

# Logic relays and display system CL range

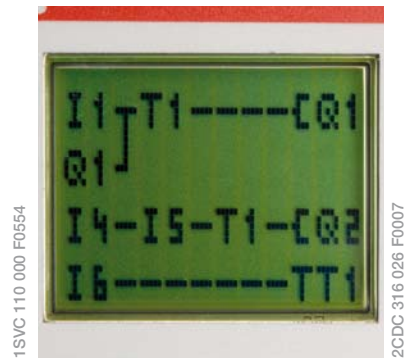
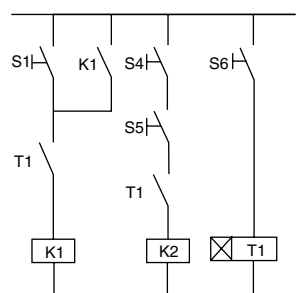


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# Logic relays and display system CL range



**T**he logic relays of the CL range are ideally suited for small and medium-sized control applications. They can replace traditional wiring easily and quickly and offer several software functions such as time relays, up/down counters, week/year time switches, analogue value comparators, editable text displays, flags and auxiliary contacts. The comprehensive modular display system completes the product range. It can be used as a MMI logic relay in stand-alone or network operations or as a remote display for the CL range logic relays.



### Conventional wiring diagram – logic links

The "electronic wiring" via programming buttons and the built-in LCD display replaces conventional designs such as several individually mounted and wired devices. This way, not only significant time and cost savings are possible, but also error sources can be eliminated and the flexibility in operation is enhanced.

### Approvals/Marks

- (depending on device)
- UL 508, CAN/CSA C22.2 No.14,
- CAN/CSA C22.2 No.213 (hazardous locations),
- GOST, Lloyds Register/ CE, C-Tick



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### At home in OEM applications ...

Logic relays are ideally suited for repeat applications: A program that has once been designed and tested can be used over and over again. This saves time, cuts cost and eliminates error sources.

The programming software CL-SOFT provides easy programming of the logic relays in the familiar way (circuit diagram display).

### ... and in individual assemblies.

In individual setups, logic relays offer many advantages as well. Because of their compact dimensions, panel boards can be reduced in dimension. Also, their comprehensive functions make it possible to replace several traditionally wired circuits that previously would have been wired and set-up manually. This way, storage costs and the complexity of installation and wiring can be easily reduced.



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A single device combines several individual functions

### Voltage loss – program saved

Non-volatile safety ensures that the wiring diagrams saved in the logic relay are not lost in case of voltage loss. An external back-up battery or auxiliary voltage is not needed. Thus, the logic relays of the CL range are absolutely maintenance-free.

Additionally to the program itself, all values and switch positions are saved in the relay and are immediately available as soon as the relay is switched-on.

### Play it safe

The logic relays offer the possibility to save your program on an external memory card. This gives you the possibility to easily transfer one program to several logic relays. Also, the memory cards can be used as backup modules for more safety in operation.



## Logic relays CL range for mounting on DIN rails



Logic relays of the CL range are programmable switching and control relays with logical, timer, counter and time switch functions. They are used as a replacement for "wiring-programmed" relay and contactor circuits. The wiring logic is easily keyed-in as a contact diagram via the keypad and onboard display. Alternatively, the CL-SOFT programming software can be used.

### Characteristics of the CL range

- Rated control supply voltages: 24 V AC, 100-240 V AC, 12 V DC and 24 V DC
- Devices with and without display and keypad
- 128 current paths with 3 contacts (NC or NO) each, serial connected, and 1 coil
- 16 user and information messages (only devices with display)
- 2 high-speed inputs 1 kHz (only DC variants)

### CL-LSR and CL-LST

- Suitable for small control functions with up to 12 input/output signals
- 8 digital inputs, 2 of which can be used as analogue inputs (analogue inputs only with 24 V DC versions)
- 4 relay or 4 transistor outputs
- With or without real-time clock

### CL-LMR and CL-LMT

- Suitable for control functions with up to 40 input/output signals (access via connection of local or decentral extension modules)
- 12 digital inputs, 4 of which can be used as analogue inputs (analogue inputs only with 24 V DC variants)
- 6 relay or 8 transistor outputs
- real-time clock
- 1 digital extension or network connection



### Functional range of the logic relays of the CL range

- Counter functions  
Up/down counters, frequency counters, fast counters, operational hours counters
- Timer functions  
Weekly and yearly time switches, time relays from 0.02 s to 99 h 59 min (ON-delay, OFF-delay, impulse formers, flashing, star-delta timers)
- Arithmetic functions  
Analogue value comparators
- Markers / auxilliary relays
- Program sequence functions  
Steps, conditional steps, master reset
- Text functions  
freely editable text displays



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**Expandability of the logic relays of the CL-LMR/T range**

decentral extension



local extension



up to 30 m



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**On-board display and keypad**

(depending on device)  
The on-board display provides information about the device configuration as well as the saved program. The program is displayed as a circuit diagram and can easily be modified via the keypad, if required. NO and NC contacts as well as coils can be connected or configured via key-press. A current flow display shows the active current flows.



