Limited Liability Company
«NPK MORSVYAZAVTOMATICA»

SHIP SECURITY SURVEILLANCE TV SYSTEM, DIGITAL COT II – 2003/1 TYPE

Operating manual

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INTRODUCTION

This operating manual (hereinafter referred to as «OM») covers the Ship security surveillance TV system, digital COT II – 2003/1 type (hereinafter referred to as the «System») and any System configurations.

The OM is intended to describe the System components, structure, operating principles, technical specifications and rules for the safe System operation (intended use, technical service, maintenance, storage and transportation), as well as Disposal requirements of the System and its units.

Only those who have had general education in the area of radio communication and electronic devices, and those who have read and understood this document shall be permitted to operate with the System. In addition to the instructions given in this document, the safety regulations and rules applicable in the field shall be observed.

The System’s scalable architecture allows for compliance with any project.

1 DESCRIPTION AND OPERATION OF THE SYSTEM

1.1 DESCRIPTION

The System is designed to ensure remote surveillance solutions for onshore facilities and sea or river-going vessels, providing automatic video data recording, storage and playback.

The System can be used to increase the vessel's safety during the mooring: to control the current values of the distance from the vessel to the mooring wall or other structure, and to control stop point of the vessel relative to the mooring wall.

The open architecture, data transmission protocols, hardware and software tools allow for providing the flexible and easy System configuration.

The System units can be used either inside (including explosion-hazardous areas) or outside and on open deck (for the description of the models see technical description).

1.2 TECHNICAL SPECIFICATIONS

Main parameters and technical specifications of the System are represented in Table 1.

Table 1 – The System's main technical specifications

Parameter	Value	
	Network video server	**Hybrid video server**
Video server type	Digital video recorder, NVR type	Digital video recorder, DVR type
Video standard / protocol	ONVIF	AHD, TVI, CVBS (до 1080p), ONVIF
Number of ports	1 Ethernet 10/100/1000 Base-T	16 (1Vp-p 75Ω), BNC 1 Ethernet 10/100/1000 Base-T
Number of channels for cameras with resolution 2MP	16 channels, recording rate max 25 fps	8 analogue,8 digital channels, recording rate max 25 fps
Bandwidth (total / per channel)	128 (8) Mbps	
Video archive storage capacity	2 x HDD SATA 2.5"/3.5» (max 12 TB each)	
Video compression	H.264	
Video archive playback	Built-in player; export to USB drive (AVI, MP4)	
Multiple view, channels	16	8

Parameter	Value	
	Network video server	**Hybrid video server**
Screen splitting, windows	16, 9, 4, 1	
Video outputs	1xVGA (D-Sub/DBH-15), 1920x1080 1xComposite Video (BNC), 704x576 1xHDMI, 1920x1080	1xVGA (D-Sub / DBH-5), 1920x1080 1xHDMI, 1920x1080
Alarm inputs	3/8 NO (NC), alarm sensors can be connected to the cameras	
Alarm outputs	2 NO и 1 NO (NC)	
Motion detection	– programmed (in the video camera); – by sensors (external)	– programmed (in the video server; – by sensors (external)
Control	trackball (USB interface), PTZ cameras control console (RS-485/Ethernet)	
Supported network protocols	TCP/IP,UDP,HTTP,RTP, RTSP	
Remote connection	HTTP, FTP	
Mounting type	Wall or rack mounting 19"	
Dimensions and weight	see technical description	
Power supply voltage	Main power: 220 V, 50/60 Hz (180-264 V) or 24 V (18-36 V DC) Standby power: 24 V (18-36 V DC) or 220 V, 50/60 Hz	
Power consumption	Defined by the total power consumed by the units included in the scope of the delivery. For power data see technical description	

1.3 THE SYSTEM'S STRUCTURE AND OPERATION

1.3.1 System functions

1.3.1.1 The System ensures the surveillance of the secured areas and facilities from local or remote monitoring stations, providing:

1) video data playback, audio data playback at the remote station (from the camera's built-in or external microphone) and service data display (date, time, camera name and / or number);

2) video data display from the cameras in full-screen and split-screen modes (4/9/16 windows at the local station and 4/9/16/32/64 at the remote one), PIP («Picture-in-Picture») image or digital ZOOM modes;

3) video data display in every window from any camera according to the settings;

4) alternate change of the cameras on the display;

5) image scrolling in «ZOOM» mode (up/down/back/forward) to view the whole covered area.

1.3.1.2 The System ensures audio and video data recording from the video cameras and microphones to the network video recorder, and, additionally, to the remote monitoring station, providing:

1) data recording from the video camera in the following modes / settings:

– continuous / uninterrupted recording;

– scheduled recording;

– recording if triggered break-in detection alarm;

– recording if triggered camera video sensor.

2) storage of the recorded data for 1 month or more. The remote clients NVC-19-4 (NVC DVS 1-2003/3) or NVC-127 (NVC DVS 1-2003/4) use RAID technology (at option) to provide fault-tolerant data storage (recording on the several drives;

3) chronological data storage and use of FIFO method («First in – First out»). The archive can be accessed from local and / or remote station, providing the following features (current recording is not interrupted):

– playback of the past 5 minutes on the each camera (surveillance is not interrupted);

– audio and video search by the time and event;

– audio and video data playback in full-screen and split-screen modes (4/9/16 windows at the local station and 4/9/16/32/64 windows at the remote one): regular and reverse (backwards) playback, including frame by frame; synchronous or independent audio and video data playback;

– copying of a freeze-frame shot or selected data to USB drive.

4) event processing (motion detection by camera sensor, triggering of external sensors (dry contact type);

– built-in alarm provides sound notification; alarm messages and images from the triggered camera are displayed, if required (programmed for each camera);

– pre-set camera operations: rotation, tilt, auto cruise, zoom;

– dry contact signal type output to external units;

– recording of particular time interval prior to the triggered alarm (programmed);

– freeze-frame alarm shot and its recording to external USB drive;

– the events / alarms are automatically stored in the audio / video archive

1.3.1.3 The System ensures light and sound alarm in case of:

– failure of video camera or communication channel «video camera – display» (short circuit, open circuit);

– failure of video and audio recorders;

– main power loss and a switchover to the standby power.

1.3.1.4 The System ensures data transmitting to the remote client via Ethernet (XML format).

1.3.1.5 The System ensures access control: an operator and administrator.

1.3.1.6 The System ensures all settings are recovered from non-volatile memory in case of power loss.

1.3.1.7 If a user changes the System settings, the following records are kept in the log:

1) the number of record;

2) the time;

3) the type – a minor failure, change of settings, user logon/logout, motion detection, alarm sensor triggering, camera triggering;

4) the source – a camera, user.

1.3.1.8 The System ensures remote control of the video cameras, pan/tilt platforms and lens wipers from the local or remote station via RS-485, Ethernet interfaces.

1.3.2 Structural diagram

The System's functional diagram is shown in Figure 2.

