106727
DILM1600/22(RAW250)

DELIVERY PROGRAM

Product range
Contactors

Application
Contactors for Motors

Subrange
Comfort devices greater than 170 A

Utilization category
AC-1: Non-inductive or slightly inductive loads, resistance furnaces
NAC-3: Normal AC induction motors: starting, switch off during running
AC-4: Normal AC induction motors: starting, plugging, reversing, inching

Connection technique
Screw connection

Rated operational current

AC-3
380 V 400 V [I_e]
1600 A

AC-1
Conventional free air thermal current, 3 pole, 50 - 60 Hz
Open
at 40 °C [$I_{th} = I_e$]
2200 A

AC-1
Conventional free air thermal current, 1 pole
open [I_{th}]
4500 A

Max. rating for three-phase motors, 50 - 60 Hz

AC-3
220 V 230 V [P]
500 kW

AC-3
380 V 400 V [P]
900 kW

AC-3
660 V 690 V [P]
1600 kW

AC-3
1000 V [P]
1770 kW

AC-4
220 V 230 V [P]
430 kW

AC-4
380 V 400 V [P]
750 kW

AC-4
660 V 690 V [P]
1300 kW

AC-4
1000 V [P]
1650 kW

Contact sequence


Can be combined with auxiliary contact
DILM820-XHI…

Actuating voltage
RAW 250

Voltage AC/DC
AC operation

Contacts

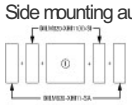
N/O = Normally open
2 N/O

N/C = Normally closed
2 NC

Auxiliary contacts

possible variants at auxiliary contact module fitting options on the side: 2 x DILM820-XHI11(V)-SI; 2 x DILM820-XHI11-SA

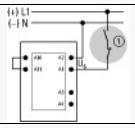
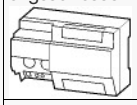
Side mounting auxiliary contacts



Instructions
Interlocked opposing contacts according to IEC/EN 60947-5-1 Appendix L, inside the auxiliary contact module
Auxiliary contacts used as mirror contacts according to IEC/EN 60947-4-1 Appendix F (not NC late open)

Instructions
integrated suppressor circuit in actuating electronics
660 V, 690 V or 1000 V: not directly reversing

Notes

Classic	DILM1600, DILH2000, DILH2200
A1/A2 werden wie bisher gewohnt an Spannung gelegt	
Direct from the PLC	
An die Anschlüsse A3/A4 kann direkt ein 24-V-Ausgang der SPS angeschlossen werden. 	□
From a low-power actuating device	
Gering belastbare Befehlsgeber wie Leiterplattenrelais, Befehlsgeräte oder Positionsschalter können direkt an A10/A11 angeschlossen werden.	□
	□ Stopping in the event of an emergency (emergency switching off) □ max. Cable capacitance 6 nF

TECHNICAL DATA

General

Standards
IEC/EN 60947, VDE 0660, UL, CSA

Lifespan, mechanical
AC operated [Operations]
5×10^6

Lifespan, mechanical
DC operated [Operations]
5×10^6

Operating frequency, mechanical
AC operated [Operations/h]
1000

Operating frequency, mechanical
DC operated [Operations/h]
1000

Climatic proofing
Damp heat, constant, to IEC 60068-2-78
Damp heat, cyclic, to IEC 60068-2-30

Ambient temperature
Open
-40 - +60 °C

Ambient temperature
Storage
- 40 - + 80 °C

Mounting position

Mechanical shock resistance (IEC/EN 60068-2-27)
Half-sinusoidal shock, 10 ms
Main contacts
N/O contact
10 g

Mechanical shock resistance (IEC/EN 60068-2-27)
Half-sinusoidal shock, 10 ms
Auxiliary contacts
N/O contact
10 g

Mechanical shock resistance (IEC/EN 60068-2-27)
Half-sinusoidal shock, 10 ms
Auxiliary contacts
N/C contact
8 g

