

Reliably Switching Highest Currents up to 2200 A



Product Information
DIL M contactors
DIL H contactors



Powering Business Worldwide

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An Eaton Brand

High Rated Contactors DIL: Switching High Currents Reliably



Contactors DIL M from 580 A and contactors DIL H from 1400 A are vacuum contactors with significant advantages over air-break contactors:

- The electrical lifespan is considerably higher than air-break contactors.
- A higher packing density and cleaner distribution compartment are possible since there are no open arcs and therefore no escaping gases.

Highly efficient switching

The benefits of vacuum technology arise from the closed system of vacuum switching tubes that excludes any external influences on the switching operations inside the tubes and at the same time prevents switch gases from entering the environment. The most important feature of the vacuum tubes is the long lifespan when switching high currents.

This is due to the reduction of contact erosion since no switching arcs can be produced in a vacuum. The vacuum technology means the small device dimensions are possible compared to conventional contactors which switch in air. Even higher currents can be switched with switching tubes connected in parallel for switching resistive loads (AC-1).



Use with large motors – utilisation category AC-3/AC-4

Whether for bow thrusters in ships, crusher for material recycling and hardboard production, mining machines, water treatment equipment or cement production, contactors DIL M can switch motors up to 1600 A reliably and safely. Circuit-breakers NZM and the motor protective relay ZEV ensure reliable motor protection. The extensive product range of circuit-breakers and accessories enable them to be adapted for a wide range of protection tasks with selectable tripping characteristics.



Use with utilisation category AC-1

Contactors DIL M and DIL H are used in several applications for isolating circuits when contactors are used for utilisation category AC-1 applications. For example, as mains connection devices for wind generators, for large heating outputs in plastics processing, induction welding in the steel and aluminium industry or for isolating in conjunction with power electronics.



All contactors DIL M and DIL H from 185 A to 2200 A are available with electronically-controlled drives. This provides outstanding benefits for your application:

- Flexible actuation
- Considerably lower switch cabinet temperatures due to reduced sealing power
- Design of smaller control transformers due to reduced pick-up power
- Considerably greater control voltage tolerance than required by the standard, ensuring greater reliability with voltage deviations
- Long lifespan of switching contacts, due to optimised contact forces
- Integrated suppressor
- Auxiliary contact equipped with 2 make contacts, 2 break contacts

Motor protective relay ZEV

The innovative motor protective relay ZEV is designed to protect motors up to 820 A against phase failure, overload and current imbalance. An earth fault is detected quickly by the external core-balance transformers. The integrated thermistor connection enables the relay to be upgraded to provide a full motor protective system. With eight preselectable tripping classes you can even control the most difficult starting conditions for motors with long starting times.

High Rated Contactors – Compact and Powerful

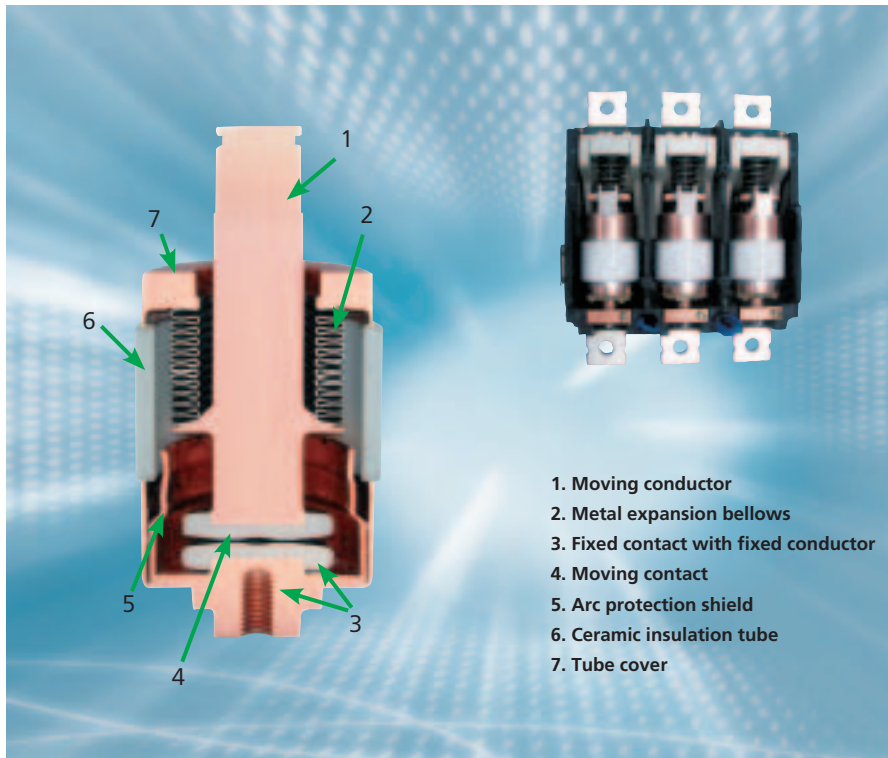
Compact dimensions

The vacuum switching tubes with the electromechanical drive system have a very compact design. Vacuum contactors therefore also offer outstandingly small dimensions.

