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MOGILEVLIFTMASH HOLDING COMPANY



JSC ZENIT

LED LIGHTING FOR THE TRANSPORT FACILITIES

LED LIGHTING
FOR QUARRY MACHINERY

LED LIGHTING
FOR TRACTOR MACHINERY

LED LIGHTING
FOR AGRICULTURAL
MACHINERY

LED LIGHTING
FOR OFF-ROAD VEHICLES

LED LIGHTING FOR THE TRANSPORT FACILITIES
MANUFACTURED BY JSC ZENIT

Zenit Factory was founded in 1979 as an enterprise of Soviet military-industrial complex. Nowadays, JSC Zenit is a member of Mogilevliftmash Holding Company.

Main activity directions of JSC Zenit are development and manufacture of:

- electric-and-technical items for complete set of the lifts;
- LED head-lamps and lanterns for off-road machinery operated under heavy operating conditions;
- energy-efficient LED-products of general purpose.

This catalogue presents LED lighting for the transport facilities.

Distinctive feature of LED-products manufactured by JSC Zenit is high energy-efficiency which corresponds to leading global level. Herewith, much attention is given to qualitative characteristics of the light.

Direction of manufacture of LED automobile lighting facilities is considered to be perspective and unique on CIS territory, as off-road LED head-lamps of low beam light, high beam light and working light, as well as rear turn indicator lamps, position lamps, stop-signal lamps and fog lamps of various modifications for heavy operating conditions are the development products of the specialists of JSC Zenit, and they are not considered to be a constructive copy of lighting facilities of the other manufacturers.

JSC Zenit is both developer and manufacturer of LED products; it manufactures head-lamps and lanterns of required characteristics against an order.

LED head-lamps of working light presented below are used for quarry, agricultural, tractor, railway and the other similar machinery for operation out of the automobile roads. The head-lamps are also used for lighting of special machinery and drilling units. These head-lamps are supposed to find use in every place where reliability and high-quality light under heavy operating conditions are required.

Complete manufacturing process cycle allows controlling quality of the products during all stages of the manufacture.

JSC Zenit possesses the Certificate of Conformity of the Quality Management System for designing, manufacturing and technical maintenance of electric-and-technical items to the requirements of ISO 9001-2015 Standard. Product range is being constantly updated and improved in compliance with leading tendencies of development of lighting engineering industry branch.



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LED LIGHTING

FOR QUARRY MACHINERY

LED LIGHTING FOR QUARRY MACHINERY

NAME	INTENDED USE	NOTE
FROS 24 01 G2700 U1 (NF1) head lamp	High beam light	
FROS 24 01 O 2500 (NF1) head lamp	Low beam light	
FROS 24 01 S3 3300 U1 (NF1) head lamp	Low beam light	
FROS 24 01 S4 2000 U1 (NF) head lamp	Low beam light	
FROS 24 01 S 1400 U1 head lamp	Front fog light	
FROS 24 01 S1 2100 U1 head lamp	Front fog light	
FROS 24 01 S3A 1100 U1 head lamp	Front fog light	
FROS 24 01 27 B 1800 U1 (NF1) head lamp	Lighting of deck, hydraulic cylinders and motor	Cone chart 80°
FROS 24 01 27 N 1800 U1 (NF1) head lamp	Lighting of side space, rare wheel zones and area under vehicle body from behind	Cone chart 30°
FROS 24 01 P 2000 U1 (NF1) head lamp	Lighting of working elements of aggregated machines and working area	
DKU 03 2x40-050-NF1 luminaire	Front light	Cranes, excavating machines, lighting towers, masts, etc. Upow=220V
DKU 03 2x40-050-NF1 luminaire	Front light	Cranes, excavating machines, lighting towers, masts, etc. Upow=220V
FROS 24 01 S5R 800 U1 head lamp	Marking of the rare side of machinery. Creation of red-light signals	Safety area of excavating machines
FZKH 01 24 U1 (NF1)	Back-run lantern	
FZP 01 24 U1 (NF1, A)	Rear fog lantern	
FZUP 01 24 U1 (NF1, A, E, FI)	Rear turn indicator lantern	
FZS 01 24 U1 (NF1, A, E)	Rear position lamps and stop-signal lamps	
FZS1 01 24 U1	Turn indicator and back-run signal	
FZS2 01 24 U1	Position lamps, stop-signal and turn indicator	
FPS 02 24 U1 (NF1, E), FPS1 02 24 U1	Front combined lantern	
FSB 01 24 U1 (NF1, A)	White signal lantern	
FKZ 01 24 U1	Red-and-green lantern	



LED HEAD-LAMP
OF WORKING LIGHT
(HIGH BEAM LIGHT)

FROS 24 01 G 2700 U1
FROS 24 01 G 2700 NF1
TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 24 01 G 2700 LED head-lamp of working light is used to create high beam light at quarry machinery.

The head-lamp optics is optimized for the installation height 1-4m. The head-lamp provides distance range 150-170m; herewith, it creates efficient illumination nearby the machine, which helps not lose bearings in external environment.

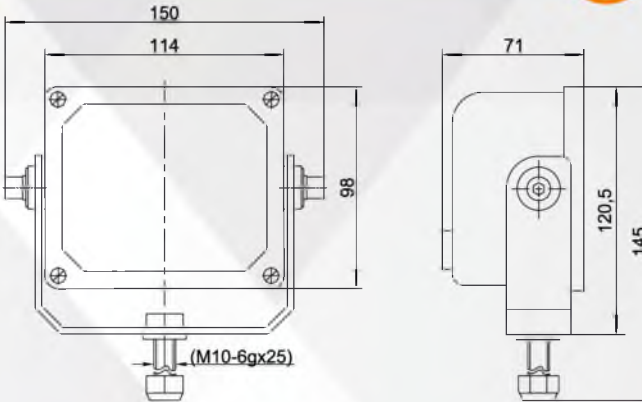
TECHNICAL CHARACTERISTICS

Parameter name	Value
Rated value of efficient light flux, lm	2700
Working illumination distance range of a single head-lamp at optical axis regarding 10lx level, m	45-50
Illumination distance range of a single head-lamp at optical axis regarding 1lx level, m	150-170
Colour temperature, K	5000
Power supply voltage range, V	from 21.6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	32
Working range of operation temperature, °C	от -40 до +60
Extreme range of operation temperature, °C	от -55 до +60
Protection level	IP67
Climatic modification	U1,NF1
Weight, kg	1,2
Warranty period	2 years, or 2000 running hours
Service life period, years	12

DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body is made of molded aluminum, with composition of advanced resistance to corrosion;
- structural items are additionally protected with powder enamel;
- at O1 climatic modification, fastening elements and the bracket are made of stainless steel;
- light-transmitting element is made of impact-proof polycarbonate with UV-protection;
- the head-lamp creates pure white light without blueness and yellowness;
- polarity of connection does not matter;
- it is equipped with pin power socket of DT series manufactured by "Deutsch" company (against an order, it can be equipped with the cable of necessary length; it is possible to use it with different pin socket or without it);
- it corresponds to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility.

OVERALL DIMENSIONS



LED head lamps of FROS series are the awardee of "The best goods of the Republic of Belarus"-2019 contest, in nomination "Products of production-and-technical purpose".



LED HEAD-LAMP
OF WORKING LIGHT
(LOW BEAM LIGHT)

FROS 24 01 O 2500 U1
FROS 24 01 O 2500 NF1
TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 24 01 O 2500 LED head-lamp of working light is used to create low beam light at quarry machinery. The head-lamp optics is optimized for creation of a light spot with depth up to 80m and angle 45-50° to horizon.

The head-lamp is given measures to prevent blinding at correct head-lamp's angle of slope. The head-lamp is equipped with the angle of slope scale; it is delivered with pre-installed angle 5°. Taking into account optic characteristics of the head-lamp, this angle is considered to be optimal for the installation height 1-3m. It helps to avoid the necessity of labour-intensive operation of head-lamp adjustment in regard to the angle of slope during operation of machinery.

High distance range of the head-lamp light allows not to use high beam light in many cases, and it helps to avoid blinding. It provides incomparably better illumination quality during replacement of halogen head-lamps; it exceeds xenon light and does not require replacement in course of operation of high-cost xenon lamps.

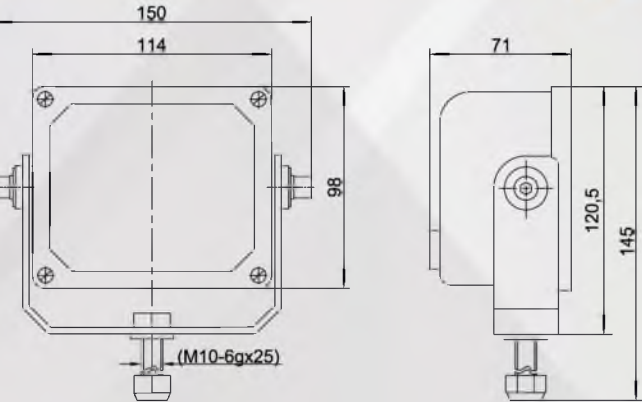
TECHNICAL CHARACTERISTICS

Parameter name	Value
Rated value of efficient light flux, lm	2500
Working illumination distance range of a single head-lamp at optical axis regarding 10lx level, m	25-30
Illumination distance range of a single head-lamp at optical axis regarding 1lx level, m	90-100
Colour temperature, K	5000
Power supply voltage range, V	from 21.6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	32
Working range of operation temperature, °C	from -40 to +60
Extreme range of operation temperature, °C	from -55 to +60
Protection level	IP67
Climatic modification	U1, NF1
Weight, kg	1,2
Warranty period	2 years, or 2000 running hours
Service life period, years	12

DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body is made of molded aluminum, with composition of advanced resistance to corrosion;
- structural items are additionally protected with powder enamel;
- at O1 climatic modification, fastening elements and the bracket are made of stainless steel;
- light-transmitting element is made of impact-proof polycarbonate with UV-protection;
- the head-lamp creates pure white light without blueness and yellowness;
- polarity of connection does not matter;
- it is equipped with pin power socket of DT series manufactured by "Deutsch" company (against an order, it can be equipped with the cable of necessary length; it is possible to use it with different pin socket or without it);
- it corresponds to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility.

OVERALL DIMENSIONS





LED HEAD-LAMP
OF WORKING LIGHT
(LOW BEAM LIGHT)

FROS 24 01 S3 3300 U1
FROS 24 01 S3 3300 NF1
TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 24 01 S3 3300 LED head-lamp of working light is used to create low beam light at quarry machinery.

As compared to FROS 24 01 O 2500 LED head-lamp, it provides wider (up to 140 degrees) angle nearby the cabin, thus improving the view while making turning. The head-lamp is given measures to prevent blinding at correct head-lamp's angle of slope. The head-lamp is equipped with the angle of slope scale; it is delivered with pre-installed angle 5°. Taking into account characteristics of the head-lamp, this angle is considered to be optimal one for the installation height 1-3m. It helps to avoid the necessity of labour-intensive operation of head-lamp adjustment in regard to the angle of slope during operation of machinery. High distance range of the head-lamp light allows not to use high beam light in many cases, and it helps to avoid blinding. It provides incomparably better illumination quality during replacement of halogen head-lamps; it exceeds xenon light and does not require replacement in course of operation of high-cost xenon lamps.