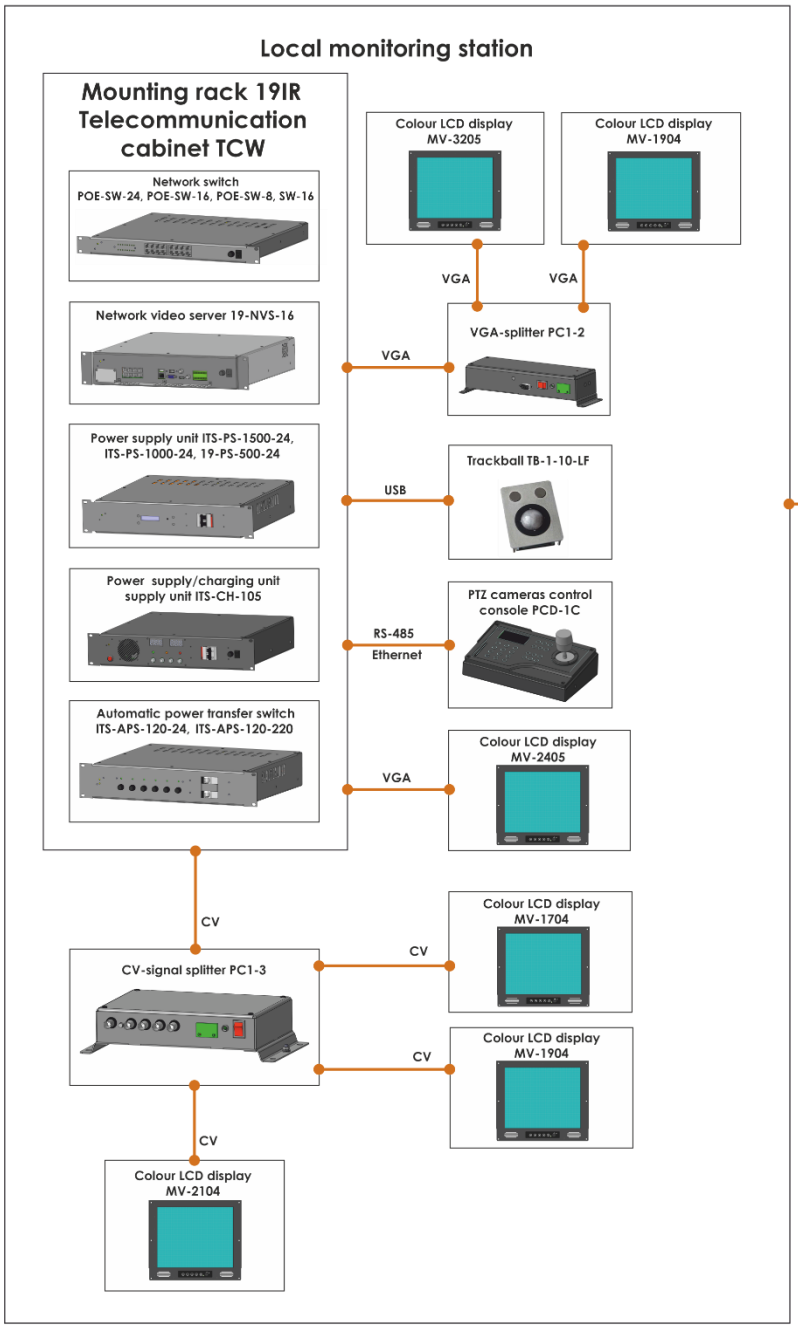
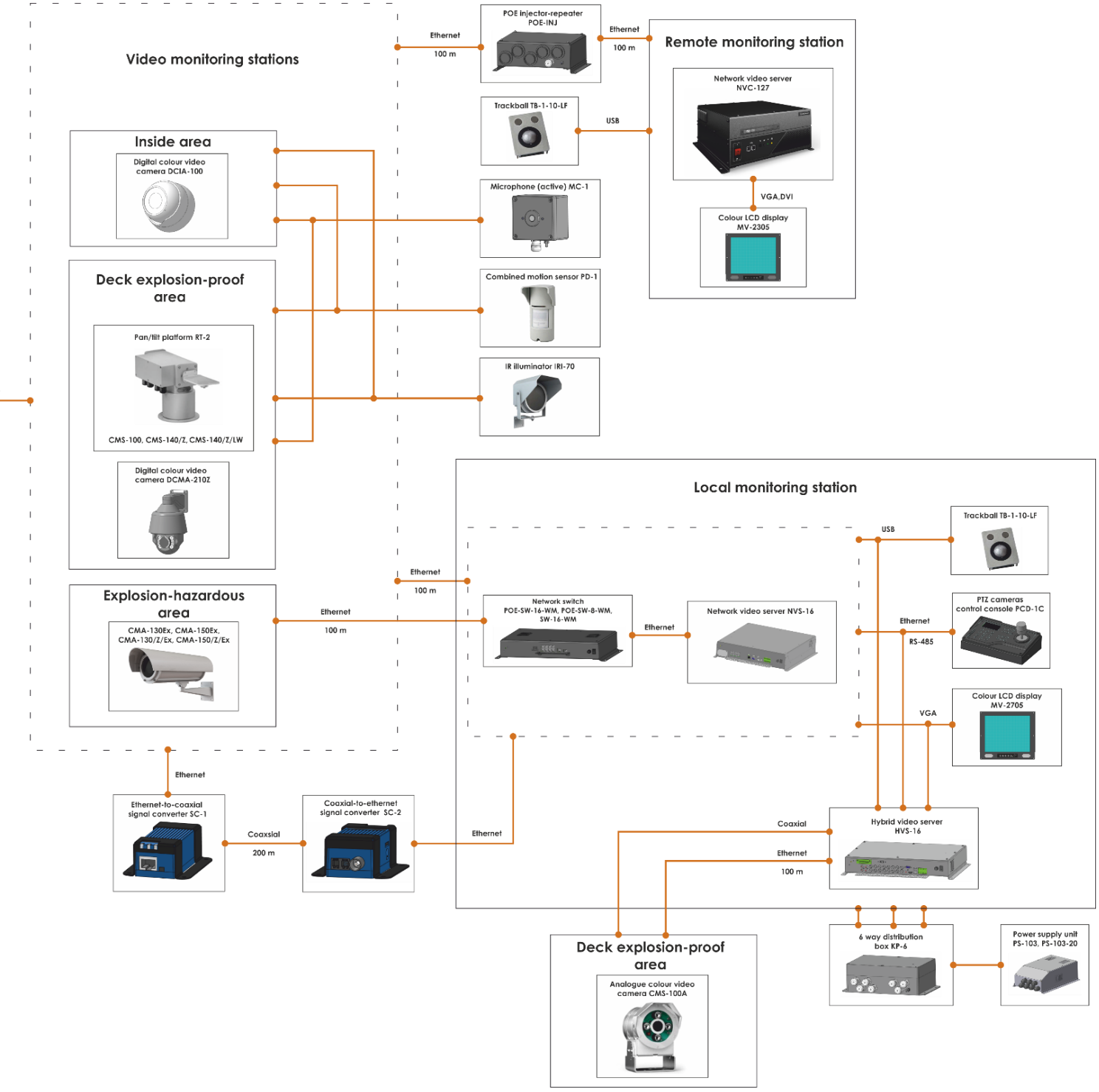


Figure 1 – The System's functional


Video monitoring stations
Inside area
Digital colour video camera DCIA-100
Deck explosion-proof area
Pan/tilt platform RT-2
CMS-100, CMS-140/Z, CMS-140/Z/LW
Digital colour video camera DCMA-210Z
Explosion-hazardous area
CMA-130Ex, CMA-150Ex, CMA-130/Z/Ex, CMA-150/Z/Ex
Ethernet
100 m
POE injector-repeater POE-INJ
Ethernet
100 m
Remote monitoring station
Network video server NVC-127
Trackball TB-1-10-LF
USB
VGA,DVI
Colour LCD display MV-2305
Microphone (active) MC-1
Combined motion sensor PD-1
IR illuminator IRI-70
Local monitoring station
Ethernet
100 m
Network switch POE-SW-16-WM, POE-SW-8-WM, SW-16-WM
Ethernet
Network video server NVS-16
USB
Trackball TB-1-10-LF
Ethernet
RS-485
PTZ cameras control console PCD-1C
VGA
Colour LCD display MV-2705
Ethernet
Ethernet-to-coaxial signal converter SC-1
Coaxsial
200 m
Coaxial-to-ethernet signal converter SC-2
Ethernet
Coaxial
Ethernet
100 m
Hybrid video server HVS-16
6 way distribution box KP-6
Power supply unit PS-103, PS-103-20
Deck explosion-proof area
Analogue colour video camera CMS-100A

diagram

1.4 THE SYSTEM'S COMPOSITION

The list of units, which can be included in the System's composition, is represented in Table 2. For more information about products see technical description.

Table 2 – The System's composition

Name/Identifier	Description
Video servers	
Network video server NVS-16 NVS DVS 2-2003/1	The product is designed to record audio and video data from the video cameras; delivered with pre-installed software
Network video server 19-NVS-16 NVS DVS 2-2003/2	
Hybrid video server HVS-16 HVS DVS 3-2003/1	
NVS remote clients (computers)	
NVS remote client MPC-19-4 NVC DVS 1 2003/3	The product ensures display and recording (further playback) of video data from the digital and analogue cameras (max 64), connected to the video servers. The unit can be additionally equipped with RAID-controller, providing data recording on several drives (backup recording)
NVS remote client MPC-127 NVC DVS 1-2003/4	
NVS remote clients (panel computers)	
NVS remote client MVPC-1904 MVPC DVS 4-2003/19	The product is designed to provide remote data dis-play from one or several video servers (max 16 cameras)
NVS remote client MVPC-2104 MVPC DVS 4-2003/21	
NVS remote client MVPC-2105 MVPC DVS 4-2003/211	
NVS remote client MVPC-2305 MVPC DVS 4-2003/231	
NVS remote client MVPC-2405 MVPC DVS 4-2003/24	
NVS remote client MVPC-2705 MVPC DVS 4-2003/27	
NVS remote client MVPC-3205 MVPC DVS 4-2003/32	
NVS remote client MVPC-4205 MVPC DVS 4-2003/42	
NVS remote client MVPC-4605 MVPC DVS 4-2003/46	
Network switches	
Network switch POE-SW-8 POE-SW-8 DVS-2003/1	The product is designed to create a local network and transmit data by Ethernet network (10/100/1000Base-T) with PoE support
Network switch POE-SW-16 POE-SW-16 DVS-2003/1	
Network switch POE-SW-24 POE-SW-24 DVS-2003/1	
Network switch POE-SW-8-WM POE-SW-8-WM DVS-2003/2	