A look inside the vacuum

The section drawing of the vacuum tubes shows the fixed and moving contact. The thin metal bellows expand and contract with the moving contact and ensure that the system is sealed during the frequent movements of the contact. All copper coloured parts in the drawing are energized.


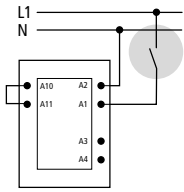

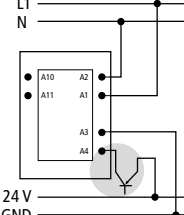

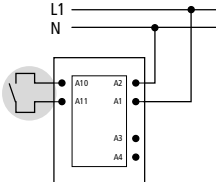
The ceramic insulation tube isolates the incoming and outgoing sides of the switching tube. The vacuum switching tube technology used has been tried and tested since the 1980s.

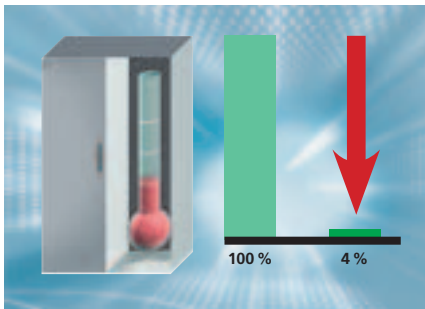


1. Moving conductor
2. Metal expansion bellows
3. Fixed contact with fixed conductor
4. Moving contact
5. Arc protection shield
6. Ceramic insulation tube
7. Tube cover

It's your choice: standard or premium version

All contactors from 185 to 570 A are available as standard or premium versions. All contactors over 570 A are premium version devices in all cases.

Contactor actuation		Standard	Premium
	Conventional: A1/A2 are energized in the usual manner.		+
	Directly from the PLC: A 24 V PLC output can be connected at terminals A3/A4 without the need of a coupling relay.		+
	From low power command devices: Low-power command devices such as board relays, control circuit devices or position switches can be connected directly to A10/A11.		+



Cool contactors reduce the costs for the switching cabinet

The contactors DIL M and DIL H reduce the sealing power required by up to 96 %, which in turn considerably reduces the temperature inside the switch cabinet. The costs for the switch cabinet and operating costs are also reduced. A smaller switch cabinet can be used than normally required, and expensive fans are often unnecessary.

Example: DIL M185 (RA250)

DC operated

Power consumption 3.3 Watt

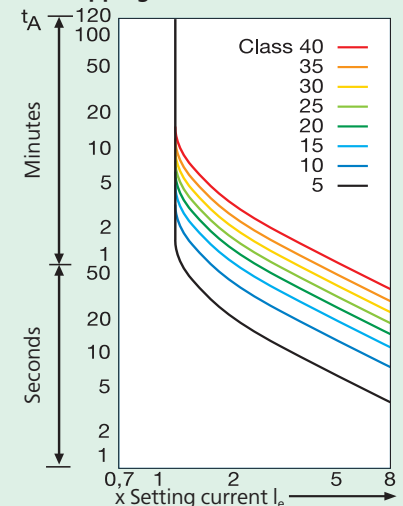


User benefits of the innovative motor protective relay ZEV

User-friendliness has top priority with the motor protective relay ZEV.

- Simple engineering with multi-voltage coils (24-240 V, 50/60 Hz or DC)
- All settings are menu guided, enabling currents, tripping classes and other functions to be set easily.
- Small and light current sensors with exceptionally broad current ranges simplify selection. The cables are simply passed through the sensors.
- With large currents, the sensor belts are wrapped round the cable and secured with a Velcro fastener (see picture).
- All three phase symbols – L1, L2, L3 – are displayed, so that a faulty phase can be indicated quickly: The symbol for the faulty phase flashes distinctively.
- Differentiated signalling: A trip caused by the thermistor or in the event of an overload can be indicated separately.
- Prewarning on overload: A prewarning is visually indicated or output via a contact before the device trips.