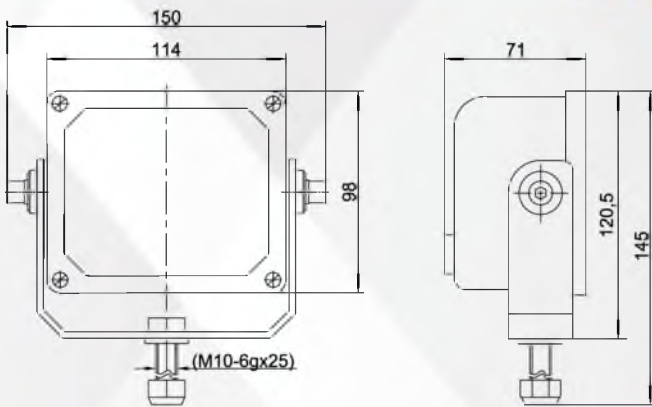
TECHNICAL CHARACTERISTICS

Parameter name	Value
Rated value of efficient light flux, lm	3300
Working illumination distance range of a single head-lamp at optical axis regarding 10lx level, m	25-30
Illumination distance range of a single head-lamp at optical axis regarding 1lx level, m	90-100
Colour temperature, K	5000
Power supply voltage range, V	from 21.6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	38
Working range of operation temperature, °C	от -40 до +60
Extreme range of operation temperature, °C	от -55 до +60
Protection level	IP67
Climatic modification	U1, NF1
Weight, kg	1,2
Warranty period	2 years, or 2000 running hours
Service life period, years	12

DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body is made of molded aluminum, with composition of advanced resistance to corrosion;
- structural items are additionally protected with powder enamel;
- at O1 climatic modification, fastening elements and the bracket are made of stainless steel;
- light-transmitting element is made of impact-proof polycarbonate with UV-protection;
- the head-lamp creates pure white light without blueness and yellowness;
- polarity of connection does not matter;
- it is equipped with pin power socket of DT series manufactured by "Deutsch" company (against an order, it can be equipped with the cable of necessary length; it is possible to use it with different pin socket or without it);
- it corresponds to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility.

OVERALL DIMENSIONS



LED HEAD-LAMP
OF WORKING LIGHT
(ANTIDAZZLING
LOW BEAM LIGHT)

FROS 24 01 S4 2000 U1 (NF1)
TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 24 01 S4 2000 U1 and FROS 24 01 S4 2000 NF1 LED head-lamp is used to create low beam light at quarry, agricultural, road, tractor and other similar types of machinery for operation out of the roads.

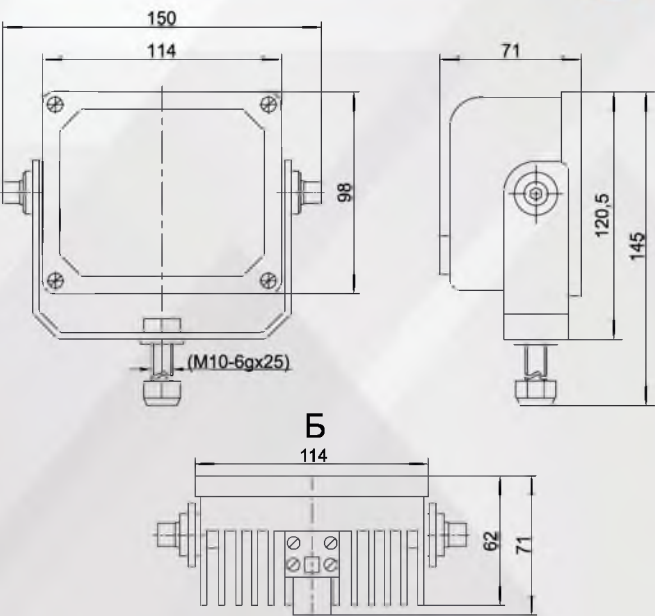
TECHNICAL CHARACTERISTICS

Parameter name	Value
Rated value of efficient light flux, lm	2000
Colour temperature, K	5000
Power supply voltage range, V	from 21.6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	32
Head-lamp weight, kg	1,13
Enclosure protection level	IP67
Working range of operation temperature, °C	from -40 to +60
Extreme range of operation temperature, °C	from -55 to +60
Climatic modification	U1, NF1

DISTINCTIVE FEATURES

- antidazzling function is realized in this head-lamp: the drivers of the opposite automobiles are not blinded, herewith the roadway and overall dimensions of the opposite automobiles are well illuminated;
- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body is made of molded aluminum;
- light-transmitting element is made of impact-proof polycarbonate;
- it is produced in two climatic modification variants: U1 - general climatic modification used for any climatic area; NF1 - for the areas of moderate and cold climate;
- pin power socket of DT series manufactured by "Deutsch" company;
- polarity of connection does not matter;
- it corresponds to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility.

OVERALL DIMENSIONS



LED head lamps of FROS series are the awardee of "The best goods of the Republic of Belarus"-2019 contest, in nomination "Products of production-and-technical purpose".



LED head lamps of FROS series are the awardee of "The best goods of the Republic of Belarus"-2019 contest, in nomination "Products of production-and-technical purpose".





LED HEAD-LAMP
OF WORKING LIGHT
(FRONT FOG LIGHT)

FROS 24 01 S 2000 U1
FROS 24 01 S1 2100 U1
FROS 24 01 S3A 1100 U1
TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 24 01 S 2000, FROS 24 01 S1 2100 and FROS 24 01 S3A 1100 LED head-lamps of working light are used at quarry machinery as front working fog light. They can be used under different conditions, when the beam narrow height-wise and broad horizon-wise is required.

DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body is made of molded aluminum, with composition of advanced resistance to corrosion;
- structural items are additionally protected with powder enamel;
- at O1 climatic modification, fastening elements and the bracket are made of stainless steel;
- light-transmitting element is made of impact-proof polycarbonate with UV-protection;
- the head-lamp creates pure white light without blueness and yellowness;
- polarity of connection does not matter;
- it is equipped with pin power socket of DT series manufactured by "Deutsch" company (against an order, it can be equipped with the cable of necessary length; it is possible to use it with different pin socket or without it);
- it corresponds to the Rule of ECE UNO No. 10 in regard to

TECHNICAL CHARACTERISTICS

Parameter name	S 2000	S1 2100	S3A 1100
Rated value of efficient light flux, lm	1400	2100	1100
Light-emission colour	white	white	yellow
Working illumination distance range of a single head-lamp at optical axis regarding 10lx level, m	17	20	16
Illumination distance range of a single head-lamp at optical axis regarding 1lx level, m	60	65	50
Colour temperature, K	5000	5000	-
Power supply voltage range, V	from 21,6 to 36	from 21,6 to 36	from 21,6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64	64	64
Power consumption, W	32	32	24
Working range of operation temperature, °C	from -40 to +60	from -40 to +60	from -40 to +60
Extreme range of operation temperature, °C	from -55 to +60	from -55 to +60	from -55 to +60
Protection level	IP67	IP67	IP67
Climatic modification	U1, NF1	U1, NF1	U1, NF1
Weight, kg	1,2	1,2	1,2
Warranty period	2 years	2 years	2 years
Service life period, years	12	12	12



LED HEAD-LAMP
OF WORKING LIGHT

FROS 24 01 27 B 1800 U1
FROS 24 01 B 1800 NF1
TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 24 01 27 B 1800 LED head-lamp of working light is intended to create light in nearby area; it is used for lighting of the deck, hydraulic cylinders and the motor at quarry machines. Due to broad beam of moderate luminous power, it does not blind even in the area of the head-lamp optical axis.

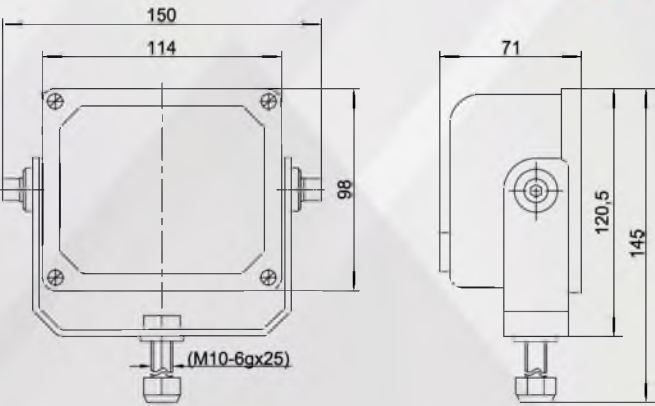
TECHNICAL CHARACTERISTICS

Parameter name	Value
Rated value of efficient light flux, lm	1800
Working illumination distance range of a single head-lamp at optical axis regarding 10lx level, m	3,5
Illumination distance range of a single head-lamp at optical axis regarding 1lx level, m	10
Colour temperature, K	5000
Power supply voltage range, V	from 21,6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	27
Working range of operation temperature, °C	from -40 to +60
Extreme range of operation temperature, °C	from -55 to +60
Protection level	IP67
Climatic modification	U1, NF1
Weight, kg	1,2
Warranty period	2 years, or 2000 running hours
Service life period, years	12

DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body is made of molded aluminum, with composition of advanced resistance to corrosion;
- structural items are additionally protected with powder enamel;
- at O1 climatic modification, fastening elements and the bracket are made of stainless steel;
- light-transmitting element is made of impact-proof polycarbonate with UV-protection;
- the head-lamp creates pure white light without blueness and yellowness;
- polarity of connection does not matter;
- it is equipped with pin power socket of DT series manufactured by "Deutsch" company (against an order, it can be equipped with the cable of necessary length; it is possible to use it with different pin socket or without it);
- it corresponds to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility.

OVERALL DIMENSIONS





LED HEAD-LAMP
OF WORKING LIGHT

FROS 24 01 27 N 1800 U1
FROS 24 01 N 1800 NF1
TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 24 01 P 2000 LED head-lamp of working light is used at quarry machinery for lighting the working units, aggregated machines and tools, and working site. The head-lamp optics creates a beam of oval shape providing possibility of substitution of the halogen head-lamps of oval shape. It is installed at the deck for lighting the side space and as a back-run head lamp.



TECHNICAL CHARACTERISTICS



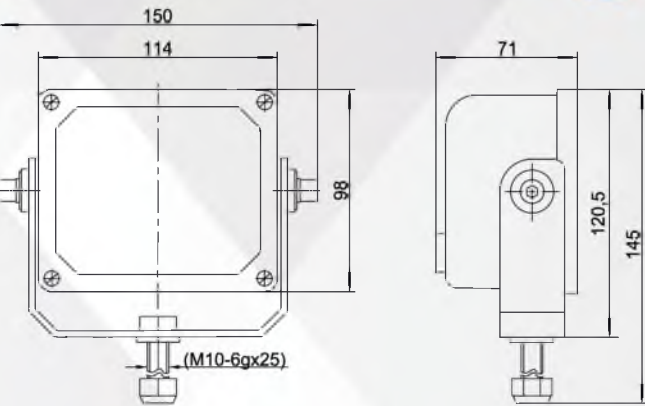
Parameter name	Value
Rated value of efficient light flux, lm	1800
Working illumination distance range of a single head-lamp at optical axis regarding 10lx level, m	15-20
Illumination distance range of a single head-lamp at optical axis regarding 1lx level, m	60-65
Colour temperature, K	5000
Power supply voltage range, V	from 21.6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	27
Working range of operation temperature, °C	from -40 to +60
Extreme range of operation temperature, °C	from -55 to +60
Protection level	IP67
Climatic modification	U1; NF1
Weight, kg	1,13
Warranty period	2 years, or 2000 running hours
Service life period, years	12

DISTINCTIVE FEATURES



- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body is made of molded aluminum, with composition of advanced resistance to corrosion;
- structural items are additionally protected with powder enamel;
- at O1 climatic modification, fastening elements and the bracket are made of stainless steel;
- light-transmitting element is made of impact-proof polycarbonate with UV-protection;
- the head-lamp creates pure white light without blueness and yellowness;
- polarity of connection does not matter;
- it is equipped with pin power socket of DT series manufactured by "Deutsch" company (against an order, it can be equipped with the cable of necessary length; it is possible to use it with different pin socket or without it);
- it corresponds to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility.

OVERALL DIMENSIONS



LED HEAD-LAMP
OF WORKING LIGHT

FROS 24 01 P 2000 U1
FROS 24 01 P 2000 NF1
TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 24 01 P 2000 LED head-lamp of working light is used at quarry machinery for lighting the working units, aggregated machines and tools, and working site. The head-lamp optics creates a beam of oval shape providing possibility of substitution of the halogen head-lamps of oval shape. It is installed at the deck for lighting the side space and as a back-run head lamp.



