parallel switching of outputs to increase capacity		not permissible
Fusing of the output relay		circuit-breaker B16 or fuse 8 A (slow-acting)
Electrical isolation	from voltage supply	yes
	from the inputs	yes
	from PC interface, memory module, CL-NET, CL-LINK	yes
	protective separation	300 V AC
	Basic isolation	600 V AC
Mechanical lifetime		$10x10^6$ switching cycles
Rung	conventional thermal current (10 A UL)	8 A
	recommended load 12 V AC/DC	> 500 mA
	short-circuit proof cos φ = 1; characteristic B16 at 600 A	16 A
	short-circuit proof cos φ = 0.5 up to 0.7; characteristic B16 at 900 A	16 A
	Rated impulse withstand voltage U_{imp} contact-coil	6 kV
	Rated operational voltage U_e	250 V AC
Rated insulation voltage U_i		250 V AC
Protective separation (EN 50178)	between coil and contact	300 V AC
	between two contacts	300V AC
Making capacity	AC15, 250 V AC, 3 A (600 ops./h)	300.000 switching cycles
	DC13, L/R ≤ 150 ms, 24 V DC, 1 A (500 ops./h)	200.000 switching cycles
Breaking capacity	AC15, 250 V AC, 3 A (600 ops./h)	300.000 switching cycles
	DC13, L/R ≤ 150 ms, 24 V DC, 1 A (500 ops/h)	200.000 switching cycles
Incandesent lamp load	1000 W at 230/240 V AC	25.000 switching cycles
	500 W at 115/120 V AC	25.000 switching cycles
Fluorescent lamp load	10 x 58 W at 230/240 V AC with electrical control gear	25.000 switching cycles
	10 x 58 W at 230/240 V AC uncompensated	25.000 switching cycles
	1 x 58 W at 230/240 V AC conventional compensated	25.000 switching cycles
Switching frequency	mechanical operations	$10x10^6$
	switching frequency	10 Hz
	resistive load / lamp load	2 Hz
	inductive load	0.5 Hz
UL/CSA		
Continuous current at 240 V		10 A AC
Continuous current at 24 V		8 A DC
AC	Utilization category (Control Circuit Rating Codes)	B 300 Light Pilot Duty
	max. rated operational voltage	300 V AC
	max. continuous thermal current cos φ = 1 at B 300	5 A
	max. making / breaking apparent power (Make/Break) cos φ ≠ 1 at B 300	3600/360 VA
DC	Utilization category (Control Circuit Rating Codes)	R 300 Light Pilot Duty
	max. rated operational voltage	300 V DC
	max. continuous thermal current at R 300	1 A
	max. making / breaking apparent power (Make/Break) at R 300	28/28 VA

Logic relays
Technical data

Data at T_a = 25 °C and rated values, if nothing else indicated.

Type		CL-LDT...
Output circuit - Transistor outputs		
Number		4
Rated operational voltage U_e		24 V DC
Operational voltage range		20.4-28.8 V DC
Residual ripple		-
Supply current	on „0“ signal	typ. 18 mA / max. 32 mA
	on „1“ signal	typ. 24 mA / max. 44 mA
Reverse voltage protection		yes (Attention: If supply voltage is reversed, applying voltage at the outputs, causes a short circuit.)
Electrical isolation	from voltage supply	yes
	from the inputs	yes
	from PC interface, memory module, CL-NET, CL-LINK	yes
Rated operational current I_e on „1“ signal DC		max. 0.5 A
Lamp load without R_v		5 W (Q1-Q4)
Residual current on „0“ signal per channel		< 0.1 mA
Max. output voltage	on „0“ signal at external load < 10 MΩ	2.5 V
	on „1“ signal at I_e = 0.5 A	$U = U_e$ - 1 V
Short-circuit protection		thermal (Q1-Q4), (analysis results from diagnosis input I16)
Short-circuit tripping current for $R_a \leq 10$ mΩ		0.7 A $\leq I_e \leq$ 2 A per output
Total short-circuit current		8 A
Peak short-circuit current		16 A
Thermal tripping		yes
Max. switching frequency with constant resistive load R_L < 100 kΩ (depending on active channels and their load)		40.000 switching cycles/h
Parallel connection of outputs	with resistive load, inductive load with external suppressor, combination within one group	group 1: Q1-Q4
	number of outputs	max. 4
	max. total current	2 A (Attention! Outputs must be actuated simultaneously and for the same length of time.)
Indication of operational states of the outputs		LCD-Display (if existing)
Inductive load[1] without external suppressor		
$T_{0.95}$ = 1 ms, R = 48 Ω, L = 16 mH	utilization factor	0.25 g
	duty time	100 %
	max. switching frequency f = 0,5 Hz (max. duty time = 50 %)	1500 switching cycles
DC13, $T_{0.95}$ = 72 ms, R = 48 Ω, L = 1.15 H	utilization factor	0.25 g
	duty time	100 %
	max. switching frequency f = 0,5 Hz (max. duty time = 50 %)	1500 switching cycles
$T_{0.95}$ = 15 ms, R = 48 Ω, L = 0.24 H	utilization factor	0.25 g
	duty time	100 %
	max. switching frequency f = 0,5 Hz (max. duty time = 50 %)	1500 switching cycles
Inductive load[1] with external suppressor		
	demand factor	1 g
	duty time	100 %
	max. switching frequency max. duty time	depends on suppressor

