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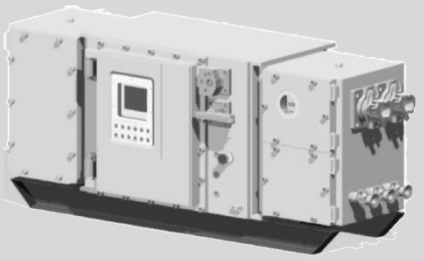

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Miningelectrical engineering

Flameproof contactor switch type MSL 200

Description

Flame-proof contactor switch type MSL 200-**-* is supplying device, intended for remote control of electric drives of machines and devices, supplied from three-phase alternating current network with isolated star point of the transformer in zones where methane and/or coal dust explosion hazard is present or in zones where gases and/or dusts included in group IIA are present.

This switch is equipped with one changeover mechanical switch with manual drive (reversible).

Used components of control system and switchgear ensure operational reliability of the contactor-type switch and meeting of the safety requirements.

Explosion-proof protection

Marking depending on components used

- I M2 Ex d [ia Ma] [ib Mb] I Mb
- I M2 Ex de [ia, ib] I
- II 2 G Ex d [ia Ga] [ib Gb] IIA T4 Gb
- II 2GD Ex de [ia, ib] IIA T4

Ambient temperature

-20^0C to $+40^0$C

CE Type Examination Certificate

OBAC 07 ATEX 194

Rated data

Ingress protection
IP56
Rated voltage of insulation
1000 V (1140 V)
Rated operational voltage
500 V (660/380 V) / 1000 V (1140 V)
Rated continuous current of supply
to 315A
Number of feeders
1 or 2
Maximum motor power
to 240 kW / to 480 kW
Auxiliary feeder
1 feeder / 42V, 24V / 200 (450) VA
Dimensions
Max. 600x500x350mm
Weight
Approx. 100 kg (max 130 kg)

Properties

- safety integrity levelof emergency tripping circuit SIL2,
- Rated current of feeder up to 315A,
- feeders with independent protection,
- local or remote control (binary or digital),
- transparent visualisation of operation modes,
- small overall dimensions,
- easy access to internal equipment.

Selection chart

Pass-through circuit	code	Number of feeders	code	Rated current of feeder	code
Yes	1	One	1	50 A	1
No	0	two	2	100 A	2
				200 A	3
				250 A	4
				315 A	5

➡ Code: **MSL 200** -**-*

Flame-proof compact station type MSL 610-**/BP

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Flame-proof compact station type MSL 610

Properties

- safety integrity level of emergency tripping circuit SIL2,
- Rated current of feeder up to 800A,
- up to 8 feeders with independent protection,
- local or remote control (binary or digital),
- transparent visualisation of operation modes,
- small overall dimensions,
- easy access to internal equipment.

Power breaker switch of current limited to 800A or power transformer up to 16kVA (secondary side voltage 230V, 127V or 42V) with set of protections can be used in place of contact applications. Contact, transformer or starter configurations are implementing, except supplying of motor consumers, also applications e.g. of stations tensioning transporters of belts, sets and others.

Description

Compact station type MSL-610-**/BP is a distributing equipment intended for underground mining industry, for remote control of electric drives of mining machines and equipment, supplied from three-phase network of alternating current with isolated star point of the transformer.

The primary unit of the electric station is disconnecting series. Each station is equipped with one changeover mechanical switch with manual drive. The series includes maximally 8 contact feeders equipped with: contact and backup fuses up to 800A. Vacuum or air switches can be used optionally. Starter of current adapted for maximum current of load switch with supplementing by-pass contact can be a supplement of power series.

