videoReferee® system

Control panel Control-VR

The Control-VR is developed for the convenience of the users, video referees, and their assistants.
The Manual describes all Control-VR elements and their functions.

Operational limits

> ⚠ Do not force the connectors into the ports.
> Make sure that:
> – no foreign objects are obstructing the port
> – the connector corresponds to the port
> – the connector is correctly positioned relative to the port

The standard warranty does not cover the following cases:

1. if the warranty stickers are damaged;
2. mechanical damage caused by the user;
3. problems caused by unauthorized equipment modifications;
4. malfunctions caused by power, telecommunications and cabling at the installation site.

Description

The Control-VR console is equipped with a **Jog/Shuttle** wheel, a joystick-button **Pan/Zoom** and 35 control buttons divided into 5 groups:

- 16 direct access buttons (channel selection);
- 5 video control buttons;
- 5 function keys;
- 5 buttons for additional control;
- 4 buttons for markup and display control.

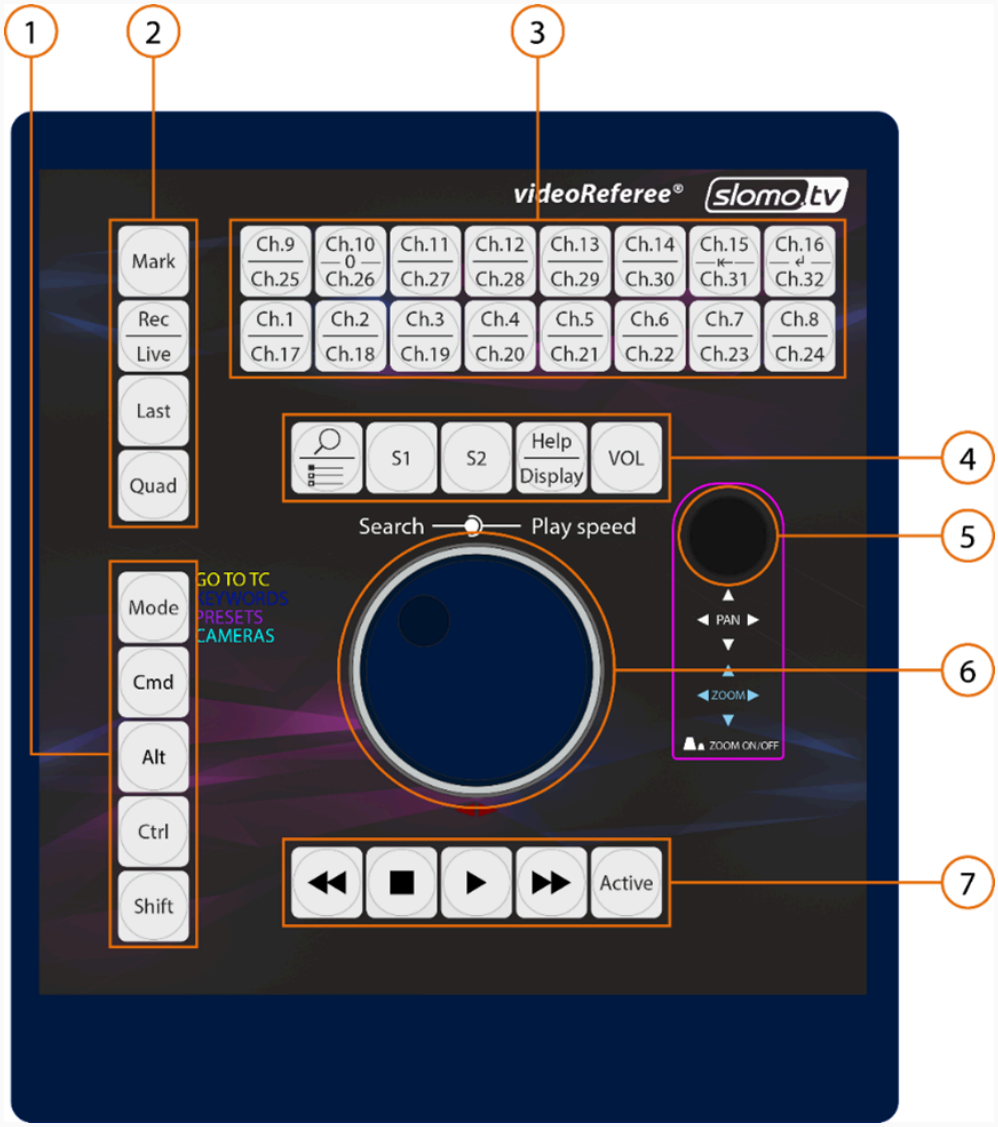
Each button has a LED indication. The LED indication of some buttons may vary depending on the key combination and the used operating mode.
Most of the buttons on the remote control are multifunctional – the effect of using them depends on the function key which is pressed at the same time.
The functions of control elements also depend on the current state of the slomo.tv video-refereeing system.