Name/Identifier	Description
Network switch POE-SW-16-WM POE-SW-16-WM DVS-2003/2	
Network switch SW-16 SW-16 DVS-2003/4	The network switch, 16 ports, 10/100/1000M Base-TX (w/o power from network)
Network switch SW-16-WM SW-16-WM DVS-2003/3	
PoE-injector POE-INJ POE-INJ DVS-2003/1	The product expands Ethernet line for 100 m
Power supply and switching units	
Power supply unit ITS-PS-1500-24 ITS-PS-1500-24 DVS-2003/1	The product is designed to provide power supply to the rack units from the mains 220 V, 50 Hz, rated output voltage 24 V DC
Stabilized power supply unit ITS-PS-1000-24 ITS-PS-1000-24 DVS-2003/1	The product is designed to provide power supply to the rack units from the mains 220 and 24 V (allows for switching from one to another), rated output voltage 24 V DC
Power supply unit 19-PS-1000-24 19-PS-1000-24 DVS-2003/1	
Stabilized power supply unit ITS-PS-500-24 ITS-PS-500-24 DVS-2003/1	
Power supply unit 19-PS-500-24 19-PS-500-24 DVS-2003/1	
Power supply unit ITS-PS-350 ITS-PS-350 DVS-2003/1	The product is designed to provide power supply to the rack units from the mains 220 V (allows for switching from one to another) in case of power mains failure (from built-in storage battery)
Charging unit ITS-CH-105 ITS-CH-105 DVS-2003/1	The product charges the external storage battery, 24 V, max capacity 200 A·h and provides power supply to the rack equipment from the chargeable battery
Automatic power supply switch ITS-APS-120-24 ITS-APS-120-24 DVS-2003/1	The product is designed to provide for a switchover between main and standby power, distributes input main and standby power to 6 outputs
Automatic power supply switch ITS-APS-120-220 ITS-APS-120-220 DVS-2003/2	
Power supply unit PS-103 PS-103 DVS-2003/1	The product supplies power to the System units with unregulated voltage 24 V DC
Power supply unit PS-103-20 PS-103-20 DVS-2003/2	
Power supply unit BPS-114-24 BPS-114-24 DVS-2003/1	The product is designed to provide power supply to the rack units from the mains 220 V (allows for switching from one to another) in case of power mains failure (from built-in storage battery)
Digital video cameras	
Digital colour video camera CMS-100 VC DVS 22121-2003/1	Digital colour fixed-focus lens video camera with built-in motion sensor
Digital colour video camera CMS-140Z VC DVS 22121-2003/6	
Digital colour video camera CMS -140Z/LW VC DVS 22121-2003/7	

Name/Identifier	Description
Digital colour video camera DCIA-100 VC DVS 22223-2003/1	Dome digital colour video camera, varifocal lens, built-in motion sensor, for installation inside
Digital colour video camera DCMA-210Z VC DVS 22222-2003/1	Digital dome PTZ colour video camera, varifocal lens and built-in motion sensor, for installation on open deck, equipped with a lens wiper
Digital colour video camera CMA-130Ex VC DVS 22121-2003/4	Digital colour video camera, for installation inside, fixed lens, built-in motion sensor, explosion-proof
Digital colour video camera CMS-150Ex VC DVS 22121-2003/5	
Digital colour video camera CMA-130Z/Ex VC DVS 22121-2003/10	Digital colour video camera, for installation on open deck, explosion-proof. The camera is delivered with IR illuminator IRI-300-A-IR
Digital colour video camera CMS-150Z/Ex VC DVS 22121-2003/11	
Thermal imaging camera TMA-130 VC DVS 22121-2003/8	Thermal imaging camera, for installation on open deck
Digital video camera CTMS-160/10.5/Z VC DVS 22121-2003/9	Digital colour video camera, combined colour-zoom and thermal imaging, built-in motion sensor, for installation on open deck
Analogue video cameras	
Analogue colour video camera CMS-100A VC DVS 12121-2003/1	Analogue colour video camera, for installation on open deck
Analogue colour video camera DCIA-100A VC DVS 12223-2003/1	Dome analogue colour video camera, varifocal lens, for installation inside (material: aluminium)
LCD displays	
LCD display MV-1004 MV DVS 22-2003/10	The product is designed to provide to display different types of data
LCD display MV-1204 MV DVS 22-2003/12	
LCD display MV-1504 MV DVS 22-2003/15	
LCD display MV-1704 MV DVS 22-2003/17	
LCD display MV-1904 MV DVS 22-2003/19	
LCD display MV-2104 MV DVS 22-2003/21	
LCD display MV-2105 MV DVS 22-2003/211	
LCD display MV-2305 MV DVS 22-2003/23	
LCD display MV-2405 MV DVS 22-2003/24	

Name/Identifier	Description
LCD display MV-2705 MV DVS 22-2003/27	
LCD display MV-3205 MV DVS 22-2003/32	
LCD display MV-4205 MV DVS 22-2003/42	
LCD display MV-4605 MV DVS 22-2003/46	
Infrared projectors	
IR illuminator IS-240 IS DVS 3-2003/1	The product is designed to ensure illumination of the secured areas in night time. The infrared band ensures discreet surveillance, because it is invisible to a human eye
IR illuminator IS-100 IS DVS 2-2003/1	
IR illuminator IS-70 IS DVS 1-2003/1	
IR illuminator IS-300-A-IR IS DVS 1-2003/2	The product is designed to ensure illumination of the secured areas in nighttime. The infrared band ensures discreet surveil-lance, because it is invisible to a human eye. Explosion-proof
IR illuminator IS-300-S-IR IS DVS 1-2003/3	
Swiveling devices	
Two-axes PTZ platform RT-1 RT DVS 22-2003/1	The product is designed to change tilt angle of the video camera, mounted on the bracket
Two-axes PTZ platform RT-2 RT DVS 22-2003/2	
Two-axes PTZ platform PTR-407Ex PTR DVS 22-2003/3	The product is designed to change tilt angle of the video camera, mounted on the bracket. Explosion-proof
Additional devices	
Combined motion sensor PD-1 PD-1 DVS-2003/1	The product is designed to detect motion within the secured areas. Combined type of detection (IR and microwave emission) reduces the number of false alarms
PTZ-cameras control console PCD-1C PCD-1C DVS-2003/1	The product is designed to ensure remote control of PTZ cameras and pan / tilt platforms
Trackball (panel-mounted) TB1-50LF TB1-50LF DVS-2003/1	The product is designed for cursor positioning
VGA-signal splitter VD1-2 VD1-2 DVS-2003/1	The product amplifies and splits input VGA signal into two out-puts
CV-signal splitter CD1-3 CD1-3 DVS-2003/1	The product amplifies and splits CV signal into three outputs
Ethernet-to-coaxial signal converter SC-1 SC1-1 DVS-2003/1	The product ensures digital signal transmitting by coaxial cable. Operates together with SC-2
Coaxial-to-Ethernet signal converter SC-2 SC-1-2 DVS-2003/1	The product ensures digital signal transmitting by coaxial cable. Operates together with SC-1
Distribution box KP-124V KP-124VF DVS-2003/1	The product is designed to split cables laid among ma-rine equipment (navigation system, vessel automa-tion, etc.)
Distribution box KP-124VF KP-124VF DVS-2003/1	

Name/Identifier	Description
Distribution box KP-2 KP-2 DVS-2003/2	The product connects 2 or 6 units to the power bus RS-485
Distribution box KP-6 KP-6 DVS-2003/3	
Microphone (active) MC-1 MC-1122 DVS-2003/1	The product converts sound waves into electrical signals
Universal data converter MDC-145 MDC-145 DVS-2003/1	The product is designed to couple two devices of different data types, formats, repetition rate, etc
Portable audio recorder PR-2 PR-2 DVS-2003/1	The product provides monaural or stereo recording of audio information in complex acoustic environments
Mounting racks 19''	
Mounting rack 19" 19IR-21 19IR-21-2003/1	The product is designed for comfortable mounting of the System units
Mounting rack 19" 19IR-25 19IR-25-2003/1	
Mounting rack 19" 19IR-30 19IR-30-2003/1	
Mounting rack 19" 19IR-34 19IR-34-2003/1	
Mounting rack 19" 19IR-39 19IR-39-2003/1	
Mounting rack 19" 19IR-43 19IR-43-2003/1	
Mounting rack 19" 19IR-48 19IR-48-2003/1	
Telecommunicational cabinets 19''	
Telecommunica-tion cabinet 19" TCW-9 TCW-9-2003/1	The product is designed for comfortable mounting of the System units
Telecommunica-tion cabinet 19" TCW-12 TCW-12-2003/1	
Telecommunica-tion cabinet 19" TCW-15 TCW-15-2003/1	

1.5 MEASUREMENT TOOLS, INSTRUMENTS AND APPLIANCES

Operability control of the System units is carried out using tools of integrated control and System's indication.

Technical service (hereinafter − TS) of the System is carried out using tools and consumables represented in Table 3.

Table 3 – Number of consumables required for the TS

Name and identifier of consumables	Weight of consumables	Note
Cleaning cloth	0.10 kg	1To clean surfaces and parts of the system – use clean cloth 2 To clean severe contamination – use alcohol-soaked cloth
Rectified hydrolytic technical ethyl alcohol	0.01 l	To soak cloth while removing contamination
Varnish	0.05 kg	To cover surfaces of the unit in case of paint coating damage
Abrasive cloth	0.06 x 0.06 m	To polish surfaces of the unit in case of paint coating damage

1.6 MARKING AND SEALING

The System’s marking plate has information about the System’s name, serial number, Manufacturer’s details. The marking plate is located on Mounting rack 19".

The units included in the System also have marking plates (nameplates) with information about serial number, weight, IP rating, input voltage and power consumption. They are located on the units’ casings.

Sealing of other units is not provided.

1.7 PACKAGING

A rack with installed equipment is delivered in wooden box ensuring its transportation and storage at the warehouse.

Other system units are packed in air film and in a corrugated board box ensuring its transportation and storage at the warehouse.

Packaging sealing is not provided.

2 DESCRIPTION AND OPERATION OF THE SYSTEM UNITS

The System shall comprise the video server, video cameras and displays to provide its basic functions (see the System's functional diagram in Figure 1).

The data are transmitted from the IP cameras to the video server by Ethernet; from the analogue cameras – by coaxial cables.