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**Digital / analogue inputs**

8/12 digital inputs are available, 2/4 of which can alternatively be used as analogue inputs (depending on device).



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**Relay or transistor outputs**

The CL range provides devices with 4/6 or 4/8 transistor outputs.



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**CL-SOFT**

Programming, setup, storage, simulation and documentation are easily handled with the compact and powerful software package CL-SOFT.



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**Remote display**

Logic relays can be read out and remotely controlled with a separate remote display. The remote display offers the full functionality of the on-board display. Special programming of the remote display is not necessary.

## Display system CL range for front-panel mounting



The display system of the CL range is a programmable device with display, operation, switching and control functions. It is used to replace relays and contactor controls as well as a control and display unit and is suitable for front-panel mounting in all kinds of panel boards and control cabinets. The integrated network solution CL-NET provides the connection of up to 8 CL-NET devices to form a control system where each of the CL-NET devices can run a separate program. Thus, fast and easy setting up of decentralised and intelligent control systems is possible.

### Characteristics of the display systems of the CL range

- Rated control supply voltages: 24 V DC, 100-240 V AC
- 256 current paths with 4 contacts (NC or NO) each, serial connected, and 1 coil
- 2 high-speed inputs
- Suitable for advanced control functions with up to 8 x 30/32 input/output signals (obtainable by connection of local or decentral extension modules)
- 12 digital inputs, 4 of which can be used as analogue inputs (analogue inputs only with 24 V DC versions)
- 1 analogue output (depending on device)
- 4 relays or 4 transistor outputs
- 24 kB memory
- Full-graphic display module with 64x132 pixels and independently controlled backlight
- Freely programmable LEDs for status indication
- 1 digital extension or network coupling
- Network CL-NET for up to 8 devices

### Functional range of the display systems of the CL range

- Counter functions: Up/down counters, frequency counters, high speed counters, incremental value counters, operational hour counters
- Timer functions: Weekly and yearly time switches, time relays from 0.005 s to 99 h 59 min (ON-delay, OFF-delay, ON- and OFF-delay, impulse formers, flashing)
- Arithmetic functions: Analogue value comparators, adder, subtractor, PID controller, PT1 signal smoothing filter, value scaler, value convertor, pulse-width modulation, value limiter
- Program sequence functions: Steps, conditional steps, master reset
- Memory functions: Block comparison, block transfer, boolean operations (AND, OR, NOT), comparator, data module, shift register, table function
- Communication functions: CL-NET value import/export, bit input/output via CL-NET, diagnostic fields, clock synchronisation via CL-NET





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- Text functions: Static text, text messages, mask menu, scrolling text, rolling text
- Value input functions: Date/time, weekly and yearly time switches, locked pushbutton, switchpad, time relay value
- Value display functions: bit display, bitmap message, bar graph, numerical value, time relay value

### Lone fighter or team player – both in one

The modular design of the MMI logic relays is ideally suited both for use as stand-alone devices or within CL-NET. CL-NET allows the connection of up to 8 MMI logic relays. The network can spread over a distance of up to 1000 metres. Each individual device can either execute its own program or "only" act as remote input/output modules. Via CL link the local connection of additional display input/output modules is possible. This way, a fully developed network can comprise of more than 300 input/output points.



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### Intelligent eye catcher – MMI logic relay

By combining a display module, display base module and display input/output module, a powerful display, operation, programming and operating unit is formed that fully matches the functionality of a compact logic relay. All components can easily be plugged together without any additional wiring.



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### Easy connection

The serial interface provides connection for the 256 kB memory module or a PC to the display base module.



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### Artistic talents

The full-graphic display is capable of a variety of advanced display functions. Its integrated backlight makes it look good even in the dark.