TECHNICAL CHARACTERISTICS



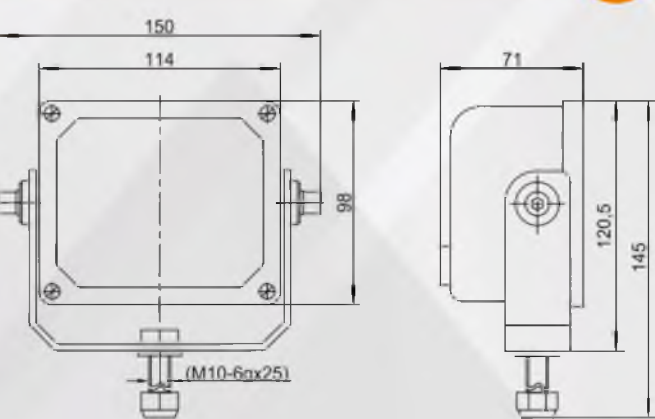
Parameter name	Value
Rated value of efficient light flux, lm	2000
Working illumination distance range of a single head-lamp at optical axis regarding 10lx level, m	15-20
Illumination distance range of a single head-lamp at optical axis regarding 1lx level, m	55-65
Colour temperature, K	5000
Power supply voltage range, V	from 21.6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	27
Working range of operation temperature, °C	from -40 to +60
Extreme range of operation temperature, °C	from -55 to +60
Protection level	IP67
Climatic modification	U1, NF1
Weight, kg	1,13
Warranty period	2 years, or 2000 running hours
Service life period, years	12

DISTINCTIVE FEATURES



- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body is made of molded aluminum, with composition of advanced resistance to corrosion;
- structural items are additionally protected with powder enamel;
- at U1 climatic modification, fastening elements and the bracket are made of stainless steel;
- light-transmitting element is made of impact-proof polycarbonate with UV-protection;
- the head-lamp creates pure white light without blueness and yellowness;
- polarity of connection does not matter;
- it is equipped with pin power socket of DT series manufactured by "Deutsch" company (against an order, it can be equipped with the cable of necessary length; it is possible to use it with different pin socket or without it);
- it corresponds to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility.

OVERALL DIMENSIONS





LED luminaire (head-lamp)

DKU 03 2x40-050-NF1
TY BY 700002620.065-2017

INTENDED PURPOSE

DKU 03 2x40-050-NF1 LED luminaire (head-lamp) is intended to be used as working light at quarry machinery and similar equipment. It can be used for installation at load-bearing structures of advanced level of blows and vibrations (cranes, excavating machines, etc., as well as lighting towers, masts, etc.). DKU luminaire was developed to replace PITMASTER MIL-PMX3060PS spotlight and similar items at contemporary technical level of the best electrical features and optic parameters improved in significant way. The head-lamp is characterized with advanced reliability and survivability under heavy operating conditions.

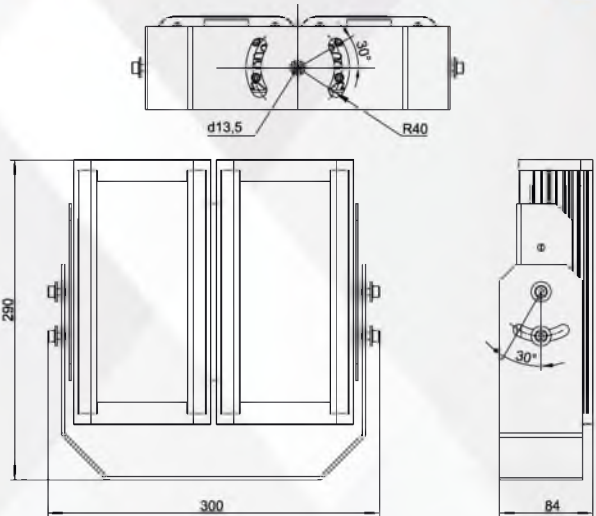
TECHNICAL CHARACTERISTICS

Parameter name	Value
Rated LED light flux, lm	14 000
LED luminous efficiency, lm/W	164,5
Rated luminaire light flux, lm	12 000
Luminaire luminous efficiency, lm/W	131
Rated light power, Cd	48 000
Rated illumination from a single head-lamp at 40m distance, lx	30
Colour temperature, K	5 000
Light pulse factor, not above, %	1,0
Generic colour rendering index Ra	77
Power supply voltage of alternating current of 50Hz frequency, V	176-264
Rated power consumption, W	91
Power ratio, not less	0,97
Extreme range of operation temperature, °C	from -60 to +50
Protection level	IP67
Climatic modification	NF1
Weight, kg	5,4
Warranty period, years	3
Service life period, years	15

DISTINCTIVE FEATURES

- LEDs in a spotlight are distributed into two independent modules with built-in power supply units; in composition with large square of the radiators, it provides low heat resistance for heat transfer from LEDs and low temperature of LED heating;
- protective glass is made of high-strength polycarbonate with UV-protection which does not turn yellow in course of time;
- body is made of anodized aluminum protected against corrosion;
- power supply units are designed for operation under conditions of heavy deviations of supply voltages, voltage drops, emergency increase of supply voltage to inter-phase level, etc.;
- protective glass is provided with reliable leak-tight fastening, with the use of a silicone sealing cord resistant to high temperature and aging;
- to provide resistance to the blows and vibrations, multi-step system of blow energy absorption and fluctuation damping is used in a spotlight;
- fastening holes for spotlight installation can be changed according to a customer's choice.

OVERALL DIMENSIONS



LED HEAD-LAMP OF WORKING LIGHT

FROS 24 01 S5R 800 U1
TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 24 01 S5R 800 U1 LED head-lamp is used to create safety zones of red colour, entrance to which is forbidden during manufacturing activity at quarry, agricultural, road, tractor and other similar machinery for operation out of roads. The head-lamp allows to prevent clash of the rotating elements of excavating machines with the process and other types of transport.

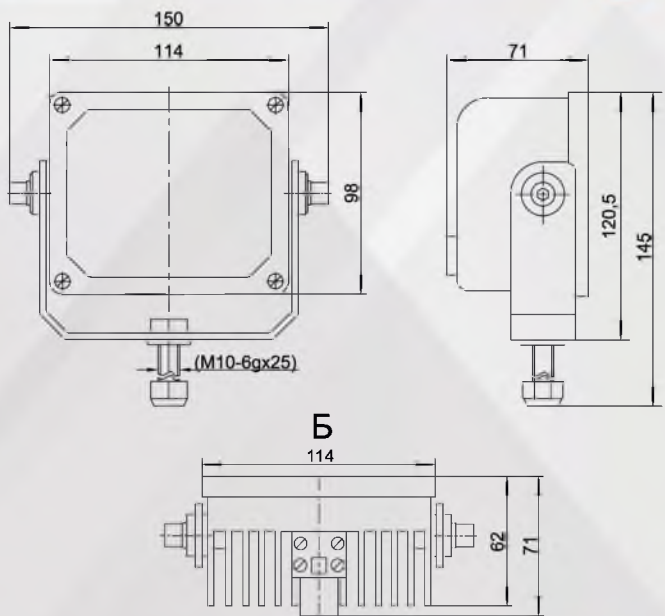
TECHNICAL CHARACTERISTICS

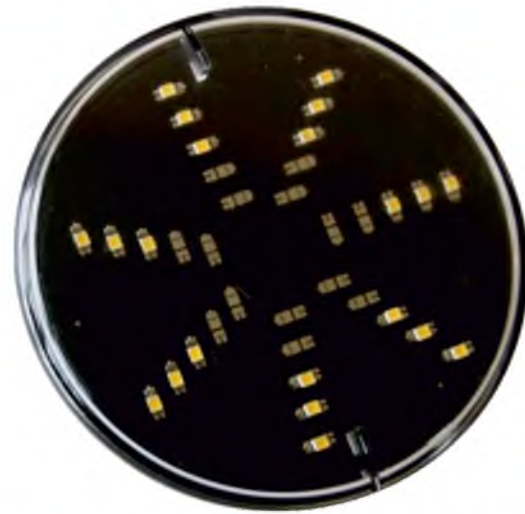
Parameter name	Value
Rated value of efficient light flux, lm	800
Light colour	red
Dominant wavelength	620
Power supply voltage range, V	from 21.6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	32
Weight, kg	1,13
Enclosure protection level	IP67
Working range of operation temperature, °C	from -40 to +60
Extreme range of operation temperature, °C	from -55 to +60
Climatic modification	U1, NF1

DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body is made of molded aluminum;
- light-transmitting element is made of impact-proof polycarbonate;
- pin power socket of DT series manufactured by "Deutsch" company;
- polarity of connection does not matter;
- it corresponds to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility.

OVERALL DIMENSIONS





LED back-run lantern

FZKH 01 24 U1
FZKH 01 24 NF1
TY BY 700002620.058-2013

INTENDED PURPOSE

FZKH 01 24 LED back-run lantern is used to create back-run light at quarry machines.

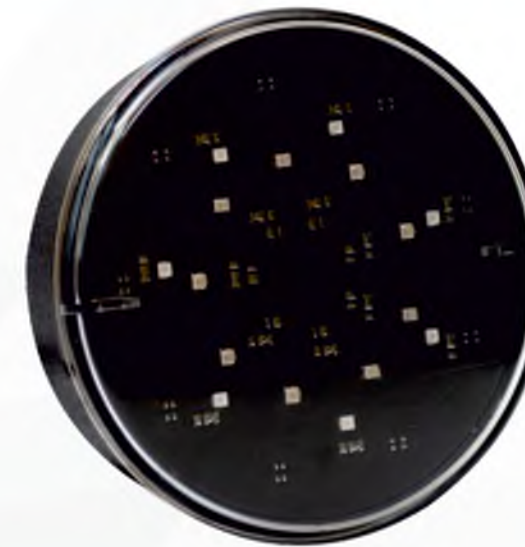
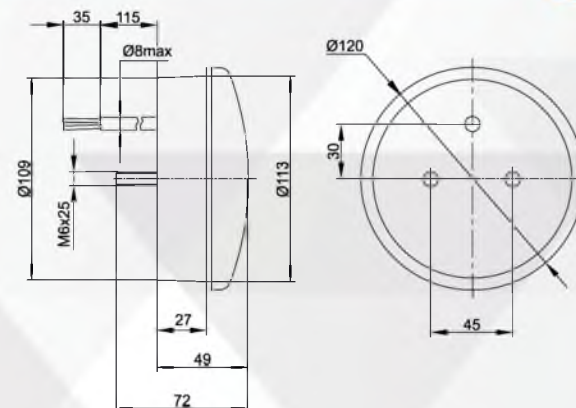
TECHNICAL CHARACTERISTICS

Parameter name	Value
Power supply voltage range, V	from 21.6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	4
Range of operation temperature, °C	from -55 to +60
Protection level	IP67
Climatic modification	U1, NF1
Weight, kg	0,28
Warranty period, years	2
Service life period, years	12

DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body and light-transmitting element are made of impact-proof polycarbonate;
- fastening elements are made of stainless steel;
- polarity of connection does not matter;
- it can be equipped with the cable of required length and size;
- photometric and colorimetric parameters correspond to the Rule of ECE UNO No. 23;
- it corresponds to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility.

OVERALL DIMENSIONS



LED rear fog lantern

FZKH 01 24 U1
FZKH 01 24 NF1
TY BY 700002620.058-2013

INTENDED PURPOSE

FZP 01 24 LED rear fog lantern is used to create rear fog light at quarry machinery.
Structure and optical characteristics of the lantern are optimized to provide high visibility of a transport vehicle under conditions of fog of various origin, including fog at extreme low temperatures. It provides proper visibility under conditions of mud accumulation.
FZP 01 24 U1 A lantern is delivered at a bracket; its cable is equipped with a terminal block of pin series, of 6.3mm size, produced by Tyco Electronics company.