The network switches can be used additionally to create a local network and provide IP cameras connection.

The video recorder can record input video signal to the internal storage.

The displays ensure audio and video output. The System includes displays with various diagonals and aspect ratios, see technical description.

The NVS remote client allows for connection by Ethernet network, providing video data display, archive creation, settings and control of the System and peripheral units.

The panel computer / NVS remote client ensures data output from the remote video server to the displays[1)].

PTZ cameras, cameras with variable focus length and camera lens wipers are controlled from the control console, video server and remote client. The trackball is used for switching, search and playback.

Uninterruptible power supply units may be delivered to provide autonomous operation in case of power failure, if the System's scope of delivery does not comprise a standby power source. The accumulator's capacity and PSU power is selected in compliance with the System power consumption and required time of the autonomous operation.

The System components are selected by the customer at order depending on the particular project, safety requirements and surveillance areas. For more detailed information see technical description.

2.1 MOUNTING RACK 19" 19IR-XX (19IR-XX-2003/1)

The mounting rack (telecommunication cabinet) – is a metal structure designed for the System units mounting.

The rack is fixed on the floor by four points. It has shock absorbers at the bottom and top parts. A special bracket fastened to the bulk keeps the cabinet in the required position. Side and back louvre access panels provide air circulation. The front panel is equipped with a transparent access door with lock.

The units are fastened above each other horizontally by screws at the front; movement and sliding of the units at the rear side is prevented by the rack ears. All units are

[1)] In case of video servers cascading, data received from the video camera may be displayed with delay.

mounted on the special slide rails which allow for pushing them out without dismantling (e.g., for installation, settings or technical service). Loosen the mounting screws to push the units out.

Rack height is measured in units «U» (1 U = 1.75» or 44.45 mm), e.g. 2U.

The fan unit which ensures exhaust / outlet of the hot air is at the top part.

Intake air is supplied through the rear and side louvre panels. In order to maintain continuous protecting grounding, the cabinet elements are grounded to each other.

The System rack is delivered assembled; the units are mounted inside the rack and operating settings are provided in compliance with a project and its technical specifications. The rack is also delivered with all necessary electric elements (terminals, connectors, etc.), allowing for cable connection at the installation site. The Scope of delivery is arranged at order.

Rack models and sample units mounting are shown in Figure 2.

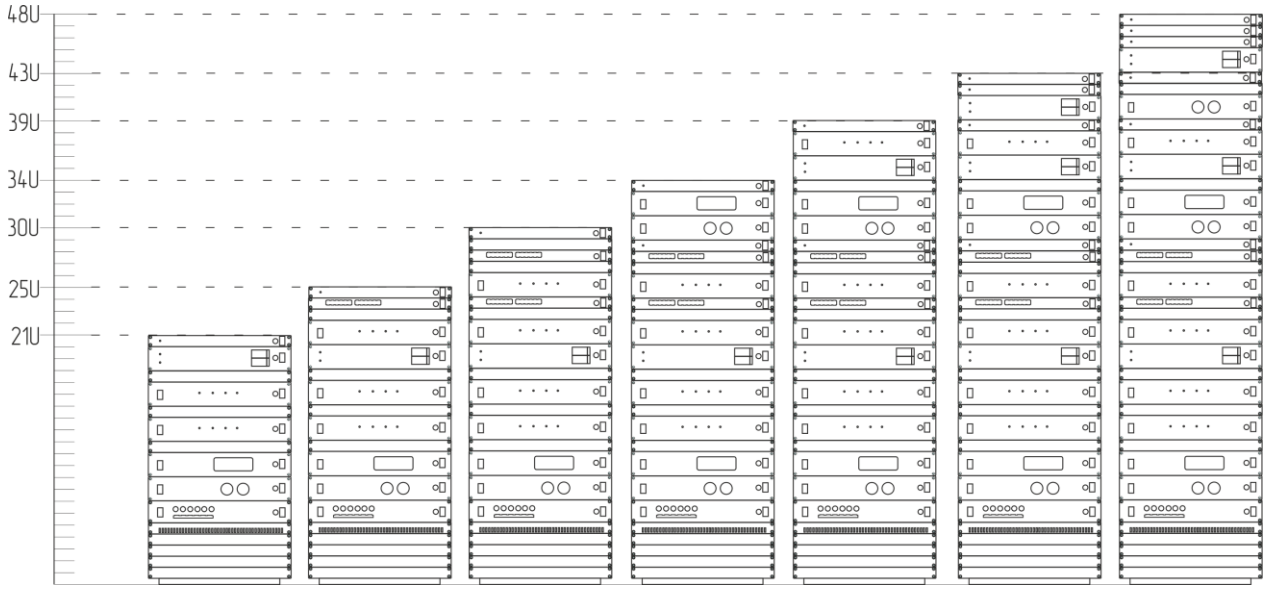


Figure 2 – Sample rack 19" models and mounting

2.2 TELECOMMUNICATION CABINETS TCW-15, TCW-12, TCW-9

The telecommunication cabinets TCW-15 (TCW-15-2003/1), TCW-12 (TCW-12-2003/1), TCW-9 (TCW-9-2003/1) are used similarly to the rack. The rack and cabinet have different dimensions and type of mounting (TCW-xx is wall-mounted). The cabinet is equipped with six shock-absorbers and a bracket (included in the scope of delivery). Firstly, the cabinet is mounted and fastened on the bracket, then the assembled cabinet is mounted on the wall. The cabinet is equipped with a door and a lock. The cables are led through the holes on the lower and top sides of the cabinet.

2.3 NVS REMOTE CLIENT (PANEL COMPUTERS)

The panel computers MVPC-XX04 and MVPC-XX05 are connected to the video server via Ethernet network. The units are designed for the remote viewing of data being transmitted from the cameras to the server. The data can be displayed from 16 cameras at the same time. Alarm log and video archive can be viewed remotely. The unit has built-in speakers to play audio recordings.

More information about the Product see in operating manual «Marine computer monoblock MVPC-xx04, MVPC-xx05, MVPC-xx06, MVPC-xx07».

2.4 NETWORK VIDEO SERVER NVS-16, 19-NVS-16

The network video servers NVS-16, 19-NVS-16 are designed for recording and storage of the video data. The cameras are connected through the Network switch by port 10/100/1000M Base-T Ethernet. Data can be displayed from 16 cameras at the same time. Use TB-1-50LF trackball to provide control. To connect alarm sensors and signaling units to the server, use alarm inputs / outputs. Connect the display to the server by VGA or HDMI interfaces. The server can be mounted on the wall or into the rack (cabinet).

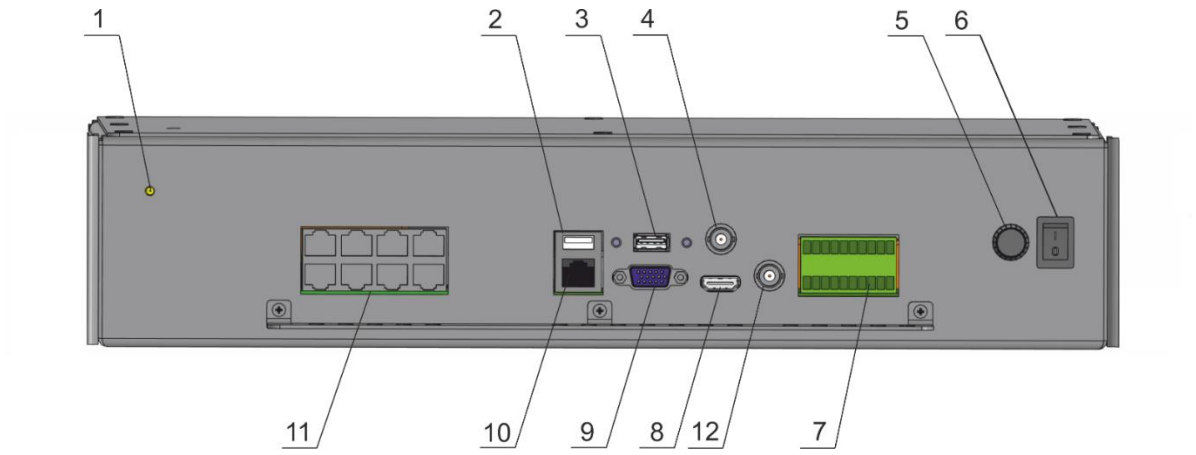


Figure 3 – Controls and LEDs of the video server

Table 4 – Controls and LEDs of the video server

№	Overview / name	Description
1	Power LED	⏻
2	To connect the trackball or external USB drive	USB1
3	To connect the trackball or external USB drive	USB2
4	To connect display	CVBS
5	Fuse	FUSE
6	Power button	«On / Off»
7	To connect alarm sensors, zoom-cameras, pan / tilt plat-forms, lens wipers and lens washers	--
8	To connect display	HDMI
9	To connect display	VGA
10	Port to connect to local Ethernet network	LAN
11	Port to connect to local Ethernet network with PoE support	LAN (1 − 8 pcs.)
12	To connect audio output (speaker)	XS1.13

Control the System operation using the menu on the screen (appears after switching the System on and software loading). The menu access is protected by a password.