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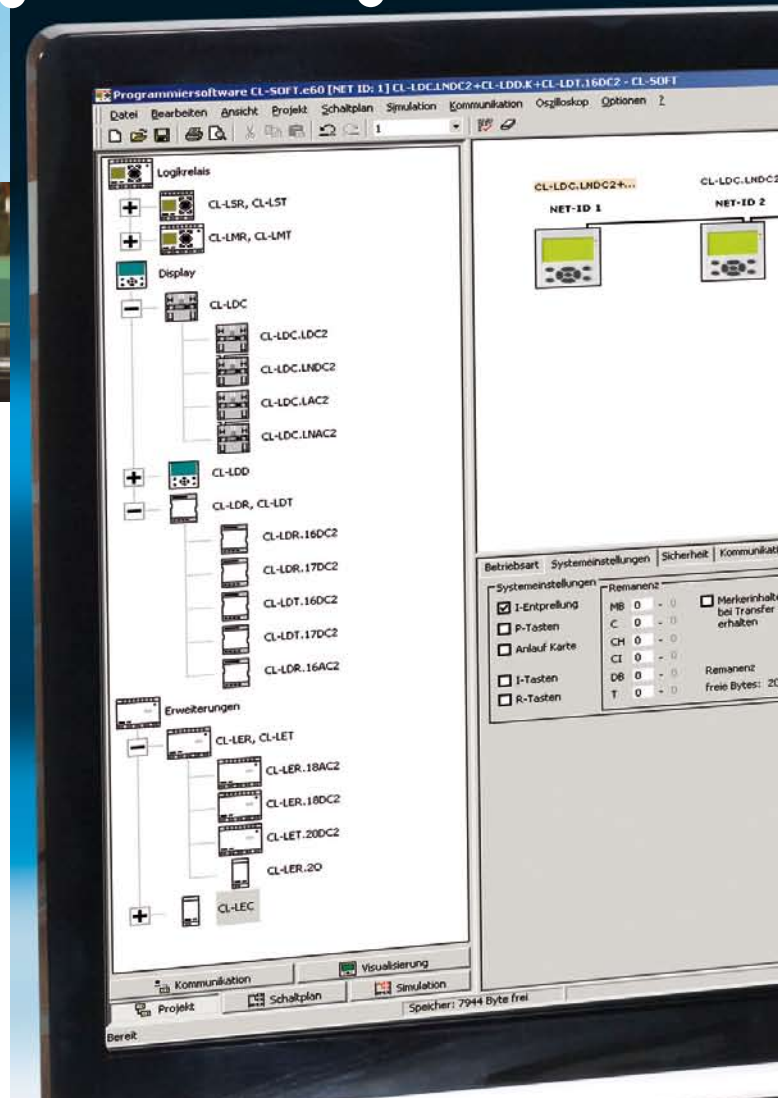
### A tough companion

Thanks to IP65 protection the display modules can also be used in severe environmental conditions.



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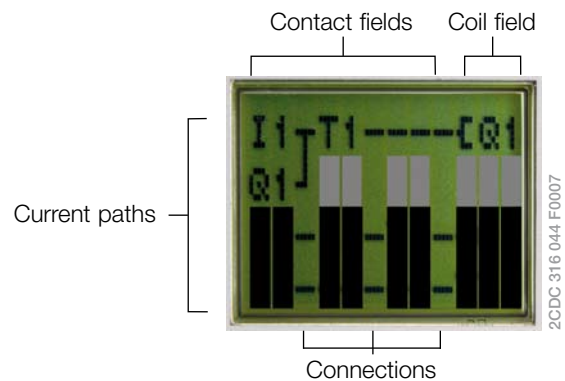
# Programming software CL-SOFT



**W**ith the programming software CL-SOFT you can design, test and manage wiring diagrams. The programming software provides all necessary functions to design wiring diagrams and simulate the modules under real-world conditions.

With CL-SOFT, wiring diagrams can be transferred from the PC to the logic relay or display system and vice-versa. Also, logic relays and display systems can be saved for specific unit types.

CL-SOFT offers three different formats for the development of the current flow diagram: DIN/IEC, ANSI/CSA or the device-specific CL format. This allows an easy, comfortable and fast design process of the wiring diagrams.



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## Entering wiring diagrams

In the CL wiring diagram, switching contacts and coils are wired from left to right – from contact to coil. Individual elements are entered in a fixed pattern comprised by contact and coil fields and current paths.

The logic relays of the CL range offer 3, the display system 4 contact fields per current path. At every end of each current path, a coil field is located.





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### Multi-language ability

The programming software CL-SOFT can be installed in different languages.