ZEV tripping characteristics



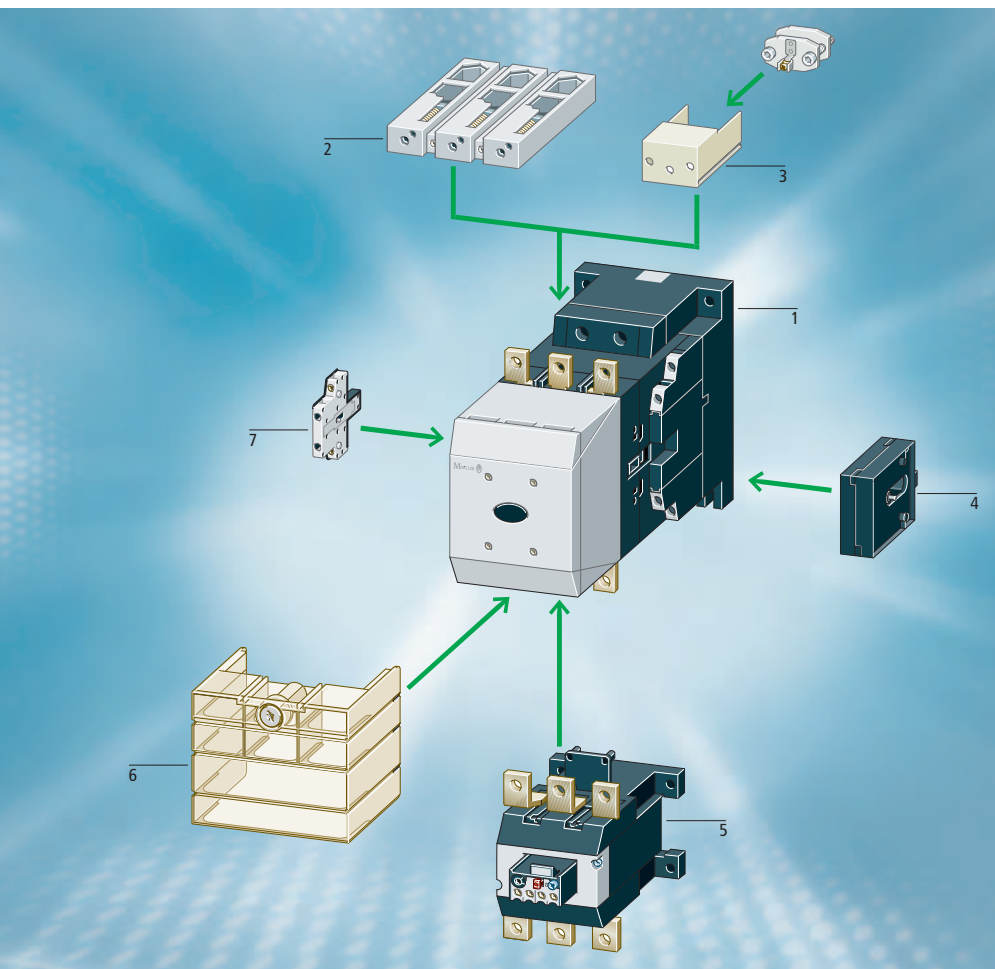
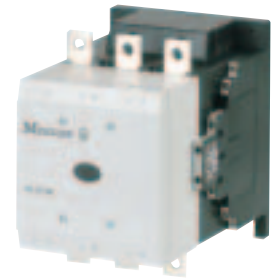
The motor protective relay ZEV can control even the most difficult startup conditions. The extended tripping classes up to Class 40 ensure the reliable protection of motors with long starting times. Optimum protection for any motor startup condition can be provided by selecting one of the eight tripping classes between 5 and 40.



Only four coils for every application

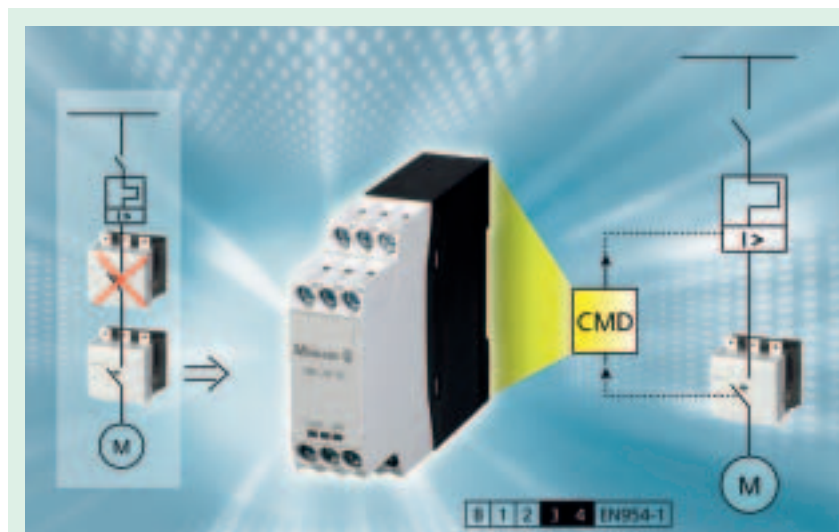
The premium version of the contactors DIL M enables you to cover all application ranges and voltages used worldwide with only four coils. This makes for simple engineering and mostly only requires one contactor in stock. The other voltage ranges of the coils ensure safe operation even with unreliable network conditions. Single voltage coils for the most typical voltages used worldwide are available for the standard contactors.