2.5 NVS REMOTE CLIENTS (COMPUTERS) NVC-19-4, NVC-127

The network video clients are included in the System. The units NVC-19-4, NVC-127 display and record to the archive (with further playback) the video data from analogue and digital cameras (max 64), connected to the video servers. RAID controller ensures data recording to the several drives (backup).

NVC-19-4 is mounted into the rack 19", NVC-127 – on vertical surface. More information about the Product see in operating manual «Computer system unit».

2.6 HYBRID VIDEO SERVER HVS-16

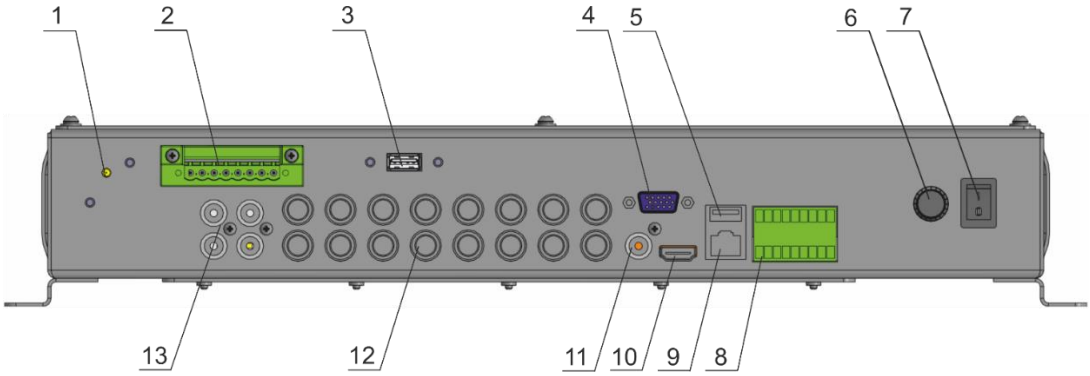


Figure 4 – Controls and LEDs of HVS-16

The hybrid video server HVS-16 is designed to upgrade current video surveillance systems using existent coaxial cables. The video server ensures recording, storage and data display from 8 analogue and 8 digital cameras at the same time. The HVS-16 is equipped with 8 analogue video inputs and 4 audio inputs. The digital cameras are connected by the 10/100/1000M Base-T Ethernet port. The trackball TB-1-50LF is used for control by USB interface. The server is equipped with alarm inputs / outputs; the displays are connected by VGA or HDMI interfaces. The unit is wall-mounted.

Table 5 – Controls and LEDs of HVS-16

№	Description	Overview / name
1	Power LED	⏻
2	12 V DC power supply for external microphones	--
3	To connect the trackball or external USB drive	USB1
4	To connect display (video out)	VGA
5	To connect the trackball or external USB drive	USB2
6	Power mains fuse	FU1
7	Power button	«On / Off»
8	To connect alarm sensors, zoom-cameras, pan / tilt plat-forms, lens wipers and lens washers	--
9	Port to connect to local Ethernet network	LAN

№	Description	Overview / name
10	To connect display (video out)	HDMI
11	To connect audio output (speaker)	XS1.13
12	BNC ports to connect 16 analog video cameras or 8 analog and 8 digital video cameras	«1» – «16»
13	4 RCA ports to connect an external microphone	«1A» – «4A»

2.7 NETWORK SWITCHES POE-SW-8, POE-SW-8-WM, POE-SW-16, POE-SW-16-WM, POE-SW-24

The network switches are designed to create Ethernet network. The units comprised in the System can supply power to the connected units (PoE): POE-SW-8, POE-SW-8-WM, POE-SW-16, POE-SW-16-WM and POE-SW-24.

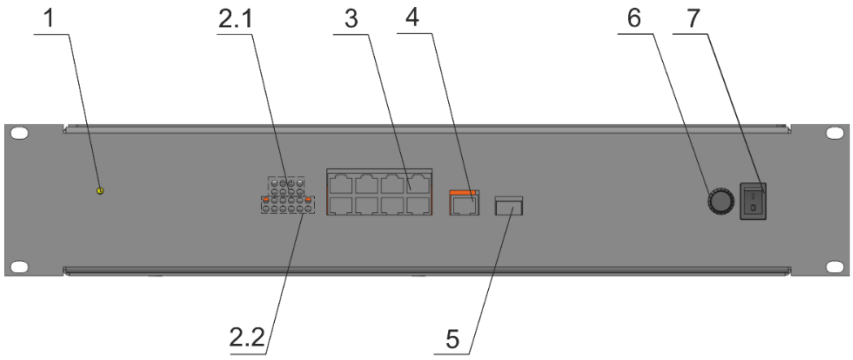


Figure 5 – Controls and LEDs of POE-SW-8

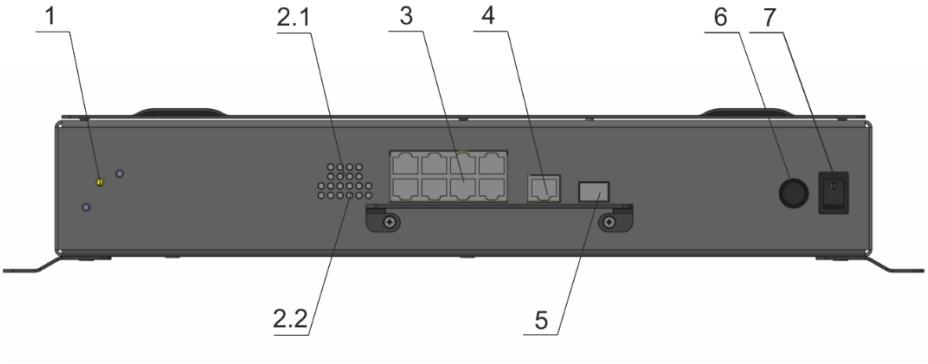


Figure 6 – Controls and LEDs of POE-SW-8-WM

Table 6 – Controls and LEDs of POE-SW-8, POE-SW-8-WM

№	Description	Overview
1	Power LED	⏻
2.1	Port status LEDs «1» … «8»	--
2.2	Port status LEDs «1» … «10»	--
3	Ethernet 10/100 M Base-TX ports with PoE support	«1» … «8»
4	Ethernet 10/100/1000 Base-T port	1
5	SFP port	1
6	Power mains fuse	FU1
7	Power button	«On / Off»

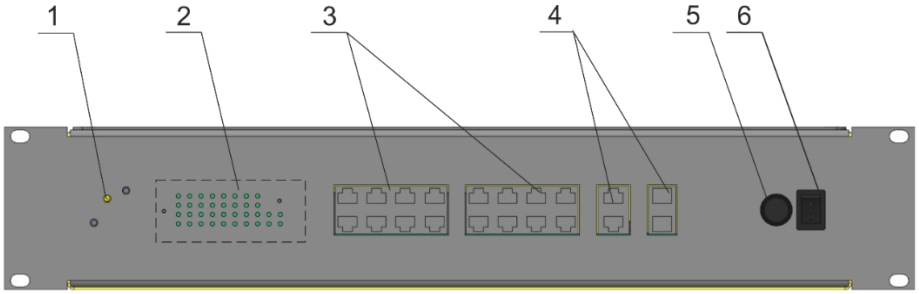


Figure 7 – Controls and LEDs of POE-SW-16

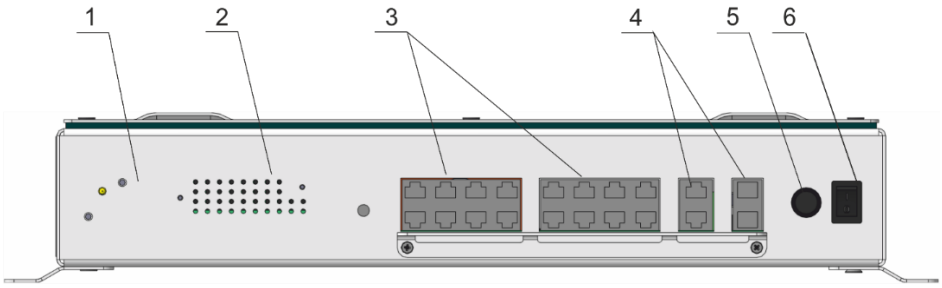


Figure 8 – Controls and LEDs of POE-SW-16-WM

Table 7 – Controls and LEDs of POE-SW-16, POE-SW-16-WM

№	Description	Overview
1	Power LED	⏻
2	Port status LEDs	--
3	Ethernet 10/100 M Base-TX ports with PoE support	«1» … «16»
4	Combo ports 10/100/1000BASE-T/SFP	«17F», «18F»
	Combo ports 10/100/1000BASE-T/SFP	«17T», «18T»
5	Power mains fuse	FU1
6	Power button	«On / Off»

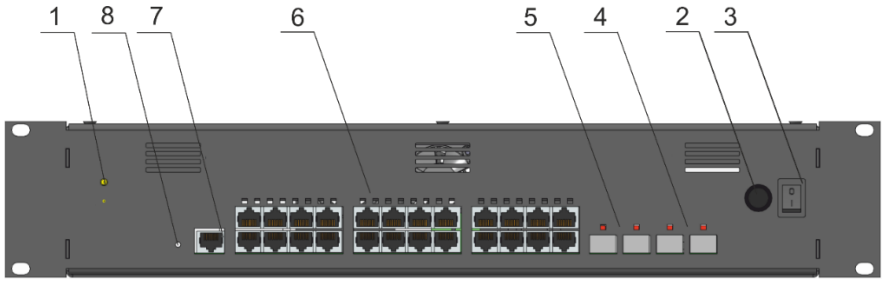


Figure 9 – Controls and LEDs of POE-SW-24

Table 8 – Controls and LEDs of POE-SW-24

№	Description	Overview
1	Power LED	⏻
2	Power mains fuse	FU1
3	Power button	«On / Off»
4	Gigabit Ethernet SFP ports	«27», «28»
5	10 Gigabit Ethernet SFP+ ports	«25», «26»
6	Ethernet 10/100 M Base-TX ports with PoE support	«1» … «24»
7	Service port	«Service»
8	Reset button (reset to default settings)	«Reset»

2.8 NETWORK SWITCHES SW-16, SW-16-WM

Unmanaged network switches SW-16, SW-16-WM, 16 ports 10/100/1000Base-T, are designed to create local network among the units which support Ethernet 10/100/1000Base-T.