This control panel simplifies work and provides faster fulfillment of various operations, including:

- channel selection,
- event creation,
- search through events,
- naming events,
- switching between cameras,
- changing the number of displayed cameras,
- displaying virtual offside lines in football.

Figure 1 shows the button groups of the Control-VR.

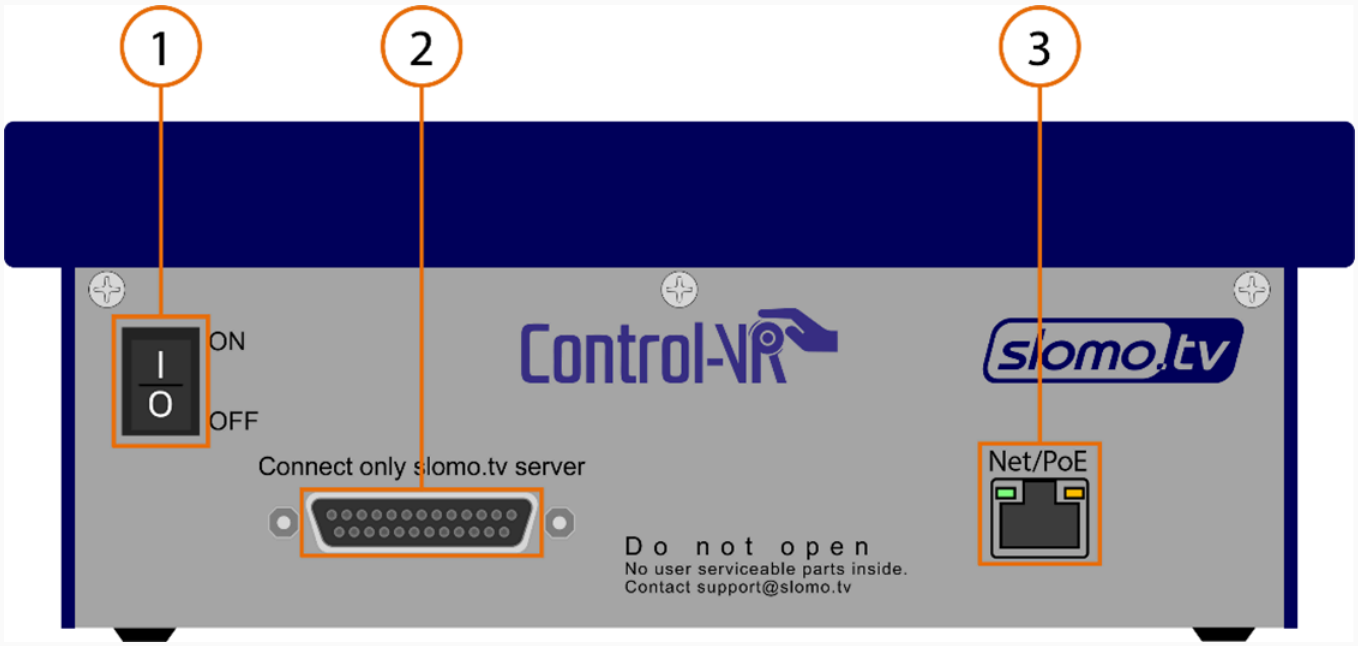
Figure 1 – Control-VR front panel



1 – Function keys;
2 – Buttons for markup and display control;
3 – Direct access buttons;
4 – Buttons for additional control;
5 – Joystick-button Pan/Zoom;
6 – Jog/Shuttle wheel;
7 – Video control buttons.

Figure 2 shows the rear panel of the control console.