Degree of Protection
IP00

Altitude
Max. 2000 m

Weight
AC operated
32 kg

Weight
DC operated
32 kg

Weight

Weight
32 kg

Terminal capacity main cable
Busbar [Width]
100 mm

Main cable connection screw/bolt
M12

Tightening torque
35 Nm

Terminal capacity control circuit cables
Solid
1 x (0.75 - 2.5)
2 x (0.75 - 2.5) mm^2

Terminal capacity control circuit cables
Flexible with ferrule
1 x (0.75 - 2.5)
2 x (0.75 - 2.5) mm^2

Terminal capacity control circuit cables
Solid or stranded
18 - 14 AWG

Control circuit cable connection screw/bolt
M3.5

Tightening torque
1.2 Nm

Tool
Main cable
Width across flats
18 mm

Tool
Control circuit cables
Pozidriv screwdriver
2 Size

Main conducting paths

Rated impulse withstand voltage [U_{imp}]
8000 V AC

Overvoltage category/pollution degree
III/3

Rated insulation voltage [U_i]
1000 V AC

Rated operational voltage [U_e]
1000 V AC

Safe isolation to EN 61140
between coil and contacts
500 V AC

Safe isolation to EN 61140
between the contacts
500 V AC

Making capacity (p.f. to IEC/EN 60947)
19000 A

Breaking capacity
220 V 230 V
16000 A

Breaking capacity
380 V 400 V
16000 A

Breaking capacity
500 V
16000 A

Breaking capacity
660 V 690 V
16000 A

Breaking capacity
1000 V
5800 A

Component lifespan
AC1: See → Engineering, characteristic curves
AC3: See → Engineering, characteristic curves
AC4: See → Engineering, characteristic curves

AC

AC-1
Rated operational current
Conventional free air thermal current, 3 pole, 50 - 60 Hz
Open
at 40 °C [$I_{th} = I_e$]
2200 A

AC-1
Rated operational current
Conventional free air thermal current, 3 pole, 50 - 60 Hz
Open
at 50 °C [$I_{th} = I_e$]
1970 A

AC-1
Rated operational current
Conventional free air thermal current, 3 pole, 50 - 60 Hz
Open
at 55 °C [$I_{th} = I_e$]
1880 A

AC-1
Rated operational current

Conventional free air thermal current, 3 pole, 50 - 60 Hz
Open
at 60 °C [I_{th} =I_e]
1800 A

AC-1
Rated operational current
Conventional free air thermal current, 1 pole
Note
at maximum permissible ambient air temperature

AC-1
Rated operational current
Conventional free air thermal current, 1 pole
open [I_{th}]
4500 A

AC-3
Rated operational current
Open, 3-pole: 50 – 60 Hz
Notes
At maximum permissible ambient temperature (open.)