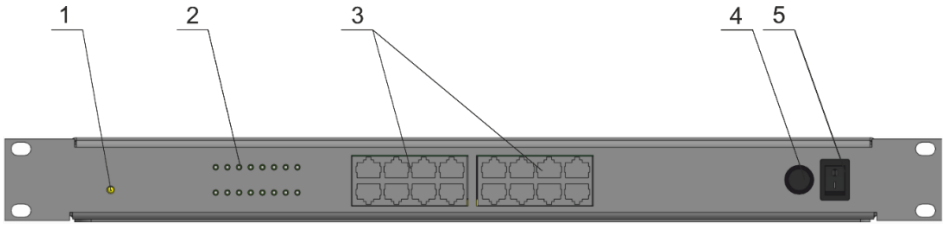


Figure 10 – Controls and LEDs of SW-16

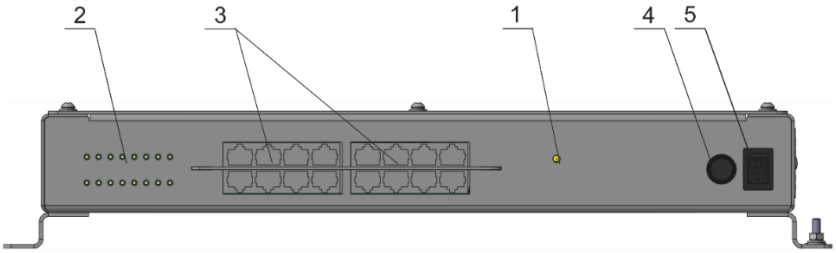


Figure 11 – Controls and LEDs of SW-16-WM

Table 9 – Controls and LEDs of SW-16, SW-16-WM

№	Description	Overview
1	Power LED	⏻
2	Channel status LEDs	«1» … «16»
3	Ports RJ-45 with 10/100/1000Base-T support	«X1»… «X16»
4	Power mains fuse	FU1
6	Power button	«On / Off»

2.9 POWER SUPPLY UNITS

2.8.1 Power supply units 19-PS-1000-24, 19-PS-500-24, ITS-PS-1000-24, ITS-PS-500-24

19-PS-1000-24, 19-PS-500-24 ITS-PS-1000-24, ITS-PS-500-24 ensure uninterruptible power supply to the System units, 220 and 24 V; switching to standby power occurs automatically in case of main power failure, output rated voltage is 24 V, power 800 W and 500 W, respectively.

Figure 12 – Controls and LEDs of 19-PS-1000-24, 19-PS-500-24

Table 10 – Controls and LEDs of 19-PS-1000-24, 19-PS-500-24

№	Description	Overview
1	Main and standby power LEDs	«Main», «Standby»
2	Automatic transfer switch	«Standby»
3	Power mains fuse	FU1
4	Power button	«On / Off»

2.8.2 Power supply unit ITS-PS-350

Power supply unit ITS-PS-350 supplies power to the System units from the mains 220 V or built-in storage battery 20 A·h, with rated output voltage 24 V DC and power 320 W. Power mains are protected by fuses. Mounting type: into the rack 19".

2.8.3 Power supply units ITS-PS-1500-24

The power supply unit ITS-PS-1500-24 provides power supply to the System units mounted into the rack from the mains 220 V, rated output voltage 24 V DC, and max power 1500 W. Mounting type: into the rack 19".

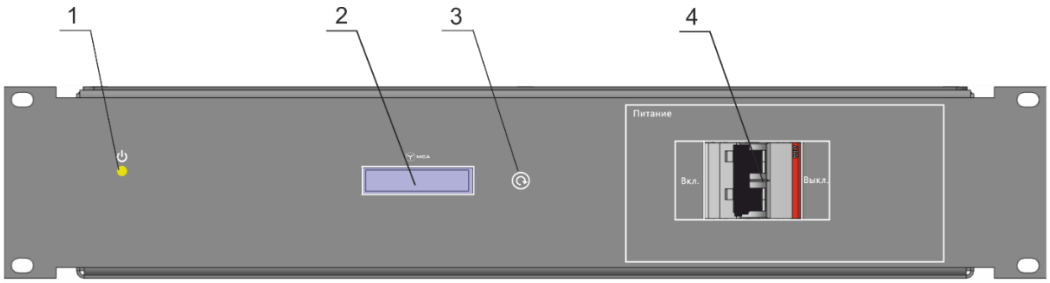


Figure 13 – Controls and LEDs of ITS-PS-1500

Table 11 – Controls and LEDs of ITS-PS-1500

№	Description	Overview
1	Power LED	⏻
2	Current service data is displayed on the LCD	--
3	A button to change current service data	--
4	Automatic transfer switch	«On / Off»

2.8.4 Power supply unit BPS-114-24

The power supply unit BPS-114-24 is used as a source of uninterruptible power supply with rated output voltage 24 V DC and power 320 W. BPS-114-24 operates with single-phase mains 110/220 V AC, 50 Hz.

If operating with single-phase mains BPS-114-24 automatically charges the built-in storage battery. The charge level (status) is shown on the built-in 4-digit LED display.

If the voltage is lost, BPS-114-24 automatically switches over to the storage battery.

If the charge level of built-in storage battery decreases to 1-2% (19,2 V), BPS-114-24 cuts the storage battery from the output terminal (load terminal). The unit also cuts all internal circuits from the battery in order to avoid the damage.

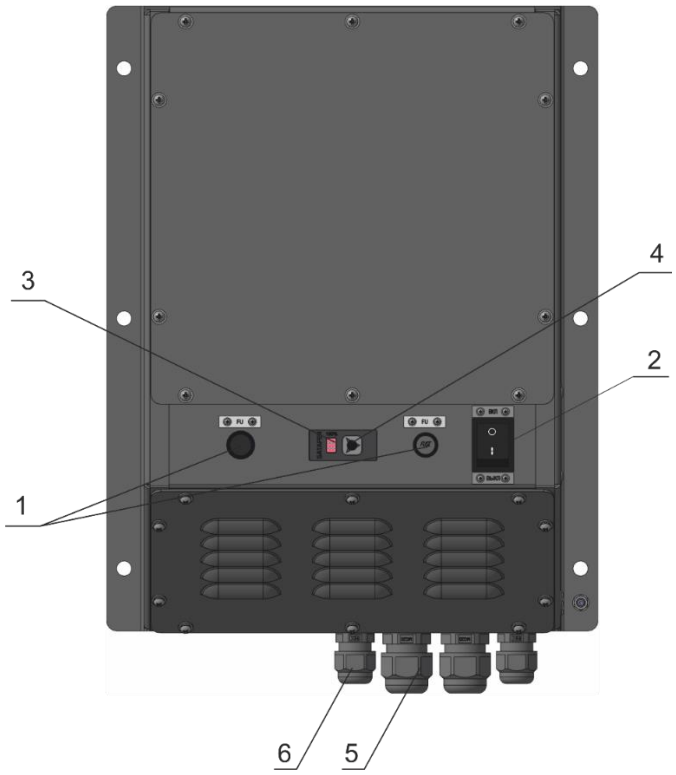


Figure 14 – Controls and LEDs of BPS-114-24

Table 12 – Controls and LEDs of BPS-114-24

№	Description	Overview
1	To install a fuse	--
2	Power button	Piano type switch «O/I»
3	4-segment LED charge indicator	--
4	Ensures start of the BPS-114-24 when the input power mains is absent	Button «Start»
5	To connect input power, load and external alarm unit	MG-20
6		MG-16

2.8.5 Automatic power supply switches ITS-APS-120-24 and ITS-APS-120-220

ITS-APS-120-24 and ITS-APS-120-220 ensure automatic power transfer switch between main and standby power mains (220 V or 24 V), and distribute power to six outputs, each equipped with the fuse.