Simply Select: Contactors DIL M and DIL H up to 2200 A



Contactor, 3-pole			
AC-1	AC-3	Standard electronics	
		AC: 110 - 120 V 50/60 Hz 220 - 240 V 50/60 Hz	
$I_e=I_{th}$ at 60° C	I_e A (400 V)	P kW (400 V)	Part no.
			Add voltages from above
275	185	90	DILM185-S/22(...)
315	225	110	DILM225-S/22(...)
350	250	132	DILM250-S/22(...)
400	300	160	DILM300-S/22(...)
500	400	200	DILM400-S/22(...)
700	500	250	DILM500-S/22(...)
750	570	315	DILM570-S/22(...)
800	580	315	—
850	650	355	—
900	750	400	—
1000	820	450	—
1000	1000	560	—
1400	—	—	—
1800	1600	900	—
2000	—	—	—
2200	—	—	—

1. Contactors 90 - 900 kW
2. Cable terminal block
3. Flat strip conductor terminals
4. Mechanical interlock
5. Overload relay
6. Terminal cover, finger-proof
7. Auxiliary contact modules, 2-pole, side mounted



Redundant design of contactors becomes unnecessary



		Auxiliary contacts		Overload/motor protection			
Premium electronics AC/DC: RDC48*, RA110* RA250*, RAC500* conventional	AC/DC: RDC110* RA250*, RAC500* vacuum	2 DILM1000- XHI11SI integrated	Optional Max. total number of auxiliary contacts: 8	Relays			Circuit-breakers
Part no.	Part no.	Contacts	Part no.	Part no.	Part no.	Part no.	Part no.
Add voltages from above	Add voltages from above		SI at side internally SA at side externally				
DILM185/22(...)	–	2N/O 2N/C	DILM1000-XHI11-SI	Z5	ZW7	ZEV	NZM...
DILM225/22(...)	–	2N/O 2N/C	DILM1000-XHI11-SA				
DILM250/22(...)	–	2N/O 2N/C	DILM1000-XHI11V-SI				
DILM300/22(...)	–	2N/O 2N/C	DILM1000-XHIC11-SI				
DILM400/22(...)	–	2N/O 2N/C	DILM1000-XHIC11-SA				
DILM500/22(...)	–	2N/O 2N/C					
–	–	2N/O 2N/C					
–	DILM580/22(...)	2N/O 2N/C					
–	DILM650/22(...)	2N/O 2N/C					
–	DILM750/22(...)	2N/O 2N/C					
–	DILM820/22(...)	2N/O 2N/C					
–	DILM1000/22(...)	2N/O 2N/C					
–	DILH1400/22(RAW250)*	2N/O 2N/C					
–	DILM1600/22(RAW250)*	2N/O 2N/C					
–	DILH2000/22(RAW250)*	2N/O 2N/C					
–	DILH2200/22(RAW250)*	2N/O 2N/C					
							IZM...

* RDC48 = 24-48 V DC, RA110 = 48-110 V, 40-60Hz/48-110 V DC, RA250 = 110-250 V, 40-60Hz/110-250 V DC, RAC500 = 250-500 V, 40-60Hz, RAW250 = 230-250 V, 40-60Hz/DC

CMD contactor monitoring device

The CMD (Contactor Monitoring Device) monitors the main contacts of a contactor for welding. For this it compares the contactor control voltage with the state of the main contacts, which is indicated reliably by a mirror contact (IEC EN 60947-4-1 Ann. F). If the contactor coil is de-energized and the contactor does not drop out, the CMD trips the backup circuit-breaker, motor-protective circuit-breaker or switch-disconnector via an undervoltage release. The CMD also monitors the functioning of the internal relay using an additional auxiliary make contact of the monitored contactor. For this the auxiliary make and break contact is positively driven. The break contact is designed as a mirror contact.

Components with which the CMD can be combined

Contactors	Motor-protective circuit-breakers and circuit-breakers
DILEM DILM7 to DILM150 DILM185 (-S) bis DILM500 (-S) DILM580 to DILM1600 DILH1400 to DILH2000 SE-A-PKZ2 and S-PKZ2	PKZ2 + U-PKZ2 (18 VDC) NZM1 + NZM1-XUVL NZM2 + NZM2/3-XUVL NZM3 + NZM2/3-XUVL NZM4 + NZM4-XUVL N1 + NZM1-XUVL N2 + NZM2/3-XUVL N3 + NZM3/3-XUVL N4 + NZM4-XUVL

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