TECHNICAL CHARACTERISTICS

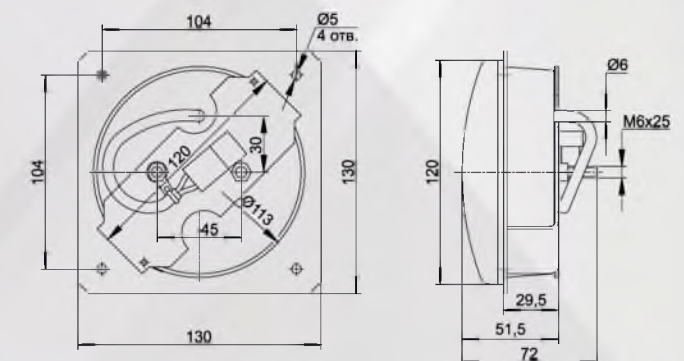
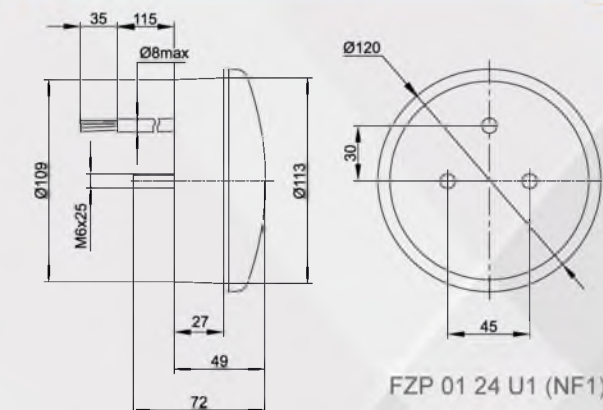
Parameter name	Value
Power supply voltage range, V	from 21.6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	3,5
Range of operation temperature, °C	from -55 to +60
Protection level	IP67
Climatic modification	U1, NF1
Weight, kg	
- FZP 01 24 O1 (NF1)	0,28
- FZP 01 24 O1 A	0,48
Warranty period, years	2
Service life period, years	12

DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body and light-transmitting element are made of impact-proof UV-stabilized polycarbonate ;
- fastening elements are made of stainless steel;
- polarity of connection does not matter;

- it can be equipped with the cable of required length and size;
- photometric and colorimetric parameters correspond to the Rule of ECE UNO No. 23;
- it corresponds to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility.

OVERALL DIMENSIONS



FZP 01 24 U1 A
(at the bracket, with a terminal block of pin series, of 6.3mm size)



LED rear turn indicator lantern

FZUP 01 24 U1 FZUP 01 24 U1 FI
FZUP 01 24 NF1 FZUP 01 12 U1 FI
FZUP 01 24 U1 A
TY BY 700002620.058-2013

INTENDED PURPOSE

FZUP 01 24 LED rear turn indicator lantern is used to create rare turn indicator signal at quarry machines.

FZUP 01 24 U1 A lantern is delivered at a bracket; its cable is equipped with a terminal block of pin series, of 6.3mm size, produced by Tyco Electronics company.

FZUP 01 24 U1 E lantern is delivered with Superseal 1.5 contact socket at the cable.

FZUP 01 24 U1 FI lantern is equipped with a pulse former in compliance with ISO 13207-1 to provide proper operation of turn signal indication.

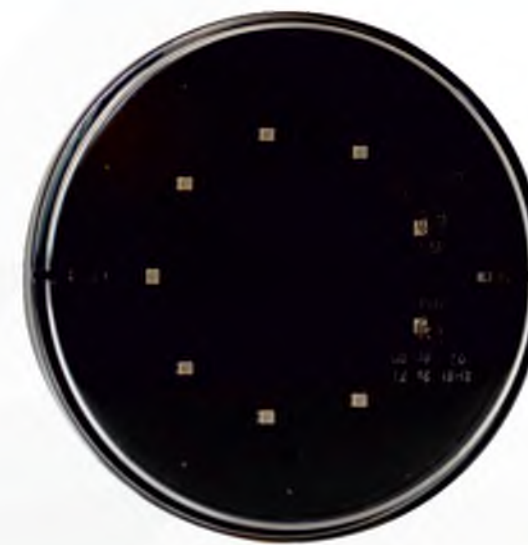
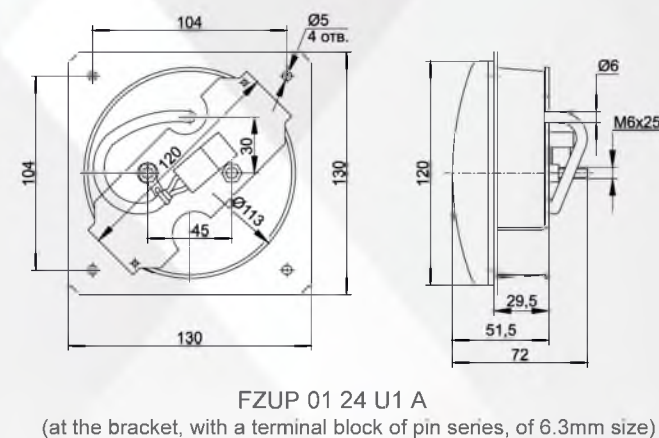
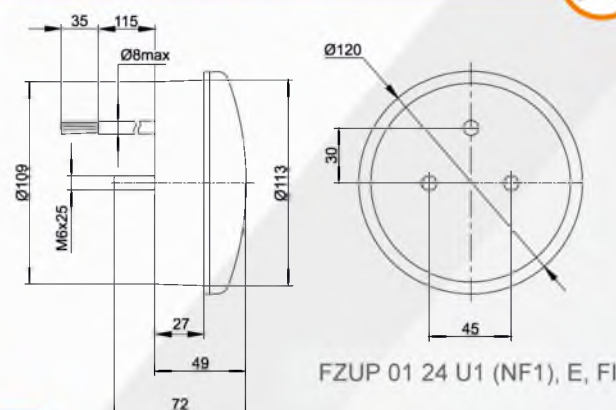
TECHNICAL CHARACTERISTICS

Parameter name	Value
Power supply voltage range, V	from 21.6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	3,5
Range of operation temperature, °C	from -55 to +60
Protection level	IP67
Climatic modification	U1, NF1
Weight, kg	
- FZUP 01 24 U1 (NF1) E, FI	0,28
- FZUP 01 24 U1 A	0,48
Warranty period, years	2
Service life period, years	12

DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body and light-transmitting element are made of impact-proof UV-stabilized polycarbonate ;
- fastening elements are made of stainless steel;
- polarity of connection does not matter;

OVERALL DIMENSIONS



LED rear combined lantern

FZS 01 24 U1 **FZS2 01 24 U1 FI**
FZS 01 24 NF1 **FZS2 01 12 U1**
FZS 01 24 U1 A **FZS2 01 12 U1 FI**
 TY BY 700002620.058-2013

INTENDED PURPOSE

FZS 01 24 LED rear combined lantern is used to create rear position light and stop-signal at quarry machinery. It provides advanced visibility under extreme low temperatures and under conditions of mud contamination.

FZS 01 24 U1 A lantern is delivered at a bracket; its cable is equipped with a terminal block of pin series, of 6.3mm size, produced by Tyco Electronics company. FZS 01 24 U1 E lantern is delivered with Superseal 1.5 contact socket at the cable. Composition of FZS1 01 24 U1 lantern includes turn indicator and back-run signal. Composition of FZS2 01 24 U1 lantern includes turn indicator, position lights and stop-signal.

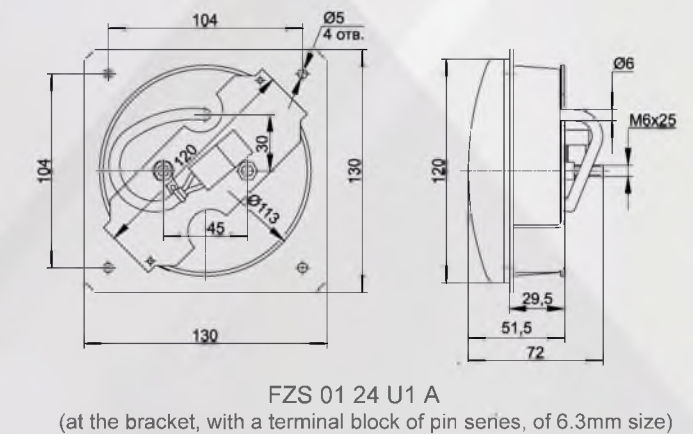
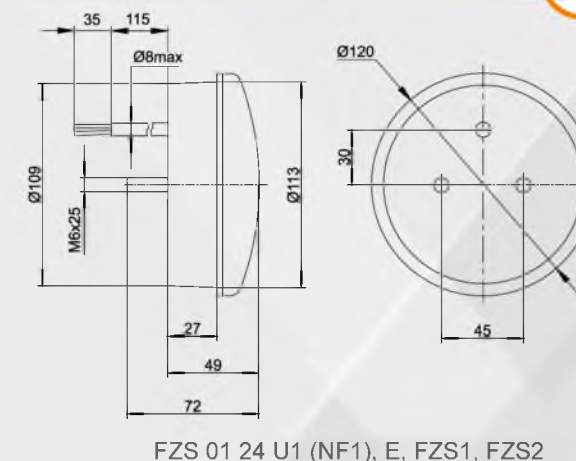
TECHNICAL CHARACTERISTICS

Parameter name	Value
Power supply voltage range, V	from 21.6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	0,3/1,7
Range of operation temperature, °C	from -55 to +60
Protection level	IP67
Climatic modification	U1, NF1
Weight, kg	
- FZS 01 24 U1 (UKHL1) E, FZS1, FZS2	0,28
- FZS 01 24 U1 A	0,48
Warranty period, years	2
Service life period, years	12

DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body and light-transmitting element are made of impact-proof UV-stabilized polycarbonate ;
- fastening elements are made of stainless steel;
- polarity of connection does not matter;

OVERALL DIMENSIONS





LED front combined lantern

FPS 02 24 U1

FPS1 02 24 U1

FPS1 02 24 U1 FI

FPS1 02 12 U1

FPS1 02 12 U1 FI

TY BY 700002620.058-2013

INTENDED PURPOSE

FPS 02 24 LED front combined lantern is used to create daytime running lights, position lights and turn indicators at quarry machines. It provides advanced visibility at extreme low temperatures and under conditions of mud contamination. FPS 02 24 U1 E lantern is delivered with Superseal 1.5 contact socket at the cable.

FPS1 02 24 U1 lantern is produced without daytime running light.

TECHNICAL CHARACTERISTICS

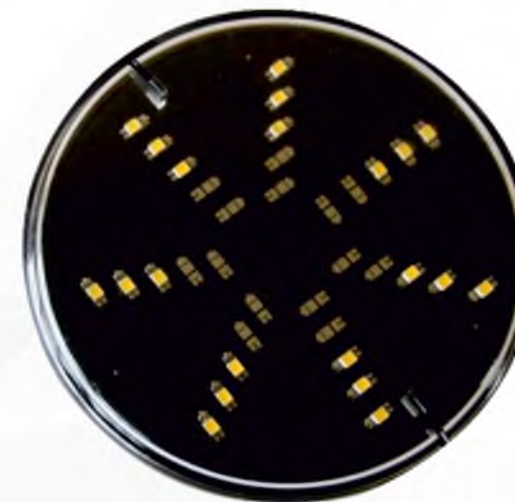
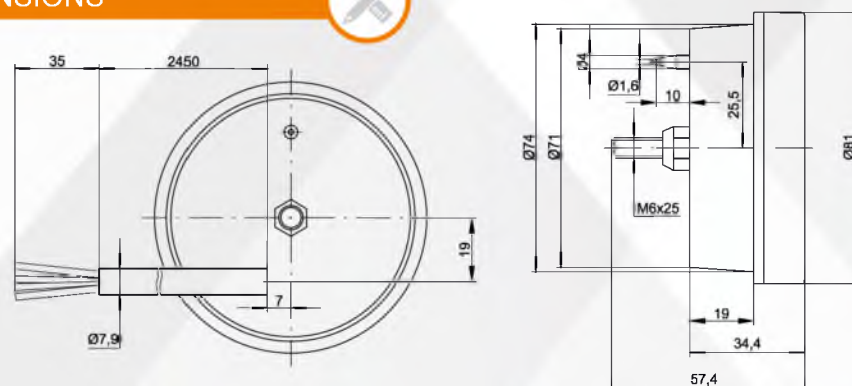
Parameter name	Value
Power supply voltage range, V	from 21.6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	3,5/0,8/3,5
Range of operation temperature, °C	from -55 to +60
Protection level	IP67
Climatic modification	U1,,NF1
Weight, kg	0,2
Warranty period, years	2
Service life period, years	12

DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable conditions of the environment;
- body and light-transmitting element are made of impact-proof UV-stabilized polycarbonate;
- polarity of connection does not matter;
- it can be installed either at the left, or at the right part of a transport vehicle;
- lighting colour of the turn indicators is auto-yellow; lighting colour of the position lights and daytime running lights is white;

- photometric and colorimetric parameters of a turn indicator correspond to the Rule of ECE UNO No. 6; these parameters of the positions lights correspond to the Rule of ECE UNO No. 7; these parameters of daytime running lights correspond to the Rule of ECE UNO No. 87;
- they correspond to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility;
- the lanterns are connected by means of the cable of 2.5m length without a contact socket;
- against a customer's order, it can be equipped with the cable of required length and required size.