Explosion-proof protection

Marking depending on components used
Ⓔx I M2 Ex d [ia Ma] [ib Mb] I Mb
Ambient temperature
-10°C to +40°C

CE Type Examination Certificate
KOMAG 11 ATEX 132X

Rated data

Ingress protection
IP65
Rated voltage of insulation
1000 V (1140 V)
Rated operational voltage
500 V / 1000 V (1140 V)
Rated continuous current of supply
to 800A
Number of feeders
1 to 8
Number of reversion panels
0 to 4
Number of transformer feeders
0 to 4
Number of release feeders
0 to 4
Dimensions (depending on execution)
1130 (1500) x 605 x 500mm
Weight (depending on execution)
approx. 300 or approx. 550 kg

Selection chart

Execution	code	Number of feeders	code
motor and lighting supply	3	1 to 8	Enter number 1-8
lighting supply	4	1 to 4	Enter number 1-4
Motor supply	5	1 to 8	Enter number 1-8

Code **MSL 610-** ☐ ☐ / BP

*Flame-proof compact station type MSL 1203.***/BP*

Properties

- enclosure in form of quadrangular main chamber with connecting chambers with increased protection level to IP65,
- optimised individual arrangement of all components using the newest structural software “3D”,
- individual protection for each contact, transformer or start-up set,
- protection by cutting off voltage supplying compact station in case of attempt to open main or additional chamber,
- specified safety integrity level (SIL) for control circuits and safety circuits,
- local or remote control (binary or digital),
- clearly visualisation of operation modes - PSO panel.

Rated data

Ingress protection
IP54 / IP65
Rated total current of feeders
1200 A
Number of disconnecting series.
max 3
Rated thermal current of disconnecting series
(315) 500 (630, 800) A
Number of feeders
limited of max. current of feeders
Rated max. thermal current of feeder
to 315 (500*) A
Rated operational current of feeder
100, 200, 400 or 500 A
Rated breaking current of feeder
6.5 kA
Rated breaking short-circuit current (with external backup fuse)
30 or 25 kA

Number of reversible units
0÷6
Number of transformer units
0÷4
Rated power of transformer
3; 3.5; 5; 6.3; 40 kVA
Voltage of primary side
3x550, 3x660, 3x990, 3x1000(1140) V
Voltage of secondary side
3x127, 3x230, 3x500 (660) V
Setting range of overload element of the protection OSC-3
0.25÷630 A
Setting range of shorting element of the protection OSC-3
$3I_N \div 12I_N$ A
Central-interlocking leakage protection of circuits 42, 127, 230V (ER-100im)
- interlocking resistance
  2÷100 kΩ
- trip-out resistance
  2÷100 kΩ

*) - for multiplicity of shorting element set to 10

PMB type protection unit

Protection of primary contact feeders with functional relays

⇒ **OSC-3** as overload-current protection
- setting range of overload element I_N
  0.25÷315, 0.5...630 or 1...1000A*)
- setting range of shorting element
  $3I_N \div 12I_N$ A

⇒ ***ER 100im*** *as leakage central-interlocking or leakage-interlocking protection*
- measurement resistance
  2÷100 kΩ

⇒ ***TMA 100Am*** *as posistor temperature protection*
- resistance of temperature sensor
  ≤ 6÷7 kΩ
- resistance of return
  ≥ 14 kΩ
- reaction time
  ≤ 170 ms

⇒ ***PMS-**** *as earthing protection control*
- trip-out resistance
  $100^{-10\%}$(≤1000V)/$50^{-10\%}$(>1000V)Ω

*) - for multiplicity of shorting element set to 10

Description

Compact station type MSL-1203-***/BP is a distributing equipment intended for underground mining industry, for remote control of electric drives of mining machines and equipment, supplied from three-phase network of alternating current with isolated star point of the transformer.

All apparatus can be adapted for operational voltage 500/660(990)/1000(1140) V by switching of proper switch, plug or change of tapping of auxiliary transformer.

Each station can be equipped with maximum three protection-disconnecting series equipped with disconnecting switches with manual drive. Series consist of contact feeders, equipped with integrated protections units type PMB. Vacuum or air switches can be used alternatively.

It is possible to substitute any contact set with power transformer up to 6.3kVA (secondary side voltage 500(660), 230, 127, 42 or 24V).

It is possible to install additional contact feeders or transformer of power up to 40kVA, or thyristor starters of total current up to 800A in additional flameproof enclosure, screwed to the main chamber of compact stations, between inlet connecting chamber and main chamber.

Contact and transformer units used can be configured as multi-feeder, reversible, release and other.