Figure 2 – Control-VR rare panel



1 – ON/OFF switch;
2 – USB / RS-232 / RS-422 / RS-485 connector;
3 – Ethernet connector with PoE.

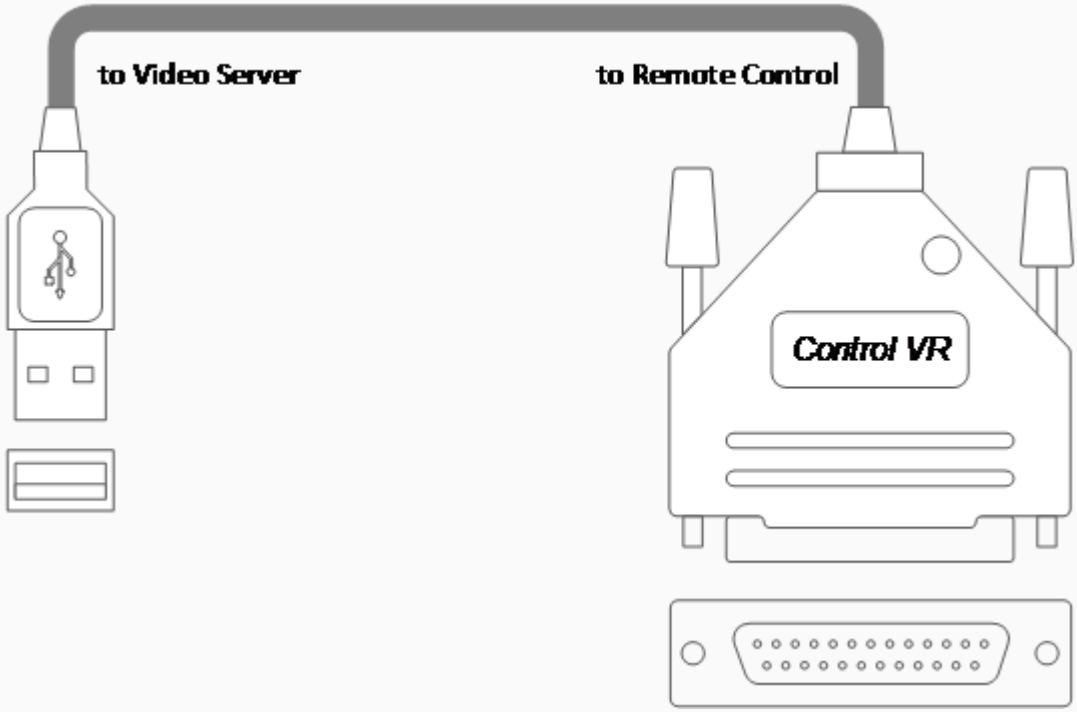
Connecting the remote controller

Connecting to 1U / 2U servers

Connection to 1U and 2U servers is made with a USB cable 900.026.300.01[1], shown in Figure 3.