So, nothing gets in the way of world-wide operation.

### Display formats

The choice between an IEC (international standard) display with contact and coil symbols or an ANSI (american standard) display provides easy and fast input of wiring diagrams in any way that suits the users' individual habits.

### Clear design

Individual wiring diagram elements can be assigned with names or comments, allowing easily understandable and clear wiring diagram design.

### Program storage

Programs are saved on the PC and can be transferred into the logic relay via interface cable at any time.

### Simulation

The simulation function of CL-SOFT enables you to test the entered wiring diagram offline, without connection of the logic relay. This way you can safely and easily check the program before starting live operation.

### Documentation

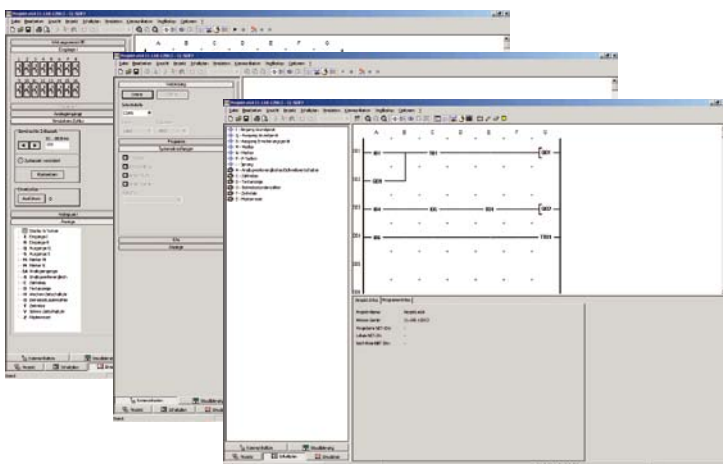
The programs designed with CL-SOFT can be printed as user documentation. The individual design of the cover sheet with your own company's logo as well as with comments and cross-references is possible.

### Online help

CL-SOFT comes with a detailed help function. In addition to the familiar index search help, CL-SOFT also offers pre-defined training courses to help the user get acquainted with the software and its various functions.

### Always the right view

The PC programming software CL-SOFT provides multiple display modes for every project. Available are project, current flow diagram, simulation, communication and visualising windows.



## Extensions for the logic relays and display system of the CL range



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The logic relays CL-LMx and the display system of the CL range can be extended both locally or decentrally with further relay or transistor outputs.

A local extension is realised by simply adding the extension module to the base unit with CL-LINK. A coupling module serves as the connection between the base module and the extension. The extension module can be installed and operated within a range of up to 30 m.

### Base modules and extensions

- 1 Logic relays: CL-LMR..., CL-LMT..
- 2 Display system: CL-LDD.. + CL-LDC.. + CL-LDR.. or CL-LDT..
- 3 CL-LINK connector CL-LAS.TK011 to connect extensions
- 4 Output extension CL-LER.2O
- 5 Input/output extensions CL-LER..., CL-LET..
- 6 Coupling unit CL-LEC.CI00 for remote extensions

### Extension attributes

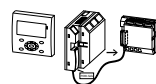
- Suitable for advanced control functions with up to 40 input/outputs altogether
- 12 digital inputs in addition to the base module
- 2/6 relay outputs or alternatively 8 transistor outputs in addition to the base module
- decentral remote extension of up to 30 m
- base module with relais outputs can be combined with extension with transistor outputs



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### Extensions via CL-LINK

The connection between the CL base unit and a local extension or coupling unit to the remote extension is carried out with the data connector CL-LINK.



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### Point-to-point connection via COM-LINK

With serial connection through COM-LINK, the bus devices take over different functions. While the active device controls the interface, the remote device "only" reacts on queries of the active device.

# Selection guides and order references for logic relays

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## Logic relays CL range

Type	Rated operational voltage	Digital inputs	Useable as analog inputs	Relay outputs	Transistor outputs	Display + keypad	Real time clock (timer)	Expandable	Order code
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### Logic relay