OVERALL DIMENSIONS



LED signal white lantern

FSB 01 24 U1

FSB 01 24 U1 A

FSB 01 24 NF1

TY BY 700002620.058-2013

INTENDED PURPOSE

FSB 01 24 LED signal white lantern is used to create white signal of load control at quarry machinery. It provides advanced visibility at extreme low temperatures and under conditions of mud contamination.

FSB 01 24 U1 lantern is delivered at a bracket; its cable is equipped with a terminal block of pin series, of 6.3mm size, produced by Tyco Electronics company.

TECHNICAL CHARACTERISTICS

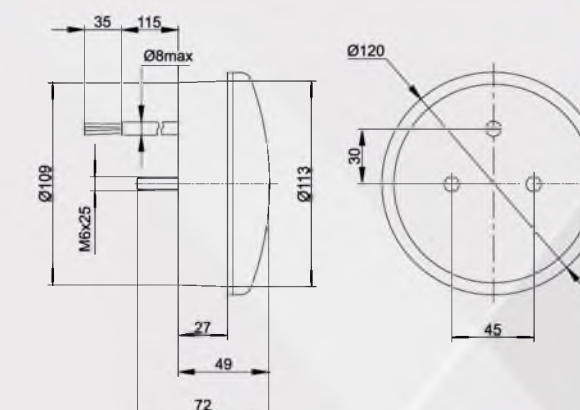
Parameter name	Value
Power supply voltage range, V	from 21.6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	4
Range of operation temperature, °C	from -55 to +60
Protection level	IP67
Climatic modification	U1, NF1
Weight, kg	
- FSB 01 24 U1' (NF1)	0,28
- FSB 01 24 U1 A	0,48
Warranty period, years	2
Service life period, years	12

DISTINCTIVE FEATURES

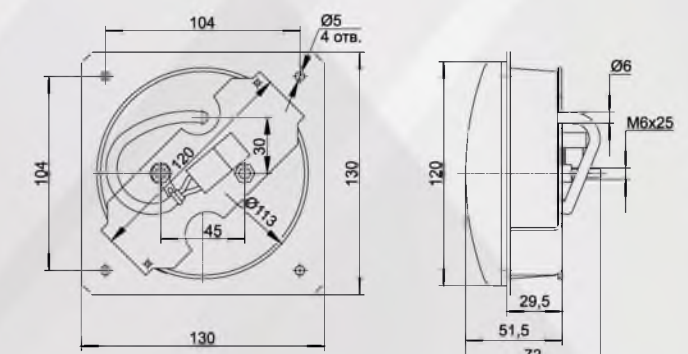
- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body and light-transmitting element are made of impact-proof UV-stabilized polycarbonate ;
- fastening elements are made of stainless steel;
- polarity of connection does not matter;

- it can be equipped with the cable of required length and size;
- it corresponds to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility.

OVERALL DIMENSIONS

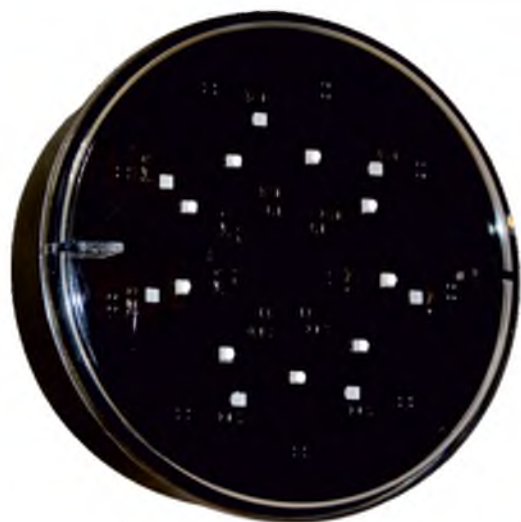


FSB 01 24 U1 (NF1)



FSB 01 24 U1 A

(at the bracket, with a terminal block of pin series, of 6.3mm size)



LED red-and-green lantern

FKZ 01 24 U1

TY BY 700002620.058-2013

INTENDED PURPOSE

FKZ 01 24 U1 LED red-and-green lanterns are used to create red and green signals at quarry, agricultural, road, tractor and other similar machinery. Lanterns of FKZ series are characterized with advanced reliability and survivability under heavy conditions; they are manufactured on the basis of lanterns widely used at quarry machinery by JSC BELAZ.

TECHNICAL CHARACTERISTICS

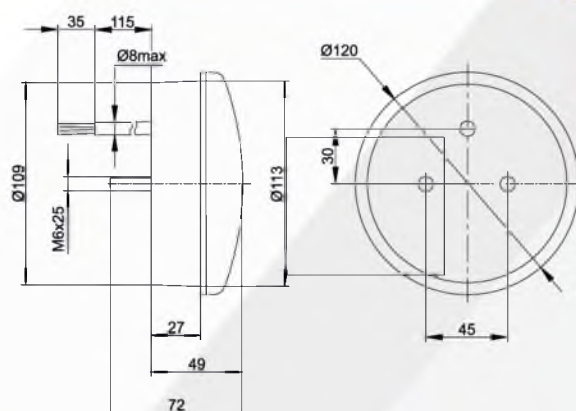
Parameter name	Value
Rated power supply voltage, V	24
Power supply voltage range, V	from 21.6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption: in red light mode / in green light mode, W	1,3/2,8
Weight, kg	0,28
Enclosure protection level	IP67
Climatic modification	U1
Range of operation temperature, °C	from -55 to +60
Warranty period, years	2
Service life period, years	12

DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body and light-transmitting element are made of impact-proof UV-stabilized polycarbonate;
- it can be manufactured in two variants of climatic modification: U1 - general climatic modification; it is used for any climatic zone; HF1 - for zones with moderate and cold climate;

- the lanterns are connected by means of mounted cable (cable length is up to the customer's choice; by default the length is 115mm; socket is not installed). Up to the customer's choice, it can be manufactured with various socket types, for example, DT by Deutsch company, AMP SUPERSEAL, or without socket;
- it corresponds to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility.

OVERALL DIMENSIONS



NAME	INTENDED USE	NOTE
12 01 O1 1000 U1 G (G1, G2) FROS head-lamp	Illumination of working areas	In accordance with GOST 12.2.019-2005
12 01 O2 2400 U1 G (G1, G2) FROS head-lamp	Low beam light of working areas of energy-loaded tractors	Illumination being many times improved regarding GOST 12.2.019-2005
24 01 P 2000 U1 (NF1) FROS head-lamp	Medium range light	
24 01 G 2700 U1 (NF1) FROS head-lamp	High beam light	
24 01 O 2500 U1 (NF1) FROS head-lamp	Low beam light	
24 01 27 B 1800 U1 (NF1) FROS head-lamp	Short range light	
24 01 S3 3300 U1 (NF1) FROS head-lamp	Low beam light	
24 01 27 N 1800 U1 (NF1) FROS head-lamp	Medium range light	
FZGO 01 24 U1 (01 12 U1)	Rear position light lantern	
FZSS 01 24 U1 (01 12 U1)	Rear stop-signal lantern	



LED LIGHTING

FOR TRACTOR MACHINERY



LED head-lamp
of working light

FROS 12 01 O1 1000 U1 G
FROS 12 01 O1 1000 U1 G1
FROS 12 01 O1 1000 U1 G2
TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 12 01 O1 1000 U1 LED head-lamp of working light is used for illumination of working areas at tractor machinery and the other off-road machinery with on-board power supply voltage 12V. Orientation diagram of the head-lamp beam is optimized to provide lighting in compliance with GOST 12.2.019-2005 in front and rare areas of tractor machinery.
FROS 12 01 O1 1000 U1 G1 head-lamp is intended for mounting at metal surface; FROS 12 01 O1 1000 U1 G2 head-lamp is intended for mounting at plastic surface (difference is in the number of washers and availability of a polycarbonate washer).

TECHNICAL CHARACTERISTICS

Parameter name	Value
Rated value of efficient light flux, lm	1000
Colour temperature, K	5000
Power supply voltage range, V	from 10.8 to 18
Power supply voltage, after impact of which functional capacity is ensured, V	32
Power consumption, W	17
Extreme range of operation temperature, °C	from -55 to +60
Protection level	IP67
Climatic modification	U1
Weight, kg	1,2
Warranty period	2 years, or 2000 running hours
Service life period, years	12

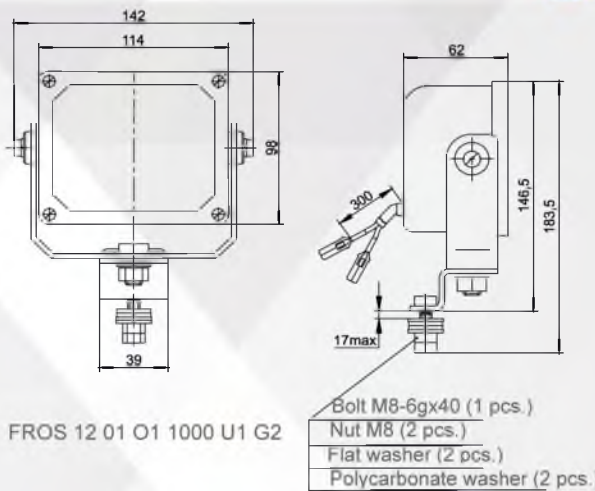
DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable conditions of the environment;
- body is made of molded aluminum, with composition of advanced resistance to corrosion;
- structural items are additionally protected with powder enamel;
- at O1 climatic modification, fastening elements and the bracket are made of stainless steel;
- light-transmitting element is made of impact-proof polycarbonate with UV-protection;
- the head-lamp creates pure white light without blueness and yellowness;
- polarity of connection does not matter;
- it is equipped with power supply cable of 300mm length, with two contacts of pin series, of 6.3mm size (against a customer's order, it can be equipped with the cable of required length; it is possible to use it with different pin socket or without it);
- it corresponds to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility.

LED head lamps of FROS series are the awardee of "The best goods of the Republic of Belarus"-2019 contest, in nomination "Products of production-and-technical purpose".



OVERALL DIMENSIONS



LED head lamps of FROS series are the awardee of "The best goods of the Republic of Belarus"-2019 contest, in nomination "Products of production-and-technical purpose".



LED head-lamp
of working light

FROS 12 01 O2 2400 U1 G
FROS 12 01 O2 2400 U1 G1
FROS 12 01 O2 2400 U1 G2
TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 12 01 O2 2400 U1 LED head-lamp is used as working low beam light of advanced illumination quality at agricultural, road, tractor and other similar machinery for illumination of working elements, working site, as well as other operation out of the roads.

Three optics types are used at FROS 12 01 O2 2400 U1 head-lamp; they have various diagrams and form required composite light distribution diagram. This fact and advanced light flux allow creating the illumination being many times improved regarding the requirements of GOST 12.2.019-2005 at permanent quality of the head-lamps. The head-lamp is characterized with high vibro- and shock-resistance; it is also equipped with time-tested built-in protection against voltage surges. Due to perfect optics and highly efficient LEDs with light efficiency corresponding to leading global level, FROS 01 head-lamp successfully substitute products of leading manufacturers, including the products of higher power capacity.

Head-lamps of FROS 01 series are characterized with advanced reliability and survivability under heavy operation conditions. Since 2013 more than 50 K head-lamps of FROS series operate in error-free manner at quarry machinery by JSC BELAZ in dozens of countries of the world, in regions from Far North of the Russian Federation to equatorial zones of Indonesia.