AC-3
Rated operational current
Open, 3-pole: 50 – 60 Hz
220 V 230 V [I_e]
1600 A

AC-3
Rated operational current
Open, 3-pole: 50 – 60 Hz
240 V [I_e]
1600 A

AC-3
Rated operational current
Open, 3-pole: 50 – 60 Hz
380 V 400 V [I_e]
1600 A

AC-3
Rated operational current
Open, 3-pole: 50 – 60 Hz
415 V [I_e]
1600 A

AC-3
Rated operational current
Open, 3-pole: 50 – 60 Hz
440V [I_e]
1600 A

AC-3
Rated operational current
Open, 3-pole: 50 – 60 Hz
500 V [I_e]
1600 A

AC-3
Rated operational current
Open, 3-pole: 50 – 60 Hz
660 V 690 V [I_e]
1600 A

AC-3
Rated operational current
Open, 3-pole: 50 – 60 Hz
1000 V [I_e]
1200 A

AC-3
Motor rating [P]
220 V 230 V [P]
500 kW

AC-3
Motor rating [P]
240V [P]
550 kW

AC-3
Motor rating [P]
380 V 400 V [P]
900 kW

AC-3
Motor rating [P]
415 V [P]
930 kW

AC-3
Motor rating [P]
440 V [P]
1000 kW

AC-3
Motor rating [P]
500 V [P]
1180 kW

AC-3
Motor rating [P]
660 V 690 V [P]
1600 kW

AC-3
Motor rating [P]
1000 V [P]
1770 kW

AC-4
Rated operational current
Open, 3-pole: 50 – 60 Hz
220 V 230 V [I_e]
1280 A

AC-4
Rated operational current
Open, 3-pole: 50 – 60 Hz
240 V [I_e]
1280 A

AC-4
Rated operational current
Open, 3-pole: 50 – 60 Hz
380 V 400 V [I_e]
1280 A

AC-4
Rated operational current
Open, 3-pole: 50 – 60 Hz
415 V [I_e]
1280 A

AC-4
Rated operational current
Open, 3-pole: 50 – 60 Hz
440 V [I_e]
1280 A

AC-4
Rated operational current
Open, 3-pole: 50 – 60 Hz
500 V [I_e]
1280 A

AC-4
Rated operational current
Open, 3-pole: 50 – 60 Hz
660 V 690 V [I_e]
1280 A

AC-4
Rated operational current
Open, 3-pole: 50 – 60 Hz
1000 V [I_e]
1120 A

AC-4
Motor rating [P]
220 V 230 V [P]
430 kW

AC-4
Motor rating [P]
240 V [P]
450 kW

AC-4
Motor rating [P]
380 V 400 V [P]
750 kW

AC-4
Motor rating [P]
415 V [P]
770 kW

AC-4
Motor rating [P]
440 V [P]
830 kW

AC-4
Motor rating [P]
500 V [P]
940 kW

AC-4
Motor rating [P]
660 V 690 V [P]

1300 kW

AC-4
Motor rating [P]
1000 V [P]
1650 kW

Current heat loss

3 pole, at I_{th} (60°)
155 W

Current heat loss at I_e to AC-3/400 V
123 W

Magnet systems

Voltage tolerance
U_S
230 - 250 V 50/60 Hz
110 - 350 V DC

Voltage tolerance
AC operated [Pick-up]
0.7 x $U_{S\,min}$ - 1.15 x $U_{S\,max}$

Voltage tolerance
DC operated [Pick-up]
0.7 x $U_{S\,min}$ - 1.15 x $U_{S\,max}$

Voltage tolerance
AC operated [Drop-out]
0.2 x $U_{S\,max}$ - 0.6 x $U_{S\,min}$

Voltage tolerance
DC operated [Drop-out]
0.2 x $U_{S\,max}$ - 0.6 x $U_{S\,min}$

Power consumption of the coil in a cold state and 1.0 x U_S
Note on power consumption
Control transformer with u_k □ 7%

Power consumption of the coil in a cold state and 1.0 x U_S
Pull-in power [Pick-up]
1600 VA

Power consumption of the coil in a cold state and 1.0 x U_S
Pull-in power [Pick-up]
1400 W

Power consumption of the coil in a cold state and 1.0 x U_S
Sealing power [Sealing]
36.5 VA

Power consumption of the coil in a cold state and 1.0 x U_S
Sealing power [Sealing]
17.3 W

Duty factor
100 % DF

Changeover time at 100 % U_S (recommended value)
Main contacts
Closing delay
70 ms

Changeover time at 100 % U_S (recommended value)
Main contacts
Opening delay
40 ms

Behaviour in marginal and transitional conditions
Sealing
Voltage interruptions
(0 … 0.2 x $U_{c\,min}$) □ 10 ms
Time is bridged successfully

Behaviour in marginal and transitional conditions
Sealing
Voltage interruptions
(0 … 0.2 x $U_{c\,min}$) > 10 ms
Drop-out of the contactor

Behaviour in marginal and transitional conditions
Sealing
Voltage drops
(0.2 … 0.6 x $U_{c\,min}$) □ 12 ms
Time is bridged successfully

Behaviour in marginal and transitional conditions
Sealing
Voltage drops
(0.2 … 0.6 x $U_{c\,min}$) > 12 ms
Drop-out of the contactor

Behaviour in marginal and transitional conditions
Sealing
Voltage drops
(0.6 … 0.7 x $U_{c\,min}$)
Contactor remains switched on