1. Included with the control panel.

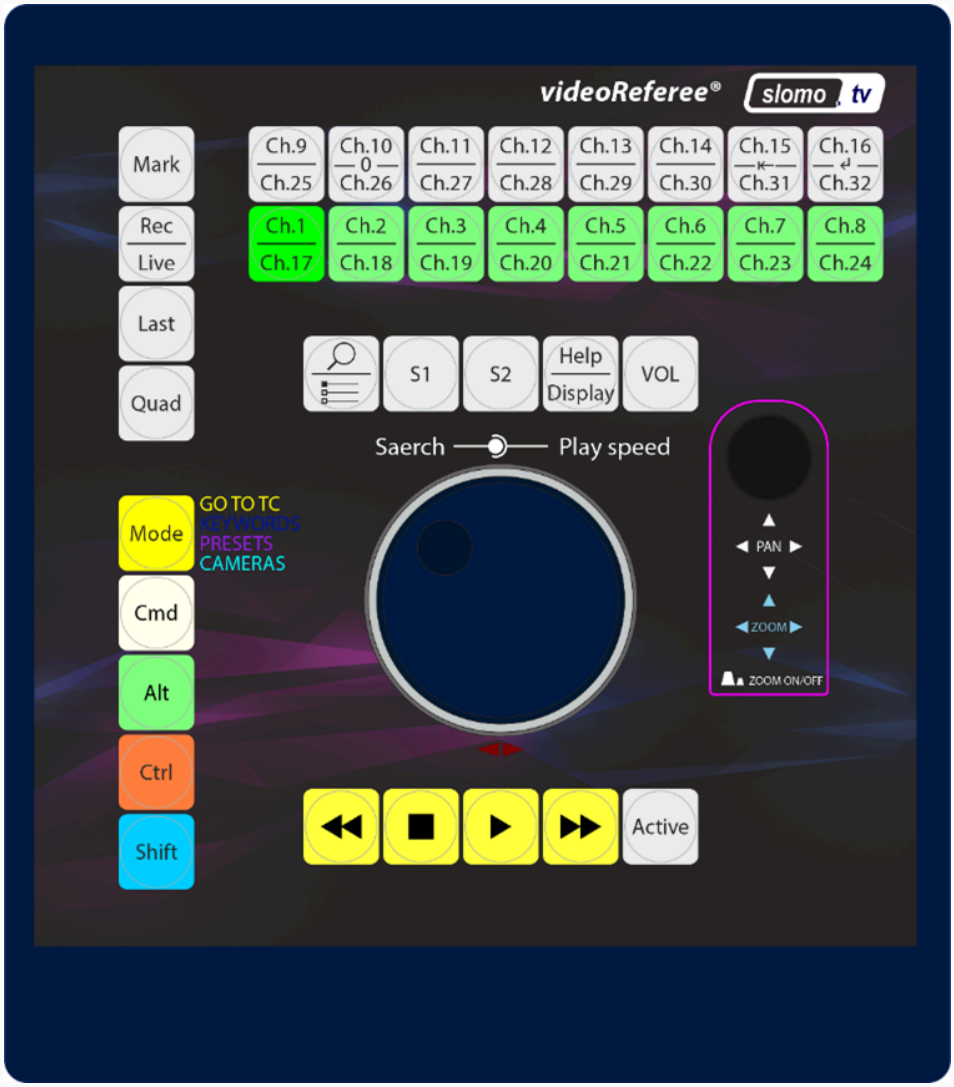
Figure 3 – Cable for connection via USB



If connected correctly, all buttons on the remote control will glow[1] when the video-refereeing system is turned on. If the COM port is not detected or the cable is connected incorrectly, the buttons and the LED will not light. After starting the application, the **Alt**, **Ctrl** and **Shift** will become multi-colored, and the direct access buttons will light green[2].

1. The color tone of the buttons in the manual may differ from the color of the buttons on the remote control.
2. The number of green-lit buttons depends on the number of channels used in the system.

Figure 4 – Control panel is connected. Application is running (8 channels)



When the application is closed, the button illumination will turn off.

Connecting to 4U servers

Connection to 4U servers can be made via one of the following interfaces[1]:

1. USB – cable 900.026.300.01[2] (Figure 3).
2. Ethernet – Ethernet cable[3] of the appropriate length[4] (Figure 5);

1. Depends on the purchased configuration.
2. From the equipment delivery set.
3. Twisted-pair cable (Cat.5 or higher) and RJ-45 connectors. Not included in the delivery set.
4. Not more than 100m.

Figure 5 – Ethernet Cable

3. RS-232 – for this purpose 3 cables can be used:

- 900.029.150.01 – (Figure 6).
- 900.012.150.01– (Figure 7). Allows connecting up to 2 control panels for configurations with two independent workplaces. With a single workplace, the second RJ-45 connector is not used;
- Ethernet cable (Figure 5) – is used when needed for lengthening using a pass-through RJ-45 coupler (2 pcs.).

4. RS-422/485 – 3 cables are used for this purpose:

- 900.030.150.01 – (Figure 6);
- 900.024.150.01 – (Figure 7). Allows connecting up to 2 control panels (for configurations with two independent workplaces). With a single workstation, the second RJ-45 connector is not used;
- Ethernet cable (Figure 5) – is used for lengthening using a pass-through RJ-45 coupler (2 pcs.). If the lengthening is not required, the cables 900.029.150.01 and 900.012.150.01 are connected to each other via the RJ-45 pass-through coupler.