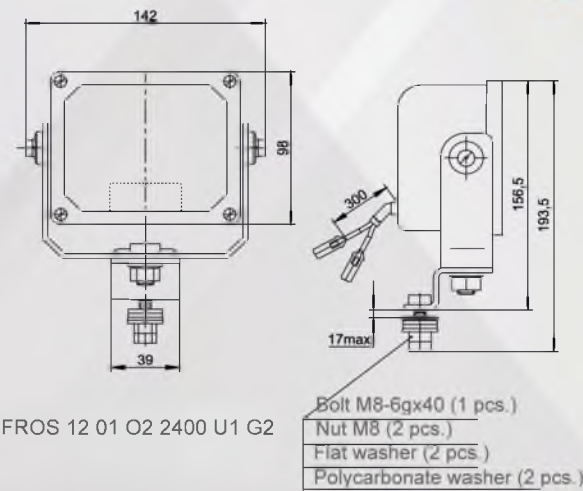
TECHNICAL CHARACTERISTICS

Parameter name	Value
Rated value of efficient light flux, lm	2400
Working illumination distance range of a single head-lamp at optical axis regarding 20lx level, m	20
Working illumination distance range of a single head-lamp at optical axis regarding 10lx level, m	28
Illumination distance range of a single head-lamp at optical axis regarding 1 lx level, m	88
Colour temperature, K	5000
Power supply voltage range, V	from 10.8 to 18
Power supply voltage, after impact of which functional capacity is ensured, V	32
Power consumption after overheating, W	30
Weight, kg	1,2
Enclosure protection level	IP67
Working range of operation temperature, °C	from -40 to +60
Extreme range of operation temperature, °C	from -55 to +60
Climatic modification	U1

DISTINCTIVE FEATURES

- proper operation under conditions of blows, vibrations and unfavourable conditions of the environment;
- body is made of molded aluminum, with composition of advanced resistance to corrosion; coverage with powder enamel; fastening is made of stainless steel;
- light-transmitting element is made of impact-proof polycarbonate with UV-protection;
- power supply socket is made at cable of 300mm length, with two contacts of pin series, of 6.3mm size (103612 according to OST 37.003.032-88) or similar one. Against a customer's order, it can be equipped with the socket by DEUTSCH company or any other one;
- it corresponds to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility; it is characterized with high interference resistance and extremely low interference emission of power supply circuits;
- driver with negative temperature factor provides thermal protection without disconnection of the head-lamp;

OVERALL DIMENSIONS



LED head lamps of FROS series are the awardee of "The best goods of the Republic of Belarus"-2019 contest, in nomination "Products of production-and-technical purpose".



LED head-lamp of working light

FROS 24 01 P 2000 U1
FROS 24 01 P 2000 NF1 TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 24 01 P 2000 LED head-lamp of working light can be used to create working light of medium distance range of elliptic beam at tractor machinery and the other off-road machinery with on-board power supply voltage 24V. Detailed description is given on page 12.



LED head-lamp of working light

FROS 24 01 G 2700 U1
FROS 24 01 G 2700 NF1 TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 24 01 G 2700 LED head-lamp of working light can be used to create high beam light at tractor machinery and the other off-road machinery with on-board power supply voltage 24V. Detailed description is given on page 5.



LED head-lamp of working light

FROS 24 01 O 2500 U1
FROS 24 01 O 2500 NF1 TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 24 01 O 2500 LED head-lamp of working light can be used to create low beam light at tractor machinery and the other off-road machinery with on-board power supply voltage 24V. Detailed description is given on page 6.



LED head-lamp of working light

FROS 24 01 27 B 1800 U1
FROS 24 01 B 1800 NF1 TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 24 01 B 1800 LED head-lamp of working light can be used to create working light of minor distance range with cone-shaped beam at tractor machinery and the other off-road machinery with on-board power supply voltage 24V. Detailed description is given on page 10.



LED head-lamp of working light

FROS 24 01 S3 3300 U1
FROS 24 01 S3 3300 NF1 TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 24 01 S3 3300 LED head-lamp of working light can be used to create low beam light at tractor machinery and the other off-road machinery with on-board power supply voltage 24V. Detailed description is given on page 7.

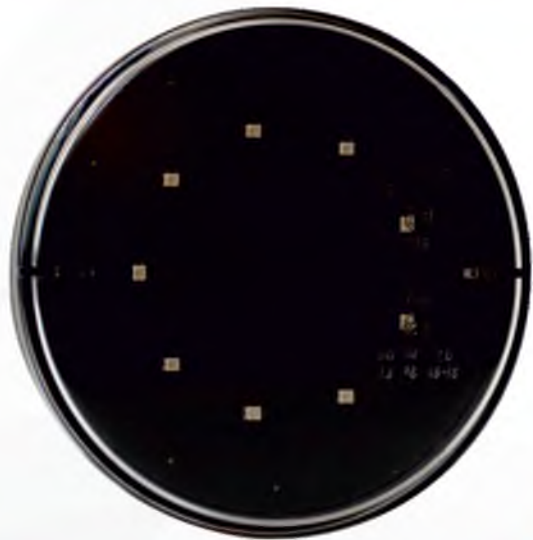


LED head-lamp of working light

FROS 24 01 27 N 1800 U1
FROS 24 01 N 1800 NF1 TY BY 700002620.054-2013

INTENDED PURPOSE

FROS 24 01 N 1800 LED head-lamp of working light can be used to create working light of medium distance range with cone-shaped beam at tractor machinery and the other off-road machinery with on-board power supply voltage 24V. Detailed description is given on page 11.



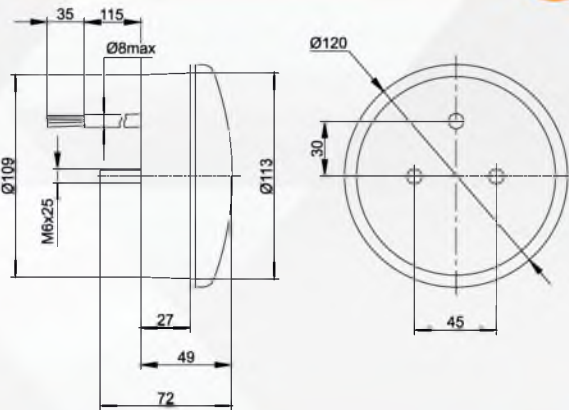
LED lanterns of rear position lights

FZGO 01 12 U1
FZGO 01 24 U1
TY BY 700002620.058-2013

INTENDED PURPOSE

FZGO 01 12 U1 and FZGO 01 24 U1 LED lanterns of rear position lights are used to create rear position lights at quarry, agricultural, road, tractor and other similar machinery. Lanterns of FZGO series are characterized with advanced reliability and survivability under heavy operation conditions. They are manufactured on the basis of lanterns widely used at quarry machinery by JSC BELAZ.

OVERALL DIMENSIONS



DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body and light-transmitting element are made of impact-proof UV-stabilized polycarbonate ;
- it can be manufactured in two variants of climatic modification: U1 - general climatic modification; it is used for any climatic zone; NF1 - for zones with moderate and cold climate;

TECHNICAL CHARACTERISTICS

Parameter name	(FZGO) value		(FZSS) value	
	12	24	12	24
Rated power supply voltage, V	12	24	12	24
Power supply voltage range, V	from 10,8 to 18 from 21,6 to 36 from 10,8 to 18from 21,6 to 36			
Power supply voltage, after impact of which functional capacity is ensured, V	32	64	32	64
Power consumption, W	0,3		1,7	
Weight, kg	0,28		0,28	
Enclosure protection level	IP67		IP67	
Climatic modification	U1		U1	
Range of operation temperature, °C	from -55 to +60		from -55 to +60	
Warranty operation period, years	2		2	
Service life period, years	12		12	

LED lanterns of rear stop-signal

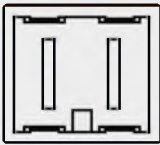
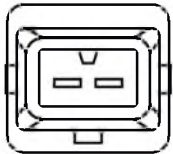
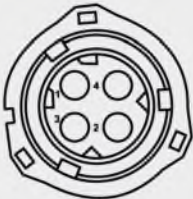
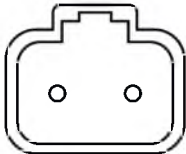
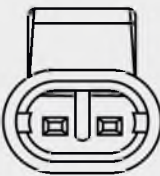
FZSS 01 12 U1
FZSS 01 24 U1
TY BY 700002620.058-2013

INTENDED PURPOSE

FZSS 01 12 U1 and FZSS 01 24 U1 LED lanterns of rear stop-signal are used to create rear stop-signal at quarry, agricultural, road, tractor and other similar machinery. Lanterns of FZSS series are characterized with advanced reliability and survivability under heavy operation conditions. They are manufactured on the basis of lanterns widely used at quarry machinery by JSC BELAZ.

- the lanterns are connected by means of mounted cable (cable length is up to the customer's choice; by default the length is 120mm; socket is not installed). Up to the customer's choice, it can be manufactured with various socket types, for example, DT by Deutsch company, AMP SUPERSEAL, or without socket;
- it corresponds to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility.

UP TO THE CUSTOMER'S CHOICE, IT CAN BE
DELIVERED WITH THE FOLLOWING
SOCKET VARIANTS:

Without socket		
PS pin socket		
Pin socket 106462-1 by AMP (TYCO ELECTRONICS)		
Female socket 1-967325-1 by AMP (TYCO ELECTRONICS)		
Pin socket or female socket (up to the customer's choice) with automobile sealed socket connector of DT series by Deutsch company		
Pin socket 282080 AMP SUPERSEAL 1.5 2 PIN (TYCO ELECTRONICS)		
7-contact round pin socket 1718230-1 AMP		



LED
LIGHTING

FOR AGRICULTURAL MACHINERY

NAME	INTENDED PURPOSE
FROS 24 01 S3 3300 U1 (NF1) head-lamp	Low beam light
FROS 24 01 P 2000 U1 (NF1) head-lamp	Light with elliptic beam
FROS 24 01 S1 2100 U1 head-lamp	White fog light
FZKH 01 24 U1 (NF1) (E1)	Back-run lantern
FZP 01 24 U1 (NF1) (E)	Rear fog lantern
FB 01 24 U1 (NF1) (NF1 D)	White lantern
FB 02 24 U1	White lantern
FZUP 01 12 U1 (NF1) (E) (FI) FZUP 01 12 U1 (FI)	Rear turn indicator lantern
FZS 01 24 U1 (NF1) (E)	Rear position lights and stop signal
FZS1 01 24 U1	Turn indicator and back-run signal
FZS2 01 24 U1 (FI) FZS2 01 12 U1 (FI)	Position lights, stop-signal, turn indicator
FPS 02 24 U1 (E)	Day-time running lights, turn indicator, position lights
FPS1 02 24 U1 (FI) FPS1 02 12 U1 (FI)	Turn indicator, position lights
FSB 01 24 U1 (NF1) (E;E1)	White signal lantern



LED head-lamp of working light

FROS 24 01 S3 3300 U1
FROS 24 01 S3 3300 NF1
TY BY 700002620.054-2013

INTENDED PURPOSE



FROS 24 01 S3 3300 LED head-lamp of working light is used to create low beam light at agricultural and other off-road machinery with on-board power supply voltage 24V. Detailed description is given on page 7.



LED head-lamp of working light

FROS 24 01 P 2000 U1
FROS 24 01 P 2000 NF1
TY BY 700002620.054-2013

INTENDED PURPOSE



FROS 24 01 P 2000 LED head-lamp of working light is used to create working light of elliptic beam at agricultural machinery and the other off-road machinery with on-board power supply voltage 24V. Detailed description is given on page 12.



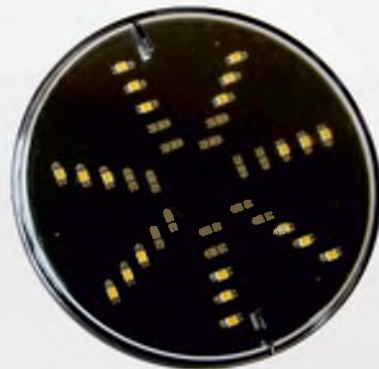
LED head-lamp of working light

FROS 24 01 S1 2100 U1
TY BY 700002620.054-2013

INTENDED PURPOSE



FROS 24 01 S1 2100 LED head-lamp of working light can be used to create working light at agricultural machinery and the other off-road machinery with on-board power supply voltage 24V. Detailed description is given on page 9.