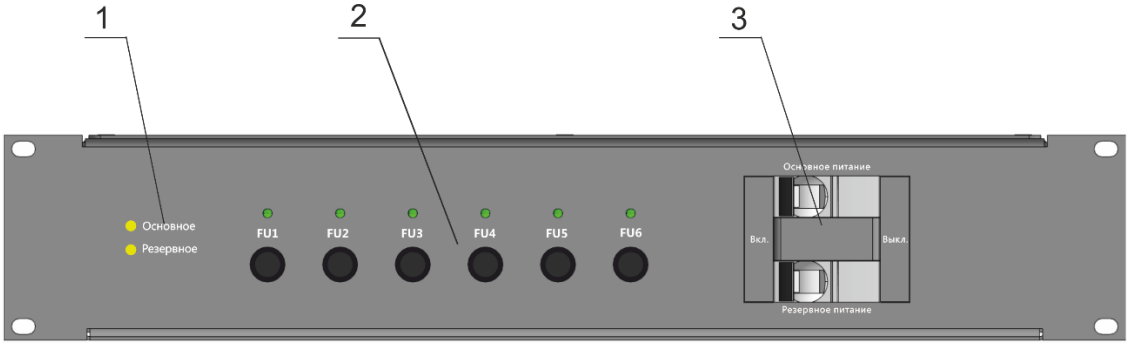


Figure 15 – Controls and LEDs of ITS-APS-120-24, ITS-APS-120-220

Table 13 – Controls and LEDs of ITS-APS-120-24, ITS-APS-120-220

№	Description	Overview
1	Main and standby power LEDs	«Main», «Standby»
2	Fuses LEDs	«FU1»… «FU6»
3	Main and standby power automatic transfer switch (on / off)	«Main» / «Standby»

2.8.6 Charging units ITS-CH-105-24, ITS-CH-105-220

ITS-CH-105-24 and ITS-CH-105-220 charge external storage battery (with rated voltage 24 V and max capacity 200 A·h) and supply power to the rack equipment from the storage battery. Mounting type: into the rack 19".

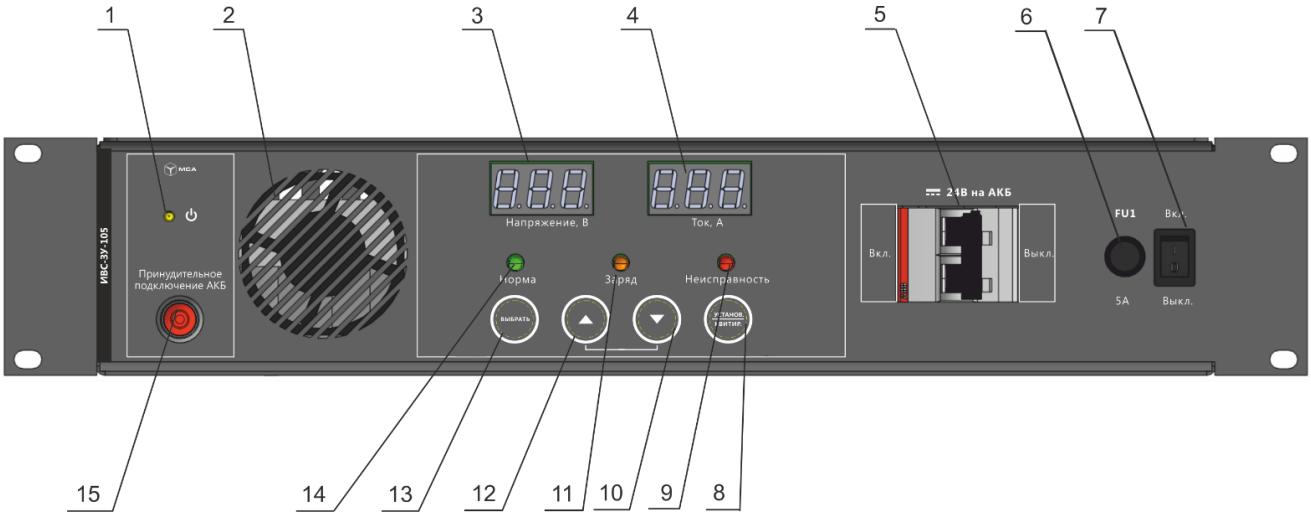


Figure 16 – Controls and LEDs of ITS-CH-105-24, ITS-CH-105-220

Table 14 – Controls and LEDs of ITS-CH-105-24, ITS-CH-105-220

№	Description	Overview
1	Power LED	⏻
2	Built-in fan	--
3	Displays current voltage	«Voltage, V»
4	Displays current (present)	«Current, A»
5	Main and standby power automatic transfer switch (on / off)	⎓24 V to storagebattery
6	Power circuit fuse	«FU1, 5 A»
7	Power button	«Вкл./Выкл.»
9	Charger status LEDs	«Error»
11		«Charge»
14		«Normal»
8	Charger control buttons	«Select»
10		▲ ▼
12		
13		«Set/reset»
15	Button	«Forced connection to battery»

2.8.7 Power supply units PS-103 and PS-103-20

PS-103 and PS-103-20 ensure power supply for the System units (unregulated voltage 24 V DC) with an optional switchover to the standby power.

2.10 VIDEO SURVEILLANCE CAMERAS

The System comprises analogue and digital video cameras (including explosion-proof ones), as well as thermal imaging cameras and combined (CMOS + focal plane array). The video cameras design is based on uncooled focal plane array. The camera scope of delivery can include a camera lens wiper and washer tank.

The lens wiper has an electric motor and ensures cleaning from water splashes, dirt and snow. It is included in CTMS-160/10.5/Z/LW and CMS-140/Z/LW cameras scope of delivery. The device is controlled from the control console PCD-1C.

The washer tank stores and supplies washing liquid to the lens (using built-in pump). It is controlled from the control console PCD-1C. The device is included in CTMS-160/10.5/Z/LW and CMS-140/Z/LW cameras scope of delivery.

Apply special cleaning liquid for the lens washer. Do not apply liquid that can damage plastic, resin or steel.

Pay attention to the ambient temperature while selecting the liquid type. If the ambient temperature can decrease lower than 0 ºC, use anti-freezing liquid with relevant temperature limit.

Liquid frozen inside the washing system can put it out of order.

The technical data (focus length, resolution, material, dimensions, etc.) are represented in technical description.

2.11 LCD DISPLAYS MV-XX04, MV-XX05

The System includes LCD displays with different diagonal, resolution, aspect ratio and inputs. The units represent audio and video data.

More information about the Product see in operating manual «Marine display MV-xx04, MV-xx05, MV-xx06, MV-xx07».

2.12 VGA-SIGNAL SPLITTER VD1-2

The unit ensures splitting of input VGA-signal to two outputs.

2.13 COMBINED MOTION SENSOR PD-1

The unit detects motion by IR and microwave sensors based on dry contact type.

2.14 PTZ CAMERAS CONTROL CONSOLE PCD-1C

The unit is designed to control PTZ cameras by Ethernet and RS-485. The number of connected video cameras - 255.

2.15 TRACKBALL (PANEL-MOUNTED) TB-1-50LF

The unit is designed to operate with the video server interface.

2.16 CV-SIGNAL SPLITTER CD1-3

The unit ensures splitting of input CV-signal to three outputs.

2.17 ETHERNET CONVERTERS SC-1, SC-2, SC-1-S

The set comprises the transmitter SC-1 and receiver SC-2. It is designed to connect digital video cameras using existent coaxial cable passages. The unit SC-1-S is a server; it converts analogue video signal into digital and then transmits it via Ethernet network.

2.18 MICROPHONE (ACTIVE) MC-1

The microphone is connected to the cameras. It converts sound into audio signal.

2.19 DISTRIBUTION BOXES КР-6, КР-2

The units КР-6 and КР-2 provide for connection to the network bus RS-485 and power supply for 6 and 2 ways, respectively.

2.20 JUNCTION BOX WITH POWER FILTER КР-124WF

The unit distributes power to outputs. Built-in filter ensures filtering from electromagnetic interference. The mains are protected by fuses.

2.21 IR ILLUMINATOR IRI-70, IRI-100, IRI-100, EXPLOSION-PROOF IR ILLUMINATOR IRI-300-A-IR, IRI-300-S-IR

The units ensure IR illumination (invisible to human eye) at night time.

The System comprises IR illuminators IRI-70, IRI-100, IRI-100 with different operating range and explosion-proof illuminators IRI-300-A-IR, IRI-300-S-IR.

2.22 TWO-AXES PTZ PLATFROMS RT-1, RT-2, EXPLOSION-PROOF PAN / TILT PLATFORMS PTR-407EX

The System includes pan / tilt platforms RT-1, RT-2, PTR-407Ex, designed to change angle of cameras' rotation. The unit PTR-407Ex is explosion-proof.

2.23 POE INJECTOR-REPEATER POE-INJ

The unit POE-INJ ensures extension of four PoE lines for 100 m (10/100Base-TX).

2.24 UNIVERSAL DATA CONVERTER MDC-145

The unit MDC-145 is designed to couple two devices of different data types, formats, repetition rate, etc.

2.25 PORTABLE AUDIO RECORDER PR-2

The product provides monaural or stereo recording of audio information in complex acoustic environments.

3 INTENDED USE

3.1 OPERATIONAL CONSTRAINTS

The System units must be connected only according to the relevant drawings and tables (corresponding to the order). All System units must have proper grounding; all cables must have insulation; non-insulated cable ends must be absent.

3.2 PREPARATION FOR THE SYSTEM'S OPERATION

3.2.1 Safety features

While preparing the System units to operation provide the visual check and make sure the mechanical damage is absent.

Connection of the units to the power mains must be provided only considering input power requirements.

Before connecting the System units they must be switched off and grounded.

The staff shall follow «The technical rules for operation of electric installation» and «Safety rules for operation of electric installation» while testing electrical circuits and insulation resistance.