Figure 6 – Cable for connection to the remote control

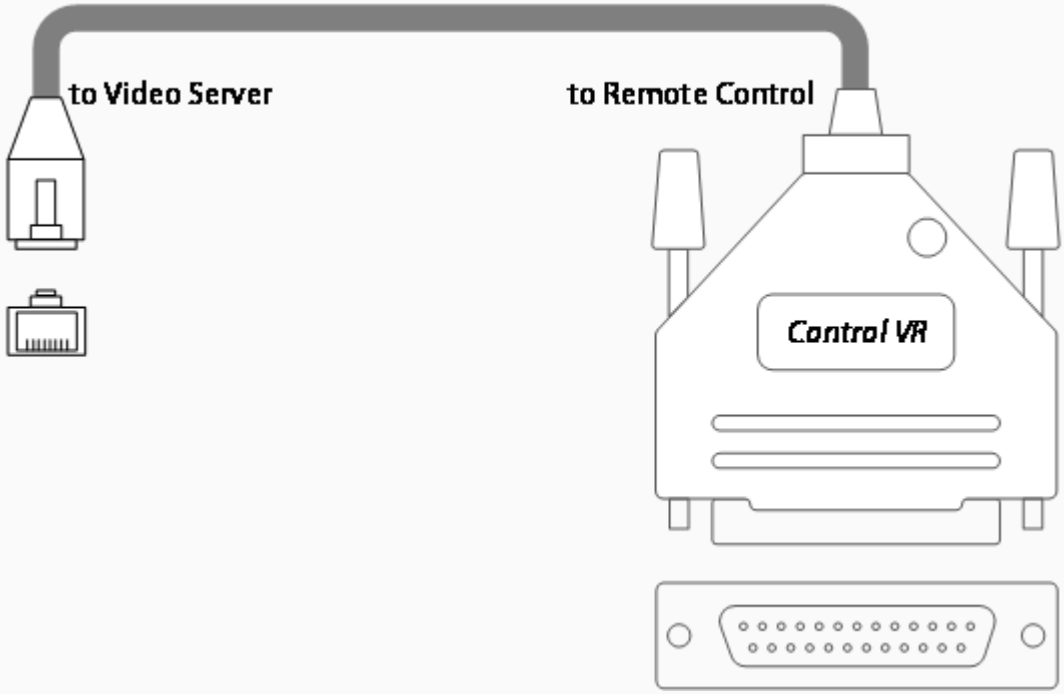
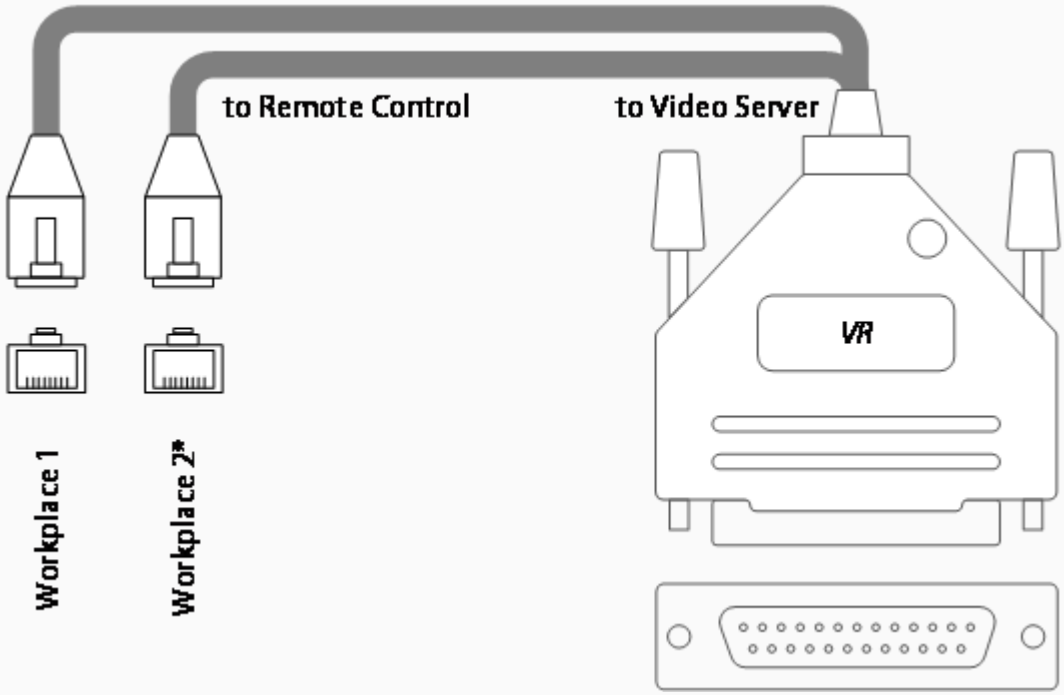


Figure 7 – Cable for connection to the server



* – option

Control elements

The color and light indication of the buttons is important for operation.
The light indication has 2 levels:

- Bright – means the key is active at the moment for the given action;
- Dim – means the key is inactive at the moment or for the given action, but potentially it can become active in the selected color group.