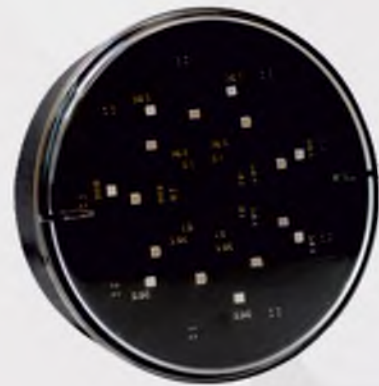


LED back-run lantern

FZKH 01 24 U1
FZKH 01 24 NF1
TY BY 700002620.058-2013



FZKH 01 24 LED back-run lantern can be used to create back-run light at agricultural machinery and the other off-road machinery with on-board power supply voltage 24V. Detailed description is given on page 14.



LED rear fog lantern

FZP 01 24 U1
FZP 01 24 NF1
TY BY 700002620.058-2013

INTENDED PURPOSE



FZP 01 24 LED rear fog lantern can be used to create rear fog light, as well as red signal of load control at agricultural machinery and the other off-road machinery with on-board power supply voltage 24V. Detailed description is given on page 15.

LED white lantern

FB 01 24 U1
FB 01 24 NF1
FB 01 24 NF1 D
TY BY 700002620.058-2013

INTENDED PURPOSE

FB 01 24 LED white lantern is used for illumination of under-hood space, local lighting of working units, hookup devices, working areas within the range 3-5m and the other places where lighting of broad beam is required at agricultural machinery and the other similar machinery with on-board power supply voltage 24V, as well as in inspection pits.
FB 01 24 NF1 D lantern is equipped with swinging bracket, leak-tight toggle switch of switching on/off and female socket connector 1-0967326 produced by AMR company.
According to light flux efficient value, FB 01 24 LED white lanterns substitute the head-lamps with halogen lamps of 70W power capacity; it can also substitute an under-hood space head-lamp 05-0757-0000 and the other ones.

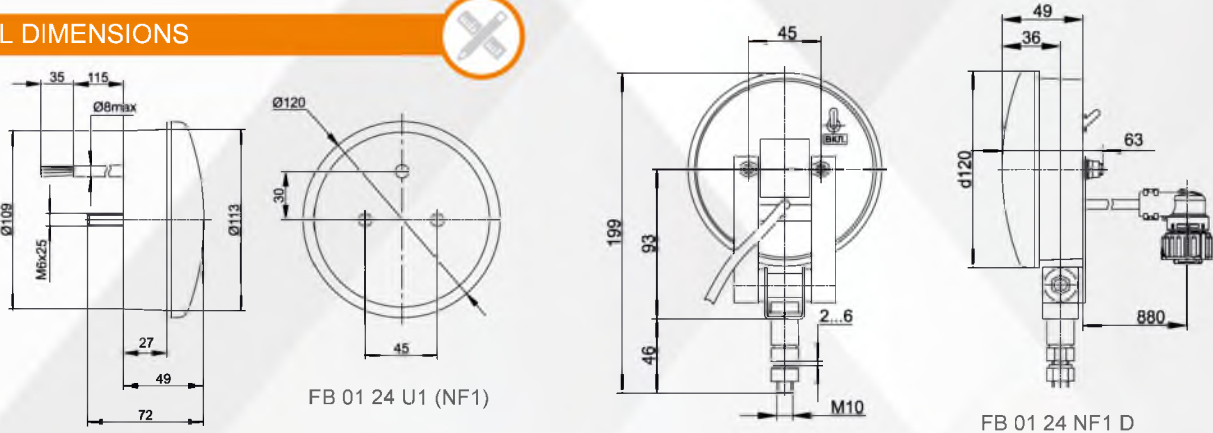
DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body and light-transmitting element are made of impact-proof UV-stabilized polycarbonate;
- fastening is made of stainless steel;
- polarity of connection does not matter;
- they can be equipped with the cable of required length and size;
- they correspond to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility.

TECHNICAL CHARACTERISTICS

Parameter name	Value
Rated light flux value, V	700
Power supply voltage range, V	from 21,6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	7
Range of operation temperature, °C	from -55 to +60
Protection level	IP67
Climatic modification	U1, NF1
Weight, kg	
- FB 01 24 U1 (NF1)	0,28
- FB 01 24 NF1 D	0,38
Warranty period, years	2
Service life period, years	12

OVERALL DIMENSIONS



LED white lantern

FB 02 24 U1
TY BY 700002620.058-2013

INTENDED PURPOSE

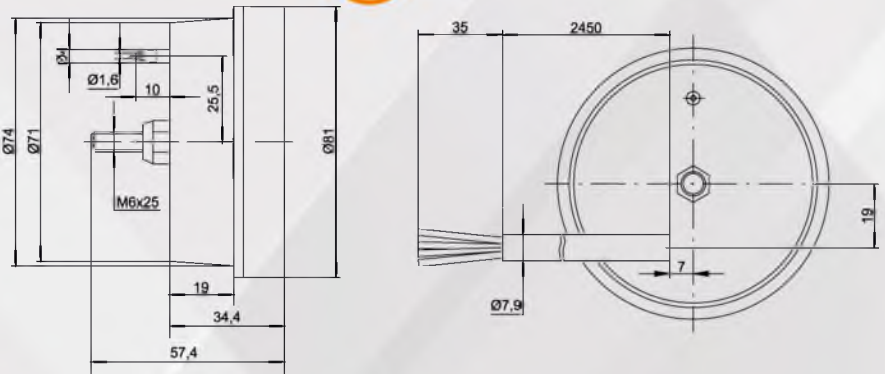
FB 02 24 U1 LED white lantern is used for illumination of working units, hookup devices, working areas at agricultural machinery and the other similar off-road machinery with on-board power supply voltage 24V. FB1 01 24 U1 and FB2 01 24 U1 lanterns are made of advanced light flux.
According to light flux efficient value, FB 02 24 LED white lanterns substitute the head-lamps with halogen lamps of 10-70W power capacity improving lighting quality.

TECHNICAL CHARACTERISTICS

Parameter name	Value
Rated light flux value, lm	250
Power supply voltage range, V	from 21,6 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	64
Power consumption, W	6
Range of operation temperature, °C	from -55 to +60
Protection level	IP67
Climatic modification	U1
Weight, kg	0,2
Warranty period, years	2
Service life period, years	12

DISTINCTIVE FEATURES

- it is resistant to blows, vibrations and unfavourable environmental conditions;
- body and light-transmitting element are made of impact-proof UV-stabilized polycarbonate;
- polarity of connection does not matter;
- they correspond to the Rule of ECE UNO No. 10 in regard to electromagnetic compatibility;
- lanterns are connected by means of cable of 2.5m length without socket connector;
- up to the customer's choice, they can be equipped with the cable of required length and size.



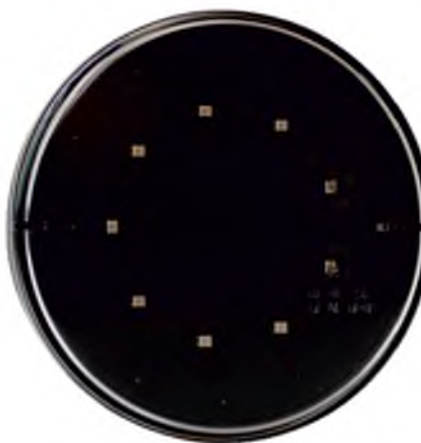


LED rear turn indicator lantern

FZUP 01 24 U1
FZUP 01 24 NF1
FZUP 01 24 U1 FI TY BY 700002620.058-2013
FZUP 01 12 U1 FI

INTENDED PURPOSE

FZUP 01 24 LED rear turn indicator lantern is used for creation of rear turn indicator signal at agricultural machinery and the other similar off-road machinery with on-board power supply voltage 24V. Detailed description is given on page 16.



LED rear combined lantern

FZS 01 24 U1
FZS 01 24 NF1
FZS2 01 24 U1
FZS2 01 24 U1 FI TY BY 700002620.058-2013
FZS2 01 12 U1
FZS2 01 12 U1 FI

INTENDED PURPOSE

FZS 01 24 LED rear combined lantern can be used to create rear position light and stop-signal at agricultural machinery and the other off-road machinery with on-board power supply voltage 24V. Detailed description is given on page 17.

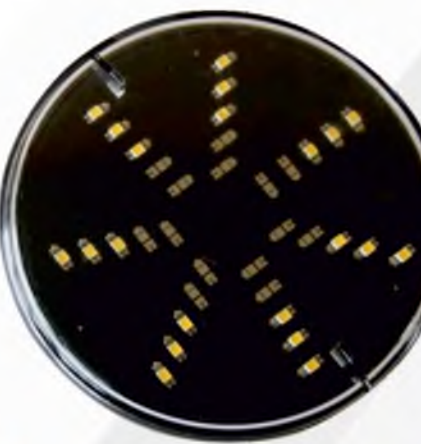


LED front combined lantern

FPS 02 24 U1
FPS1 02 24 U1
FPS1 02 24 U1 FI TY BY 700002620.058-2013
FPS1 02 12 U1
FPS1 02 12 U1 FI

INTENDED PURPOSE

FPS 02 24 LED front combined lantern can be used to create daytime running light, turn indicators and position lights at agricultural machinery and the other off-road machinery with on-board power supply voltage 24V. Detailed description is given on page 18.



LED white signal lantern

FSB 01 24 U1
FSB 01 24 NF1 TY BY 700002620.058-2013

INTENDED PURPOSE

FSB 01 24 LED white signal lantern can be used to create white signal at agricultural machinery and the other off-road machinery with on-board power supply voltage 24V. Detailed description is given on page 19.

Interchangeability table for electric-and-technical products of various manufacturers and the products manufactured by JSC Zenit