Behaviour in marginal and transitional conditions
Sealing
Excess voltage
(1.15 … 1.3 x $U_{c\,max}$)
Contactor remains switched on

Behaviour in marginal and transitional conditions
Sealing
Pick-up phase
(0 … 0.7 x $U_{c\,min}$)
Contactor does not switch on

Behaviour in marginal and transitional conditions
Sealing
Pick-up phase
(0.7 x $U_{c\,min}$ … 1.15 x $U_{c\,max}$)
Contactor switches on with certainty

Admissible transitional contact resistance (of the external control circuit device when actuating A11)
□ 500 mΩ

PLC signal level (A3 - A4) to IEC/EN 61131-2 (type 2)
High
15 V

PLC signal level (A3 - A4) to IEC/EN 61131-2 (type 2)
Low
5 V

Electromagnetic compatibility (EMC)

Electromagnetic compatibility
This product is designed for operation in industrial environments (environment A). Its use in residential environments (environment B) may cause radio-frequency interference, requiring additional noise suppression measures.

Rating data for approved types

Switching capacity
Maximum motor rating
Three-phase
200 V
208 V
560 HP

Switching capacity
Maximum motor rating
Three-phase
230 V
240 V
640 HP

Switching capacity
Maximum motor rating
Three-phase
460 V
480 V
1200 HP

Switching capacity
Maximum motor rating
Three-phase
575 V
600 V
1300 HP

Switching capacity
General use
1600 A

Auxiliary contacts
Pilot Duty
AC operated
A600

Auxiliary contacts
Pilot Duty
DC operated
P300

Auxiliary contacts

General Use
AC
600 V

Auxiliary contacts
General Use
AC
15 A

Auxiliary contacts
General Use
DC
250 V

Auxiliary contacts
General Use
DC
1 A

Short Circuit Current Rating
Basic Rating
SCCR
85 kA

Short Circuit Current Rating
Basic Rating
max. Fuse
2000 A

Short Circuit Current Rating
480 V High Fault
SCCR (fuse)
85 kA

Short Circuit Current Rating
480 V High Fault
max. Fuse
2000 A

Short Circuit Current Rating
600 V High Fault
SCCR (fuse)
85 kA

Short Circuit Current Rating
600 V High Fault
max. Fuse
2000 A

DESIGN VERIFICATION AS PER IEC/EN 61439

Technical data for design verification

Rated operational current for specified heat dissipation [I_n]
1600 A

Heat dissipation per pole, current-dependent [P_{vid}]
41 W

Equipment heat dissipation, current-dependent [P_{vid}]
0 W

Static heat dissipation, non-current-dependent [P_{vs}]
13 W

Heat dissipation capacity [P_{diss}]
0 W

Operating ambient temperature min.
-40 °C

Operating ambient temperature max.
+60 °C

IEC/EN 61439 design verification

10.2 Strength of materials and parts
10.2.2 Corrosion resistance
Meets the product standard's requirements.

10.2 Strength of materials and parts
10.2.3.1 Verification of thermal stability of enclosures
Meets the product standard's requirements.

10.2 Strength of materials and parts
10.2.3.2 Verification of resistance of insulating materials to normal heat
Meets the product standard's requirements.

10.2 Strength of materials and parts
10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects
Meets the product standard's requirements.

10.2 Strength of materials and parts
10.2.4 Resistance to ultra-violet (UV) radiation
Meets the product standard's requirements.

10.2 Strength of materials and parts
10.2.5 Lifting
Does not apply, since the entire switchgear needs to be evaluated.

10.2 Strength of materials and parts
10.2.6 Mechanical impact
Does not apply, since the entire switchgear needs to be evaluated.

10.2 Strength of materials and parts
10.2.7 Inscriptions
Meets the product standard's requirements.

10.3 Degree of protection of ASSEMBLIES
Does not apply, since the entire switchgear needs to be evaluated.

10.4 Clearances and creepage distances

Meets the product standard's requirements.

10.5 Protection against electric shock
Does not apply, since the entire switchgear needs to be evaluated.

10.6 Incorporation of switching devices and components
Does not apply, since the entire switchgear needs to be evaluated.

