


ELR W3/ 9-400

Order No.: 2964173

<http://eshop.phoenixcontact.de/phoenix/treeViewClick.do?UID=2964173>

Electronic reversing load relay, for direct driving of equipment in the 3-phase network, with light indicator and protection circuit, output: 110-440 V AC/3 x 9 A

**Commercial data**

GTIN (EAN)	 4 017918 099381
sales group	G421
Pack	1 pcs.
Customs tariff	85364900
Catalog page information	Page 190 (IF-2011)

Product notes

WEEE/RoHS-compliant since:
01/30/2007



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Technical data**Input data**

Input name	Device supply
Nominal supply voltage	24 V DC
Input voltage range in reference to U_N	0.8 ... 1.25
Quiescent current	40 mA

Protective circuit	Protection against polarity reversal Polarity protection diode
	Surge protection
Operating voltage display	Green LED
Status display	Yellow LED
Indication	Red LED
Input name	Control input right/left
Nominal input voltage U_N	24 V DC
Input voltage range in reference to U_N	0.8 ... 1.25
Typical input current at U_N	7.5 mA
Switching threshold "0" signal in reference to U_N	> 0.8
Switching threshold "1" signal in reference to U_N	< 0.4
Reaction time in normal load operation	50 ms
Switch-over frequency	< 10 Hz (At $\cos \phi > 0.5$)
Maximum reversing frequency	10 Hz
Switchover time R_L/L_L (turn-on time)	20 ms

Output data, load relay

Output name	AC output
Nominal output voltage	400 V AC
Nominal output voltage range	110 V AC ... 440 V AC
Periodic peak reverse voltage	1000 V
Mains frequency	50 Hz
	60 Hz
Load current	9 A (see derating curve)
Leakage current	Typ. 7 mA
Residual voltage	Typ. 1.5 V
Surge current	230 A ($t_p = 10$ ms, at 25 °C)
Max. load value	265 A ² s
Type of protection	RC element
Protective circuit/component	RC element
Type of protection	Surge protection
Surge voltage protection	> 750 V

Connection data

Connection method	Screw connection
Stripping length	8 mm

Conductor cross section solid min.	0.2 mm ²
Conductor cross section solid max.	6 mm ²
Conductor cross section stranded min.	0.2 mm ²
Conductor cross section stranded max.	4 mm ²
Conductor cross section AWG/kcmil min.	24
Conductor cross section AWG/kcmil max	10
Screw thread	M3

General data

Width	62 mm
Height	84 mm
Depth	110 mm
Test voltage input/output	2.5 kV
Ambient temperature (operation)	-20 °C ... 60 °C
Ambient temperature (storage/transport)	-20 °C ... 70 °C
Mounting position	Vertical (horizontal DIN rail)
Assembly instructions	Can be aligned with > 20 mm spacing
Operating mode	100% operating factor
Degree of protection	IP20
Name	Air and creepage distances between the power circuits
Standards/regulations	EN 50178
	Basic insulation
Name	Power station requirements
	EMC regulations
Standards/regulations	EN 61000-6-2
	EN 61000-6-4

Certificates / Approvals

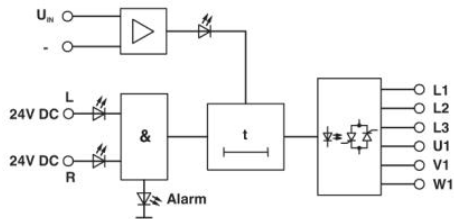


Certification

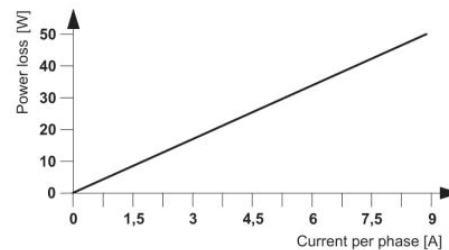
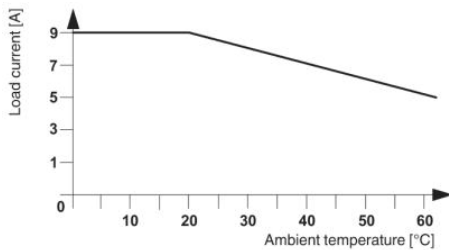
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Diagrams/Drawings

Block diagram



Diagram



FAQs

- **01. In which way and with which fuse do I have to protect a semiconductor switch against short-circuits and is there a special regulation?**

No, there is no special regulation for semiconductor switches. You may, however, designate three types of fuse. 1. Motor protection via bi-metal relay or switch, adjusted to the load current of the motor (can be dropped with ELR W3/9 400 MM which includes motor protection). 2. Conductor protection adjusted to the cross section of the conductors (VDE regulation, for example with 1,5 mm² 16A) 3. Semiconductor protection to protect the semiconductor electronics against short-circuit. In this case the tripping characteristic of the fuse must be below the I²t value of the semiconductor. For devices with a load current of 3 times 9A a 16 A FF is used. This fuse is fast enough to protect the semiconductor against short-circuit, but on the other hand slow enough to switch on a motor (high inrush current).