Interchangeable product			Designation of LED analogue by JSC Zenit	Intended purpose at replacement of lighting techniques at dumping trucks
Designation	Item number	Manufacturer		
RokLUME 280 N ZG	1GA 995 606-541	«Hella»	FROS 24 01 S4 2000 U1 head-lamp	Low beam light at the vehicles since 2019
RokLUME 280 N CR	1GA 995 606-501		FROS 24 01 O 2500 U1 head-lamp	Low beam light at the vehicles before 2019. Illumination of side and rear space from the deck at the vehicles above 55 tons
RokLUME 280 N ZG	1GA 995 606-541		FROS 24 01 O 2500 NF1 head-lamp	
Power Beam 3000 Close Range	1GA 996 192-031			
RokLUME 280 N LR	1GA 995 606-501		FROS 24 01 G 2700 U1 head-lamp	High beam light
RokLUME 280 N PB	1GA 995 606-541		FROS 24 01 G 2700 NF1 head-lamp	
Power Beam 3000 Long Range	1GA 996 192-031			
RokLUME 280 A N ZG	1GA 995 606-561		FROS 24 01 S3A 1100 U1 head-lamp	Front fog head-lamp of yellow emission colour
			FROS 24 01 S3A 1100 NF1 head-lamp	
RokLUME 190 RFCommSafe CR	1GA 996 388-561		FROS 24 01 P 2000 U1 head-lamp	Working light with oval beam. Back run. Illumination of side and rear space from the deck at the vehicles up to 55 tons inclusively
			FROS 24 01 P 2000 NF1 head-lamp	
Worklight Power Beam 1000 for close-range illumination	1GA 996 188-011	JSC Autosvet Factory	FROS 24 01 27 B 1800 U1 head-lamp	Working head-lamp with broad beam. Illumination of the deck, hydraulic elevators, motor cabinet
			FROS 24 01 27 B 1800 NF1 head-lamp	
Worklight Ultra Beam (UB)	1GA 007 506-491		FROS 24 01 27 N 1800 U1 head-lamp	Working head-lamp with medium beam.
Halogen fog light (halogen)	1NL 007 186-047		FROS24 01 27 N 1800 NF1 head-lamp	
			FROS 24 01 S1 2100 U1 head-lamp	Front fog head-lamp of white emission colour
			FROS 24 01 S1 2100 NF1 head-lamp	
Combination rear light			FROS 24 01 S3A 1100 U1 head-lamp	Front fog head-lamp of yellow emission colour
			FROS 24 01 S3A 1100 NF1 head-lamp	
	2SB 344 200-027		FZS 01 24 U1 lantern	Rear position lights and stop-signal
Indicator	2BA 344 200-037		FZUP 01 24 U1 lantern	Rear fog lantern + red load control signal (LCS)
Rear fog light	2NE 344 200-061	JSC Autosvet Factory	FZP 01 24 U1 lantern	Rear turn indicator + yellow LCS
Reverse light	2ZR 344 200-051		FSB 01 24 U1 lantern	White LCS, back run
Daytime running light (combination front light)	2BE 980 690-101		FPS 02 24 U1 lantern	Front turn indicator, position lights, daytime running lights
39.3716010 Lantern Halogen lamp A24-21			FZP 01 24 U1 A lantern	For modernization of overage machinery. Rear fog lantern + red LCS
3901.3716010 Lantern Halogen lamp A24-21			FZP 01 24 U1 A lantern	For modernization of overage machinery. Rear fog lantern + red LCS
38.3716010 Lantern Halogen lamp A24-21			FZP 01 24 U1 A lantern	For modernization of overage machinery. Rear fog lantern + red LCS
3801.3716010 Lantern Halogen lamp A24-21			FSB 01 24 U1 A lantern	For modernization of overage machinery. White LCS, back run
24.3726010 Indicator Halogen lamp A24-21			FZUP 01 24 U1 A lantern	For modernization of overage machinery. Rear turn indicator + yellow LCS
2401.3726010 Indicator Halogen lamp A24-21			FZUP 01 24 U1 A lantern	For modernization of overage machinery. Rear turn indicator + yellow LCS

Interchangeability table for electric-and-technical products of various manufacturers and the products manufactured by JSC Zenit				
Interchangeable product			Designation of LED analogue by JSC Zenit	Intended purpose at replacement of lighting techniques at dumping trucks
Designation	Item number	Manufacturer		
171.3711 head-lamp or 2012.3711 Halogen lamp AKG 24-70 (H1)		OSVAR LLC.	FROS 24 01 27 N 1800 U1 head-lamp FROS 24 01 27 N 1800 NF1 head-lamp	For modernization of overage machinery. Operation head-lamp with medium beam
Virgo PRO N3102 High Beam; Antares PRO N3302 High Beam; Nordic CENTAURUS LED N460 XD High Beam; Scorpius XTR N4403 QD High Beam; Scorpius PRO N4404 High Beam	985-113 985-313 984-305 984-308	«NordicLights»	FROS 24 01 G 2700 U1 head-lamp FROS 24 01 G 2700 NF1 head-lamp	High beam light
Nordic VIRGO LED N31 Flood; Nordic ANTARES LED N33 Flood; Nordic SCORPIUS LED N42 Flood; Scorpius XTR N4405 QD Flood; Scorpius PRO N4406 Flood	984-073 984-076		FROS 24 01 27 N 1800 U1 head-lamp FROS 24 01 27 N 1800 NF1 head-lamp	Operation head-lamp with medium beam
Nordic VIRGO LED N31 Wide Flood; Nordic ANTARES LED N33 Wide Flood; Nordic SCORPIUS LED N42 Wide Flood; Scorpius XTR N4405 QD Wide Flood; Scorpius PRO N4406 Wide Flood	984-068 984-072		FROS 24 01 27 B 1800 U1 head-lamp FROS 24 01 27 B 1800 NF1 head-lamp	Operation head-lamp with broad beam
		BELAZ + ZENIT	FZS 01 24 01 E lantern	Front turn indicator, position light, daytime running lights. Four-contact pin socket Superseal.
		BELAZ + ZENIT	FZS 01 24 01 E lantern	Rear position lights and stop-signal. With three-contact pin socket Superseal.
		BELAZ + ZENIT	FZUP 01 24 01 E lantern	Rear turn indicator + yellow LCS. With two-contact pin socket Superseal.
		BELAZ + ZENIT	FZP 01 24 01 E lantern	Rear fog lantern + red LCS. With two-contact pin socket Superseal.
		BELAZ + ZENIT	FSB 01 24 01 E lantern	Rear turn indicator + yellow LCS. With two-contact pin socket Superseal.
			FKZ 01 24 01 lantern	Red-and-green lantern. It is intended for movement indication and control.



LED LIGHTING

FOR OFF-ROAD VEHICLES



**LED head-lamp
of working light**
FROS 12/24 01 H 2200 U1 K (K1)
(high beam light)
TY BY 700002620.054-2013

INTENDED PURPOSE

LED head-lamps are intended to be used out of the roads to obtain better visibility sector by the hunters, personnel of the forestry, etc. In comparison to K modification, K1 modification is additionally equipped with fastening set which is fixed in cross-sectional manner at the vehicle's railing transverse cross bar.
Constructive modification K1 is additionally supplied with the set of mounting elements for fixing at the transverse cross bar of railing.
Intended use:
- off-road vehicles, cross-country vehicles, road machinery, special machinery, tractors, water transport and other similar machinery.

TECHNICAL CHARACTERISTICS

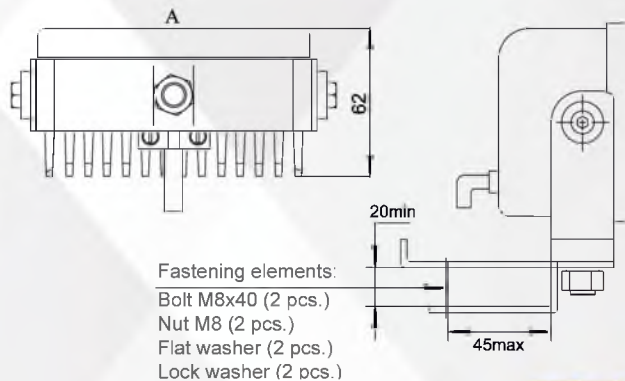
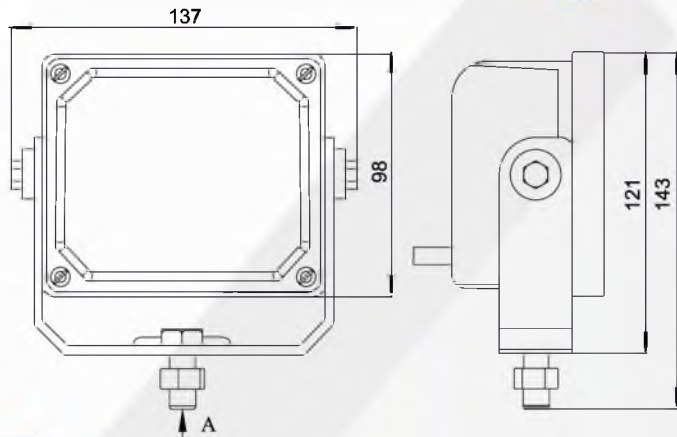
Parameter name	Value
Rated light flux value, lm	2200
Working illumination distance range of a single head-lamp at optical axis regarding 20lx level, m	45
Working illumination distance range of a single head-lamp at optical axis regarding 10lx level, m	65
Working illumination distance range of a single head-lamp at optical axis regarding 1 lx level, m	205
Colour temperature, K	5000
Power supply voltage range, V	from 10,8 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	60
Power consumption, W	19
Enclosure protection level	IP67
Extreme range of operation temperature, °C	from -55 to +60
Climatic modification	U1
Weight, kg	1,13
Length of connection cable, m	2,5

DISTINCTIVE FEATURES

- advanced resistance to blows, vibrations and unfavourable environmental conditions;
- built-in protection against voltage surges;
- advance reliability and survivability under heavy operation conditions;
- body is made of molded aluminum;

- light-transmitting element is made of impact-proof UV-stabilized polycarbonate;
- fastening elements are made of stainless steel;
- due to perfect optics and high-efficient LEDs with light emission corresponding to leading global level, FROS head-lamps successfully substitute the products of leading manufacturers. They are used at BELAZ quarry machinery in dozens of countries of the world.

OVERALL DIMENSIONS



LED head lamps of FROS series are the awardee of "The best goods of the Republic of Belarus"-2019 contest, in nomination "Products of production-and-technical purpose".



**LED head-lamp
of working light**
FROS 12/24 01 O2 2200 U1 K (K1)
(low beam light)
TY BY 700002620.054-2013

INTENDED PURPOSE

LED head-lamps are intended to be used out of the roads to obtain better visibility sector by the hunters, personnel of the forestry, etc. Constructive modification K1 is additionally supplied with the set of mounting elements for fixing at the transverse cross bar of railing. Fastening elements are made o stainless steel.
Intended use:
- off-road vehicles, cross-country vehicles, road machinery, special machinery, tractors, water transport and other similar machinery.

TECHNICAL CHARACTERISTICS

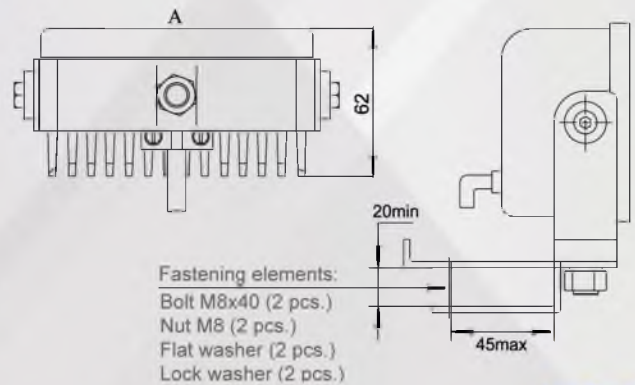
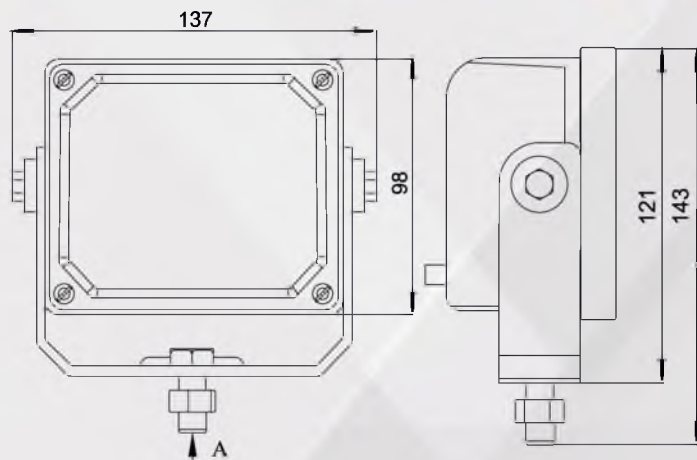
Parameter name	Value
Rated light flux value, lm	2200
Working illumination distance range of a single head-lamp at optical axis regarding 20lx level, m	17
Working illumination distance range of a single head-lamp at optical axis regarding 10lx level, m	24
Working illumination distance range of a single head-lamp at optical axis regarding 1 lx level, m	76
Colour temperature, K	5000
Power supply voltage range, V	from 10,8 to 36
Power supply voltage, after impact of which functional capacity is ensured, V	60
Power consumption, W	19
Enclosure protection level	IP67
Extreme range of operation temperature, °C	from -55 to +60
Climatic modification	U1
Weight, kg	1,13

DISTINCTIVE FEATURES

- advanced resistance to blows, vibrations and unfavourable environmental conditions;
- built-in protection against voltage surges;
- advanced reliability and survivability under heavy operation conditions;
- body is made of molded aluminum;

- light-transmitting element is made of impact-proof UV-stabilized polycarbonate;
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- due to perfect optics and high-efficient LEDs with light emission corresponding to leading global level, FROS head-lamps successfully substitute the products of leading manufacturers. They are used at BELAZ quarry machinery in dozens of countries of the world.

OVERALL DIMENSIONS



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