10.7 Internal electrical circuits and connections
Is the panel builder's responsibility.

10.8 Connections for external conductors
Is the panel builder's responsibility.

10.9 Insulation properties
10.9.2 Power-frequency electric strength
Is the panel builder's responsibility.

10.9 Insulation properties
10.9.3 Impulse withstand voltage
Is the panel builder's responsibility.

10.9 Insulation properties
10.9.4 Testing of enclosures made of insulating material
Is the panel builder's responsibility.

10.10 Temperature rise
The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.

10.11 Short-circuit rating
Is the panel builder's responsibility. The specifications for the switchgear must be observed.

10.12 Electromagnetic compatibility
Is the panel builder's responsibility. The specifications for the switchgear must be observed.

10.13 Mechanical function
The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

TECHNICAL DATA ETIM 7.0

Low-voltage industrial components (EG000017) / Power contactor, AC switching (EC000066)

Electric engineering, automation, process control engineering / Low-voltage switch technology / Contactor (LV) / Power contactor, AC switching (ecl@ss10.0.1-27-37-10-03 [AAB718015])

Rated control supply voltage Us at AC 50HZ
230 - 250 V

Rated control supply voltage Us at AC 60HZ
230 - 250 V

Rated control supply voltage Us at DC
230 - 250 V

Voltage type for actuating
AC/DC

Rated operation current Ie at AC-1, 400 V
2200 A

Rated operation current Ie at AC-3, 400 V
1600 A

Rated operation power at AC-3, 400 V
900 kW

Rated operation current Ie at AC-4, 400 V
1280 A

Rated operation power at AC-4, 400 V
750 kW

Rated operation power NEMA
895 kW

Modular version
No

Number of auxiliary contacts as normally open contact
2

Number of auxiliary contacts as normally closed contact
2

Type of electrical connection of main circuit
Rail connection

Number of normally closed contacts as main contact
0

Number of main contacts as normally open contact
3

APPROVALS

Product Standards
IEC/EN 60947-4-1; UL 60947-4-1; CSA - C22.2 No. 60947-4-1-14; CE marking

UL File No.
E29096

UL Category Control No.
NLDX

CSA File No.
012528

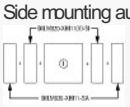
CSA Class No.
3211-04

North America Certification
UL listed, CSA certified

Specially designed for North America
No

CHARACTERISTICS

Side mounting auxiliary contacts



possible variants at auxiliary contact module fitting options on the side: 2 x DILM820-XHI11(V)-SI; 2 x DILM820-XHI11-SA

Characteristic curve

Normal switching duty
Normal AC induction motor
Operating characteristics
Switch on: from stop
Switch off: during run
Electrical characteristics:
Switch on: up to 6 x Rated motor current
Switch off: up to 1 x Rated motor current
Utility category
100 % AC-3
Typical Applications
Compressors
Lifts
Mixers
Pumps
Escalators
Agitators
fan
Conveyor belts
Centrifuges
Hinged flaps
Bucket-elevator
Air-conditioning systems
General drives for manufacturing and processing machines

Characteristic curve

Extreme switching duty
Squirrel-cage motor

Operating characteristics
Inching, plugging, reversing
Electrical characteristics
Make: up to 6 x rated motor current
Break: up to 6 x rated motor current
Utilization category
100 % AC-4
Typical applications
Printing presses
Wire-drawing machines
Centrifuges
Special drives for manufacturing and processing machines

Characteristic curve

Switching conditions for 3 pole, non-motor loads
Operating characteristics
Non inductive and slightly inductive loads
Electrical characteristics
Switch on: 1 x rated operational current
Switch off: 1 x rated operational current
Utilization category
100 % AC-1
Typical examples of application
Electric heat

Characteristic curve

Short-time loading, 3-pole
Time interval between two loading cycles: 15 minutes

DIMENSIONS

- DILM820-XHI11(V)-SI
- DILM820-XHI11-SA

DILM1600
DILH2000, DILH2200