Explosion-proof protection

Marking depending on components used

- I M2 Ex d [ia Ma] [ib Mb] I Mb
- I M2 Ex d e [ia Ma] [ib Mb] I Mb

Ambient temperature

-10^0C to $+40^0$C

CE Type Examination Certificate

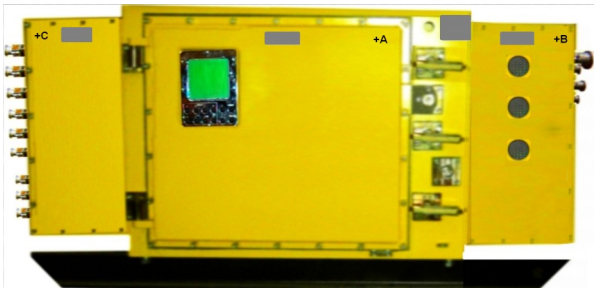
KOMAG 11 ATEX 99X

Selection chart

Designation of circuit I II III	Feeder type
	1 - single-feeder contact feeders
	2 - transformer feeder
	3 - release feeders
	4 - reversible feeders
	5 - two-feeder contact feeders
	6 - transformer feeders to 6,3 kVA
	7 - transformer feeders to 40 kVA
	8 - starter feeders

Code **MSL 1203. * * * /BP**

Different types of feeders can be used in each circuit. In such case they should be marked in brackets in designation next to the principal designation. Example: MSL1203.1(5) 1 7 /BP means stations equipped with three circuits, where I circuit has single-feeder contact and double-feeder feeders, the II circuit has single-feeder feeders while III circuit has transformer feeders 40kVA.



*Flame-proof compact station type MSL 1203.***/BP - three-chamber version*

Flameproof transformer unit type ZTO

Explosion-proof protection

Marking depending on components used
I M2 (M1) Ex d [ia,ib] I
I M2 (M1) Ex de [ia,ib] I

Ambient temperature
-20°C to +40°C

CE Type Examination Certificate
OBAC 07 ATEX 109

Rated data

Ingress protection
IP54
Rated voltage of insulation
500/1000V (660/1140) V
Rated operational voltage
ZTO-1/* 500 (660)V
ZTO-2/* 1000 (1140)V
Rated power of transformer
ZTO-1/* 3.5 kVA
ZTO-2/* 5.0 kVA
Number of disconnecting series
1 series
Number of main feeders
2 feeders
Maximum output power
ZTO-1/* 3.5 kVA
ZTO-2/* 5.0 kVA
Rated current of feeder
ZTO-1/* 16A at 127V
ZTO-1/* 8.8A at 230V
ZTO-2/* 22.3A at 127V
ZTO-2/* 12.6 at 230V
Auxiliary feeder
1 feeder / 42V / 200 (450) VA
Dimensions
170x340x500mm
Weight
to 130 kg

Properties

- safety integrity level of emergency tripping circuit SIL2,
- feeders with independent protection,
- small overall dimensions,
- easy access to internal equipment.

Description

Flameproof transformer unit type ZTO -*/* is a supplying equipment, intended for underground mining industry, for supplying of electric equipment, mining machines, supplied from three-phase or one-phase network with alternating current with isolated star point of the transformer with supply voltage of secondary side 230/133 V AC or 220/127 V AC and 42 V AC

Flame-proof transformer unit is equipped with one changeover mechanical switch with manual drive (reversible) and two independent feeders controlled separately. Used components ensure operational reliability of the transformer unit in the underground mining with meeting safety requirements.

Selection chart

Rated power	Code	Rated current of feeder	code
3.5 kVA	1	500 / 1000 V	1
		660/1140 V	2
5.0 kVA	2	500/660/1000/1140V	3

Code: **ZTO -** ☐ / ☐

Fixing hammer with transformer unit

Properties

- ⇒ low weight,
- ⇒ control and supplying of fixing hammer fron ZTO transformer unit,
- ⇒ minimum flow of cooling water 4l/min.

Description

Fixing hammer type TE MD 20 is supplied through a flameproof transformer unit type ZTO-2/1 an is intended for operation in underground mines and rooms where methane and/or coal dust explosion hazard is present or not present.