CL-LSR.C12AC1	24 V AC	8	2	4	-	■	■	-	1SVR 440 712 R0300
CL-LSR.CX12AC1	24 V AC	8	2	4	-	-	■	-	1SVR 440 712 R0200
CL-LSR.12AC2	100-240 V AC	8	-	4	-	■	-	-	1SVR 440 713 R0100
CL-LSR.C12AC2	100-240 V AC	8	-	4	-	■	■	-	1SVR 440 713 R0300
CL-LSR.CX12AC2	100-240 V AC	8	-	4	-	-	■	-	1SVR 440 713 R0200
CL-LSR.C12DC1	12 V DC	8	2	4	-	■	■	-	1SVR 440 710 R0300
CL-LSR.CX12DC1	12 V DC	8	2	4	-	-	■	-	1SVR 440 710 R0200
CL-LSR.12DC2	24 V DC	8	2	4	-	■	-	-	1SVR 440 711 R0100
CL-LSR.C12DC2	24 V DC	8	2	4	-	■	■	-	1SVR 440 711 R0300
CL-LSR.CX12DC2	24 V DC	8	2	4	-	-	■	-	1SVR 440 711 R0200
CL-LST.C12DC2	24 V DC	8	2	-	4	■	■	-	1SVR 440 711 R1300
CL-LST.CX12DC2	24 V DC	8	2	-	4	-	■	-	1SVR 440 711 R1200
CL-LMR.C18AC1	24 V AC	12	2	6	-	■	■	■	1SVR 440 722 R0300
CL-LMR.CX18AC1	24 V AC	12	2	6	-	-	■	■	1SVR 440 722 R0200
CL-LMR.C18AC2	100-240 V AC	12	-	6	-	■	■	■	1SVR 440 723 R0300
CL-LMR.CX18AC2	100-240 V AC	12	-	6	-	-	■	■	1SVR 440 723 R0200
CL-LMR.C18DC1	12 V DC	12	2	6	-	■	■	■	1SVR 440 720 R0300
CL-LMR.CX18DC1	12 V DC	12	2	6	-	-	■	■	1SVR 440 720 R0200
CL-LMR.C18DC2	24 V DC	12	2	6	-	■	■	■	1SVR 440 721 R0300
CL-LMR.CX18DC2	24 V DC	12	2	6	-	-	■	■	1SVR 440 721 R0200
CL-LMT.C20DC2	24 V DC	12	2	-	8	■	■	■	1SVR 440 721 R1300
CL-LMT.CX20DC2	24 V DC	12	2	-	8	-	■	■	1SVR 440 721 R1200

### Expansions for logic relays

CL-LER.20	-	-	-	2	-	-	-	-	1SVR 440 709 R5000
CL-LER.18AC2	100-240 V AC	12	-	6	-	-	-	-	1SVR 440 723 R0000
CL-LER.18DC2	24 V DC	12	-	6	-	-	-	-	1SVR 440 721 R0000
CL-LET.20DC2	24 V DC	12	-	-	8	-	-	-	1SVR 440 721 R1000

### Coupler unit for remote expansion with a distance of up to 30 m

CL-LEC.CI000	-	-	-	-	-	-	-	-	1SVR 440 709 R0000
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## Accessories CL range

Type	For logic relay	For display system	Description	Order code
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### Accessories for logic relays and display system

CL-LAS.PS002	■	■	Software for programming and control of CL range devices	1SVR 440 799 R8000
CL-LAS.MD003	■	-	Memory module for logic relays (32 kB)	1SVR 440 799 R7000
CL-LAD.MD004	-	■	Memory module for display base modules (256 kB)	1SVR 440 899 R7000
CL-LAS.TK001	■	-	Cable with serial interface to connect PC and logic relay (length 2m)	1SVR 440 799 R6000
CL-LAD.TK001	-	■	Cable with serial interface to connect PC and display base module (length 2 m)	1SVR 440 899 R6000
CL-LAS.TK002	■	-	Cable with USB interface to connect PC and logic relay	1SVR 440 799 R6100
CL-LAD.TK011	-	■	Cable with USB interface to connect PC and display base module	1SVR 440 899 R6700
CL-LAD.TK002	-	■	Network cable (CL-NET) to connect 2 display base modules (length 0.3 m)	1SVR 440 899 R6100





## Display system CL range

Type	Description	Rated operational voltage	Order code
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### Display modules

CL-LDD.XK	Graphic display, 132 x 64 pixels	-	1SVR 440 839 R4500
CL-LDD.K	Graphic display, 132 x 64 pixels, with keypad	-	1SVR 440 839 R4400

### Remote display connection modules

CL-LDC.SDC2	Module to displace display from the logic relay, 5 m, length adjustable	24 V DC	1SVR 440 841 R0000
CL-LDC.SAC2	Module to displace display from the logic relay, 5 m, length adjustable	100-240 V AC	1SVR 440 843 R0000