- **02. For which capacities (in kW) does Phoenix Contact provide electronic load relays and why are there only indications with respect to the maximum current?**

For a semiconductor the current is the value that sets limits to its capacity. (heat loss that has to be dissipated). Therefore with ELR's the maximum switched currents are mentioned in the data sheet. For example an ELR with 3 times 9 A corresponds to approx. 3 - 4 KW, depending on cos phi.

Following versions are available from Phoenix Contact :

1. Load relay 3 times 9 A
2. Load relay 1 time 25 A
3. Load relay 1 time 35 A
4. Reversing loaded relay 3 times 9 A

5. Reversing loaded relay with motor management 3 times 8 A

• **03. Are the electronic load relays also available with 230 V AC inputs?**

No, the control and possibly the supply voltage is always effected with 24 V DC (for example directly from the control). Other voltages have to be connected via the interface modules (for example PLC relay or PLC optical coupler).

• **04. Is a supply voltage necessary for the operation of electronic load relays of Phoenix Contact?**

Yes, for the intelligent device family ELR with Motor Management and for the reversing load relays. In this case it is required for the supply of internal electronics. "Supply voltage = 24 V DC"

• **05. To which fieldbus systems can ELR with Motor Management be connected?**

The device family ELR MM can be connected via a special gateway to "PROFIBUS-DP V1".

Gateways for additional bus systems like INTERBUS, CAN DeviceNet™ on demand/in planning process.

Via the RS-232 Interbus Inline disk the devices can be integrated in an Inline system. Then all bus systems of the Inline family, i.e. INTERBUS, PROFIBUS, CAN and DeviceNet™ are available.

• **06. Are there higher performance classes?**

At present, the class up to 3 x 9 A (approx. 3 – 4 KW) is three-phase. Single-phase up to 1 x 25 or 1 x 35 A. For the MM range, an extension to 7.5 and 18.5 KW is planned. For HMI 2003, there was a mechanical version for triggering power contactors. Input 3 x 5 A direct, larger currents are measured with a transducer. The motor management functions are therefore available for all performance classes.

• **07. Can a soft start and soft brake be realised with the ELR W 3/9 ...MM devices?**

No, this function is only planned for the higher performance classes. There is, however, an electronic reversing loaded relay with three-phase soft starter included in the Phoenix Contact product range. Performance class up to 3 times 8 A.

• **08. Can the ELR W3/9... MM only be parameterized with the software ELR-CONF?**

No, all rudimentary and relevant functions can be adjusted on the device directly via keyboard. With the assembled LC-display all important measured values are readable.

• **09. Which hardware and software equipment is at least required for operation of the ELR-CONF?**

1. Pentium > 90 MHz 2. 16 MByte main memory 3. 15 MByte free hard disk storage (without Internet Explorer) 4. CD-ROM drive 5. Mouse 6. Windows 95 (with Internet Explorer starting with version 5.0), Windows 98, Windows NT 4.0 with SP4, Windows 2000 or Windows XP 7. Serial interface (COM1... COM2)

• **10. Is it possible to connect the devices of the MM family to the PC or notebook via USB, too?**

No, the connection only functions via the RS-232 (COM1 or COM2) interface. There are, however, adapters for RS-232 to USB.

• **11. Is it necessary to use a bimetallic protection when using the Motor Management devices?**

No, a bimetal is not necessary (approval PTB is applied).

• **12. Can the Motor Management devices also be used in the Ex-range?**

The approval is applied at PTB!

- **13. Is there a minimum load for semiconductor switches?**

Yes, a minimum switching current is necessary to avoid that the holding current of the semiconductors does not fall below. For example with the ELR W3/9 400 these are 150 mA.

- **14. Can the ELR MM device be used after a frequency transducer?**

No, because the frequency transducer does not generate a pure Sinus voltage on the output side. The voltage is composed of high frequent signals (up to 40 KHz). The R-C-V protection circuitry of the semiconductor is not suitable for this type of voltage. Furthermore the present generation can only be operated in a frequency range of 45 - 65 Hz.

An application before a frequency transducer, however, is possible (maybe with corresponding protection circuitry).

- **15. To achieve a longer lifetime electromagnetic contactors are over-dimensioned. Is it necessary to also choose a higher class of the semiconductor switches?**

No, all ELR are equipped with over-dimensioned power semiconductors. This is necessary to meet the relatively high inrush current (5 to 7fold rated current) of the motor. The current indication on the ELRs (observe the derating) refers to 100% ED. In case of proper use a semiconductor switch achieves > 10 to the power of 9 cycles.

- **16. If a contactor-type reversing starter combination is set up, it has to be locked mechanically and/or electrically. What about a reversal load relay?**

With the ELR-W no further measures are necessary. The locking of the control inputs, the physically related downtime of the reversal and the wiring of the load side have already been realised in the module.

- **17. Is it possible to use three single-phase load relays for applications in three phase system?**

Yes!

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