Fixing hammer type TE MD 20 with supply and control system was executed according to the rules of the good engineering practice within the scope of safety and meets the requirements of the harmonized standards: PN-EN 60079-0; PN-EN 60079-11, PN-EN 62061, PN-EN ISO 13849-1, PN-EN 13463-5; PN-EN 60204-1, PN-EN 791, PN-EN 12111, PN-G 50007-.

Flame-proof transformer unit type ZTO -2/1 of 5000VA power is used for supplying of fixing hammer. Transformer unit is equipped with 2 feeders 3x230 V AC, of which one-phase feeder is used for supplying of fixing hammer TE MD 20 while second can be used for local lighting of place where drills are made.

Explosionproof execution

Fixing hammer TE MD 20

- I M2 Ex d I
- II 2G Ex d IIB T4

Transformer unit ZTO-2/1

- I M2 Ex d [ia, ib] I

Fixing hammer with supply system

- I M2 Ex d [ia, ib] I SYST Mb
- I M2 c Mb

Rated data of fixing hammer

Ingress protection
IP66

Rated current
15A

Rated power
2200W

Weight (without stand and supply cable)
23.5 kg

Sound pressure level at operator's ear
95 dB (A)

Vibrations (3-axis) of fixing hammer
13 m/s

Rated flow of cooling water
10 l/min

Rated data of transformer unit

Ingress protection
IP65

Rated supply voltage from network
3x500/1000V AC

Rated supply voltage of feeders
3x230V AC

Rated power
5000 VA

Weight
approx. 130

Conditions of operation

Ambient temperature
from -20°C to +40°C

Relative humidity
to 95% at temperature +40°C

Minimum flow of cooling water
4 l/min

Maximum temperature of cooling water
20°C

Heat exchanger type UC-W

Properties

- two thermal cycles,
- cooling by liquid or air,
- specified safety integrity level (SIL) for control circuits and safety circuits,
- transparent visualisation of operation modes,

PN-EN 60079-0; PN-EN 60079-1; PN-EN 60079-7; PN-EN 60079-11, PN-EN 62061, PN-EN ISO 13849-1. Safety integrity level of emergency tripping circuit SIL2.

Heat exchanger type UC-W*-** can be executed in two versions as:

- UC-WW-** exchanger, where heat is exchanged between liquid and liquid (e.g. water/water)
- UC-WP-** exchanger, where heat is exchanged between liquid and air (e.g. water/air)

Description

Heat exchanger type UC-W*-** is intended for use in cooling systems of equipment and machines requiring cooling with cooling liquid (UC-WW-**- water/water or UC-WP-** - water/air).

Heat exchanger UC-WW-** separates external liquid (e.g. water from fire fighting system of the mine) from internal liquid in cooling system of the equipment or machine protecting it against pollution by clogging and/or excessive increase of pressure.

Cooling liquid (e.g. water, glycol etc.) is located in the internal system of the UC-WP-** exchanger while heat from cooling system is received by air stream created by the fan(s).

These exchangers were executed according to the good engineering practices rules within the scope of safety and they meet the requirements of the standards

Explosion-proof protection

Marking depending on components used

Ⓔx I M2 Ex de [ia/ib] I

Ⓔx I M2 [Ex ia/ib] I

Ambient temperature

+4°C to +40°C

CE Type Examination Certificate

OBAC 07 ATEX 257X

Rated data

Ingress protection

IP55

Thermal power

2x25kW

Maximum power input

UC-WP-02/2.2 to 2x6kW

UC-WW-25 2x0.75kW

Maximum pressure of liquid in internal system

0.8 MPa

Maximum overall dimensions

UC-WP-02/2.2 2530x1650x1100mm

UC-WW-25 1600x1500x600mm

Weight

UC-WP-02/2.2 approx. 800kg

UC-WW-25 approx. 300kg

Operation position

vertical (vertical deviation ±15°)

Two heat cycles are distinguished in exchanger: external cycle, where heat is given up (resp. liquid or air) and internal cycle, which is the same for both types of equipment.

Selection chart

Utility	code	Utility	code	Number of cycles	code
water-water	WW	1 row of HP pumps	01	Enter number	
water-air	WP	2 rows of HP pumps	02		
		3 rows of HP pumps	03		
		4 rows of HP pumps	04		
		WW	25		

Code:	UCW -	**	-	**	-	*