3.2.2 Method of the visual check

Before switching the System units on, the staff shall:

– observe visually the cable integrity and initial position of the controls on the front panels;

– clean front panels from dust and dirt by clean soft cloth, if necessary;

– check reliable cable connections to the units and proper grounding.

3.2.3 Switching the Product on instructions

To turn on the system, follow these steps:

– switch on all power supply units;

– check power LEDs glowing on all units;

– check software loading is finished.

4 TECHNICAL SERVICE OF THE SYSTEM

4.1 GENERAL DESCRIPTION

The technical service (TS) shall be provided by the staff acquainted with the System's composition, structure and operation features.

In order to provide safe and reliable operation for the System units, the staff shall maintain a schedule of the technical service:

– technical service № 1 (TS-1) – semi-annual TS;

– technical service № 2 (TS-2) – annual TS

TS-1 is organized and controlled by a person in charge and carried out by the staff on the running equipment.

TS-2 is organized and controlled by a person in charge and carried out by the staff. TS-2 results are registered into the system's status record.

4.2 SAFETY FEATURES

While carrying out the TS follow the instructions given in 5.2 of this OM.

4.3 MAINTENANCE ROUTINE

The list of works for all types of the Technical service is given in Table 15. Maintenance routine procedure is given in the checklists (CL), represented in 16 - 18.

Table 15 – The list of Technical Service works for the System

CL №	Name of work	TS type	
		TS-1	TS-2
1	Visual check of the Product	+	+
2	Test for the unit operability	+	+
3	Checking completeness, SPARE–PARTS–AND–ACCESSORIES KIT LIST and condition of Operat-ing Manual	–	+
Notes 1 «+» – work is obligatory. 2 «–» – work is not required.			

Table 16 – Checklist №1. Visual check of the System units

To be done	Routine	Man-hours
Visually examine the Product	1 Check completeness and appearance of the Product; mechanical damage, paint defects must be absent; legends are to be read easily; 2 Clean all surfaces by clean cloth; 3 Remove severe contamination, parts of corrosion, oil spots: – from metal surfaces: by suds, avoiding its penetration inside the device; all surfaces clean dry by clean cloth and dry up; – from LED: by alcohol soaked cloth. Do not use hard cloth, paper, glass cleaning liquids or chemicals; Do not press hard on the surface while cleaning; Do not spray liquid directly to the surface of the Product 4 In case of varnish damage clean it with abrasive cloth, then alcohol soaked cloth, cover with varnish and let dry	1 person 5 minutes
Check reliability of cable connections and grounding buses	Connectors and attaching screws are to be fastened tight, no further fastening is needed	1 person 5 minutes

Table 17 – Checklist №2. Visual check of the System units

To be done	Routine	Man-hours
Check the System operability	Check presence/operability of: 1 Power LEDs operability on all System devices; 2 Video display on the LCDs	1 person 10 minutes per 1 device

Table 18 – Checklist №3. Check for completeness SPARE–PARTS–AND–ACCESSORIES KIT LIST

To be done	Routine	Man-hours
Check for completeness, SPARE–PARTS–AND–ACCESSORIES KIT LIST and operating documents	1 Compare SPARE–PARTS–AND–ACCESSORIES KIT LIST and documents with those listed in «the Scope of delivery»; 2 Check quality condition of each item in SPARE–PARTS–AND–ACCESSORIES KIT LIST, storage time and if the kit was used - its proper recompletion; 3 SPARE–PARTS–AND–ACCESSORIES KIT LIST packing	1 person 1 hour

5 СИСТЕМЫ CURRENT SYSTEM REPAIR

5.1 GENERAL DESCRIPTION

Used SPARE–PARTS–AND–ACCESSORIES KIT (transported) shall be recompleted on the base from basic SPARE–PARTS–AND–ACCESSORIES KIT.

5.2 SAFETY FEATURES

Any repair works must be provided by personnel examined and received proper qualifications in the area of the occupational safety.

All the System units must be grounded.

Replacement of fuse links or defective parts, boards and modules when power is ON is STRICTLY PROHIBITED.

It is PROHIBITED to put a poster «DO NOT switch on! Under Operation!», when power supply switch is in OFF position.

Installation and repair works are PROHIBITED in the room, where less than 2 people are present.

5.3 CURRENT REPAIR

Table 19 – Possible problems / defects and troubleshooting

Problem / defect	Possible reasons
Power LED is not glowing	Check the integrity of fuse, change if necessary
	Check external power supply
HDD error (not found)	Check the HDD cable connection
	Faulty HDD cable
	Faulty HDD
	Faulty SATA port
	Format HDD from video server (CAUTION: all HDD data shall be lost. Use this trouble-shooting issue only if no essential data is stored on the HDD)
Video files / data fail to be transmitted to the external drive	Check that external drive has file system FAT32
Output signal is absent on one or several channels	Check image brightness settings
	Faulty video server or network switch
	Faulty cable passages to video cameras
Colour or brightness error	Check the selected mode
Video files error (not found in local playback mode)	Faulty connection to HD
	Faulty HD
	Wrong search time
	Recording stop
Blurred image during local playback	Poor quality of recording

Problem / defect	Possible reasons
	Clean protective camera lens from dirt or dust
Audio signal is lost during playback	Check the connection to the sound reproducer
Motion detection mode is out of order	Invalid settings for motion detection area
System access through network is denied	Network connection error
	Invalid login and password
	Invalid system settings
Unstable network connection	Faulty network card or network switch
Files fail to be copied on external USB drive	No free space
Alarm signal fails to be switched on	Invalid settings of the alarm signal

Table 20 – Possible problems / defects of the network switch

Problem / defect	Possible reasons
Power LED is not glowing	Check the integrity of fuse, change if necessary.
	Check external power supply

Table 21 – Possible problems / defects of the cameras

Problem / defect	Possible reasons
Image from one or several cameras is lost / absent	Check external power supply
	Check the cable integrity between the camera and video server or network switch
	Check video server settings

6 STORAGE

The Product must be stored in packaging inside areas complying with the required storage conditions (+ 5…+ 40 °C) with the concentration of dust, oil, moisture and aggressive impurities in the air within the required limits for the working areas of production facilities.

After storage or transportation of the Product below + 10 °C, it must be unpacked only in heated premises and left in normal climate conditions for 12 hours beforehand.

7 TRANSPORTATION

The System must be transported in the Manufacturer's transportation package in closed means of transport.

Types of shipment:

– motor vehicle and railroad transportation in closed means of transport (covered cars, multipurpose containers)

– air transportation (in sealed and heated compartments);

– sea transportation (in dry service premises).

The System must be transported in compliance with transportation rules applicable for each means of transport.

During loading / unloading operations and transportation, the requirements indicated on warning labels on the boxes/packaging must be observed, and no impacts are permitted since they can affect the safety and performance of the System.

Inside the means of transport, the packed device must be firmly secured/fastened.

8 DISPOSAL

New equipment, the parts of the Product damaged during operation, and any overage equipment must not be disposed as standard household wastes, since they contain the materials suitable for re-use.

Decommissioned and non-used components of the Product must be delivered to a special waste disposal center licensed by local authorities. You can also send an overage equipment / unit to the manufacturer for its further disposal.

Proper disposal of the Product components allows avoiding possible negative environmental and health impacts, and it also allows for proper restoration of components with substantial energy and resources saving.

During operation and upon completion of its service life, the equipment is not hazardous for health and environment

This unit must be disposed according to the rules applied to electronic devices (Federal Law dated 24.06.98 No. 89-FZ On Production and Consumption of Waste as amended of 30.12.2008 No.309-FZ)

This unit must be disposed according to the rules applied to electronic devices (Federal Law dated 24.06.98 No. 89-FZ On Production and Consumption of Waste as amended of 30.12.2008 No.309-FZ)

9 WARRANTY

The Manufacturer is under warranty obligations in case of correct System exploitation according to the OM. In case of incorrect operation or service damage claims are not considered by the Manufacturer.

More information about warranty terms you can find on the official site of «NPK Morsvyazavtomatica» LLC, section Support.

Address and contacts of the Manufacturer's service centre:

«NPK MSA» LLC

26E, Kibalchicha str., 192174, St Petersburg, Russia

Tel.: + 7 (812) 602-02-64, 8-800-100-67-19

fax: +7 (812) 362-76-36

e-mail: service@unicont.com

ANNEX A
CONNECTION DIAGRAMS FOR THE SYSTEM UNITS

Table A.1 – Cable recommendations

Cable marking (brand) and specifications	Description	Units to connect	Cable cores and cross section
КМПВЭ 2х2.5-500	To provide power supply to all System units	All System units	2 core shielded cable
Flame retardant low smoke- and gas. КМПВЭнг(А)-LS 2х2.5			2 core shielded cable
Low smoke flame retardant halogen free. FUTP4-C5E-S24-OUT-LSZH	To create Ethernet network between video server / remote client and network switch.	NVS-16 19-NVS-16 HVS-16 NVC-127 19-NVC-127 Video servers, panel PCs and remote clients.	4 core shielded cable
Combined cable (twisted pair with power) CAT 5E 4x2x0.5+2x1.5mm^2 OUTDOOR	To connect video cameras.	All cameras	4 cores external shielding (outside insulation) + 2 power cores
Flame retardant low smoke- and gas. КМПЭВнг(А)-LS 2х0.5	To connect motion sensors.	Motion sensors	2 core shielded cable