### Display base modules

CL-LDC.LDC2	CPU / power supply	24 V DC	1SVR 440 821 R0000
CL-LDC.LAC2	CPU / power supply	100-240 V AC	1SVR 440 823 R0000
CL-LDC.LNDC2	CPU / power supply, networking-compatible (CL-NET)	24 V DC	1SVR 440 821 R1000
CL-LDC.LNAC2	CPU / power supply, networking-compatible (CL-NET)	100-240 V AC	1SVR 440 823 R1000

Type	Rated operational voltage	Digital inputs	Relay outputs	Transistor outputs	Analog outputs	Order code
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### Display I/O modules

CL-LDR.16AC2	100-240 V AC	12	4	-	-	1SVR 440 853 R0000
CL-LDR.16DC2	24 V DC	12	4	-	-	1SVR 440 851 R0000
CL-LDR.17DC2	24 V DC	12	4	-	1	1SVR 440 851 R2000
CL-LDT.16DC2	24 V DC	12	-	4	-	1SVR 440 851 R1000
CL-LDT.17DC2	24 V DC	12	-	4	1	1SVR 440 851 R3000

## Accessories CL range

Type	For logic relay	For display system	Description	Order code
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### Accessories for logic relays and display system

CL-LAD.TK003	-	■	Network cable (CL-NET) to connect 2 display base modules (length 0.8 m)	1SVR 440 899 R6200
CL-LAD.TK004	-	■	Network cable (CL-NET) to connect 2 display base modules (length 1.5 m)	1SVR 440 899 R6300
CL-LAD.TK007	■	-	Cable for point-to-point connection of remote-display connection module and logic relay, length adaptable (length 5 m)	1SVR 440 899 R6600
CL-LAD.TK005	-	■	Cable for point-to-point connection of remote display connection modules and display base module, length adaptable (length 5 m)	1SVR 440 899 R6400
CL-LAD.TK006	-	■	Cable for point-to-point connection of 2 display base modules, length adaptable (length 5 m)	1SVR 440 899 R6500
CL-LAS.TK011	■	■	Spare plug (CL-LINK) for connection of logic relay to expansion	1SVR 440 799 R5100
CL-LAD.TK009	-	■	Termination resistor (2 pieces)	1SVR 440 899 R6900
CL-LAS.FD001	■	-	Fixing brackets for screw mounting of logic relay, expansion, display base module (9 pieces)	1SVR 440 799 R5000
CL-LAD.FD002	-	■	Tool for mounting of display modules	1SVR 440 899 R3000
CL-LAS.SD001	■	-	Primary switch mode power supply: Rated input voltage 100-240 V AC, rated output voltage / current 24 V DC / 0.25 A, 12 V DC / 20 mA	1SVR 440 703 R0000
CL-LAS.SD002	■	-	Primary switch mode power supply: Rated input voltage 100-240 V AC, rated output voltage / current 24 V DC / 1.25 A	1SVR 440 713 R0000
CL-LAS.TD001	■	-	Input-/ output simulator with wall power supply, fits to CL-LSR and CL-LST Rated input voltage 100-240 V AC, rated output voltage 24 V DC	1SVR 440 793 R0000
CL-LAD.FD001	-	■	Protective cover, transparent, for harsh environmental conditions and application in the food industry	1SVR 440 899 R1000
CL-LAD.FD011	-	■	Protective cover, transparent and sealable	1SVR 440 899 R2000



### Remote display

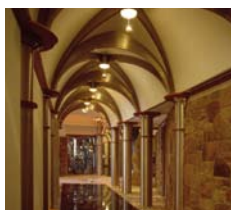
- 1 Remote display: CL-LDD.. + CL-LDC.S..
- 2 Connecting cable: a) CL-LAD.TK005 and b) CL-LAD.TK007 to connect a remote display
- 3 Logic relay: CL-LSR.., CL-LST..
- 4 Logic relay: CL-LMR.., CL-LMT..

### Applications

Thanks to the huge range of possibilities regarding functionality, operating voltage, extensions and network abilities, the logic relays and display systems of the CL range can be used in machine building, plant engineering or commercial applications.

Example application areas for logic relays and display systems of the CL range are:

- **Industry**
  - Machine building
  - Controlling compressors
  - Gas/air dryer
  - Packaging machines
  - Transport systems
  - etc.
- **Building services**
  - Controlling light/doors
  - Ventilators
  - Air conditioning
  - etc.
- **Energy technology**
  - Generators
  - Solar and wind power
  - Water supply
  - Sewage technology
  - etc.
- **Oil, gas and water**
  - Pump control
  - Tank and level control
  - etc.





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