[1] For inductive loading, without external suppression of the transistor outputs, the following applies:
$T_{0.95}$ = time in ms, until 95 % of the steady-state current is achieved. $T_{0.95}$ 3 × $T_{0.65}$ = 3 × L/R.

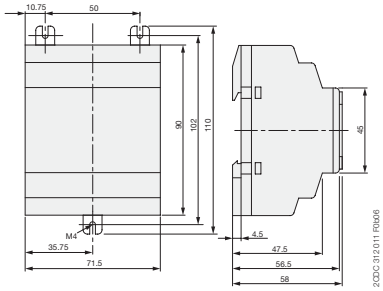
Data transfer rate in the CL-NET network: bus lengths of 40 m and over only attainable with cables with additional cross-section and connection adapter.

Logic relays
Dimensional drawings

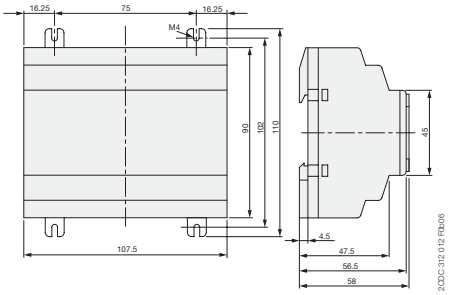
Dimensional drawings

dimensions in mm

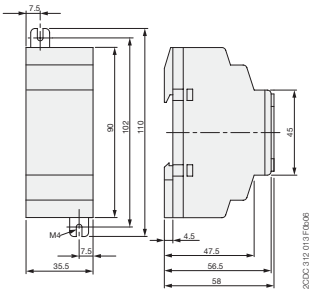
CL-LSR, CL-LST



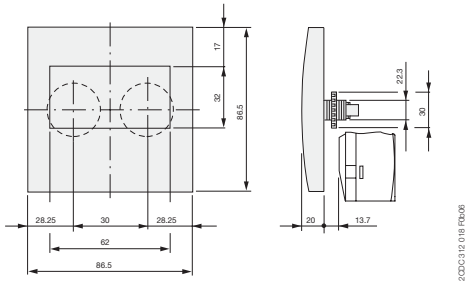
CL-LMR, CL-LMT



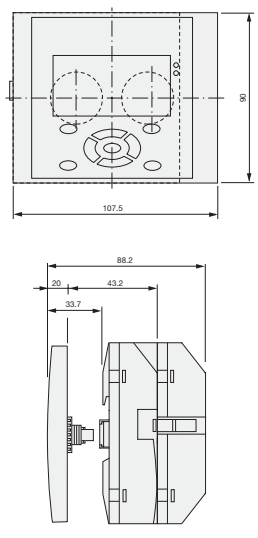
CL-LER.2O



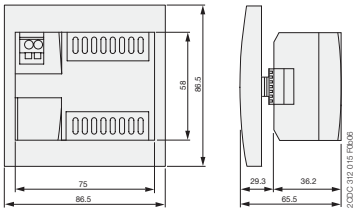
CL-LDD



CL-LDD.K + CL-LDC.L.. + (CL-LDR or CL-LDT)



CL-LDC.S..



CL-LDR, CL-LDT