The color of the button depends on the function key used and can be:

- **Mode**:
  - green – direct access to cameras;
  - purple – work with presets;
  - blue – tags assignment;
  - yellow – direct access by time code.
-  (**Search**) – orange – search by the specified search tags;
- **Cmd** – yellow – direct access by time code;
- **Alt** – blue – tags assignment;
- **Ctrl** – purple – work with presets;
- **Shift** + **Ch. N** – light blue – direct access to cameras from 17 to 32.
  white – background lighting of the buttons.
- **Ch. N** – green / light blue / purple / blue / yellow / orange – active channel selection / presets selection / tags assignment / numeric input / search by tags;
- **Rec / Live**:
  - **Live** – green;
  - **Rec** – yellow;
- **Quad** – light blue – toggle the display mode on the referee monitor – one / four channels.
- **Last** – light blue – display the last two cameras used. Switch the display mode on the referee's monitor – 2, 3 or 4 cameras.
- **Active**: transfer control between referee's workplaces:
  - green – console is active;

- red – console is inactive.

Functionality of control console keys is described below.

Ch. 1 ... Ch. 16

Ch. 1 ... Ch. 16 – active channel selection / preset selection / tags assignment / input of numeric values. Pressing any button makes the corresponding channel active. All available in the system channel buttons are backlit.
The active camera button is brighter.
Depending on the mode selected by the function key, some buttons have multiple functions.

Key	Function
Ch. N	Select an active channel from 1 to 16 (buttons are green).
Shift + **Ch.N**	Select an active channel from 17 to 32 (buttons are light blue).
Ctrl + **Ch.N** **Ctrl** + **Shift** + **Ch.N**	Select preset (buttons are purple). In presets mode (**Mode**): select an active channel from 1 to 16; select an active channel from 17 to 32.
Alt + **Ch.N**	Tags assignment to the events (buttons are blue).

Function keys

Alt, Ctrl, Shift

Modifier keys change the behavior of other buttons of the control panel when pressed together with them. They do not perform any functions by themselves. For proper operation, modifiers have to be held down first.

Cmd

Direct access by time code. Available in the Recorded video mode – "Rec | Live":

- **REC** – yellow – Recorded video mode;
- **LIVE** – green – Live video mode.

The channel keys are used for quick positioning by time code:

1. numeric keys from 0 to 9 – enter the time code value in HH:MM format,

2. key **15 [⇤]** – correction of entered value (erase entered values),
3. key **16 [↲]** – **ENTER** – confirmation of the entered value.

Press the Cmd key and keep it pressed while entering the time code value with the numeric keys. Confirm by pressing the **ENTER** – key **16 [↲]**.

Mode

Allows you to toggle the operation modes of the direct access buttons. The color of the **Mode** key and the direct access buttons changes depending on the selected mode:

- green – direct access to cameras;
- purple – work with presets;
- yellow – access by time code;
- blue – tags assignment.

The **Mode** key enables/disables the mode and does not need to be held down for further operation in the selected mode.

Key		Function
Mode	Green	Direct access to the cameras from 1 to 16. All buttons corresponding to the available in the system cameras backlit. The active camera button has a brighter backlight.

<table>
<tr>
<td>  </td>
<td>Purple</td>
<td>Work with presets.
<u>Create and assign a preset:</u>
– select with the Last button the desired number of cameras – 2, 3 or 4;
– use the Ch.1...Ch.16 buttons (with Shift if there are more than 16 channels) to select the channels to be included in the preset;
– select the channel button to which the preset will be assigned - Ch.1...Ch.14, press and hold it down until the button starts flashing (~ 2–3 seconds)[1];
– confirm with the Ch.16 (Enter) button – the button of the selected channel will stop flashing and the preset will be assigned to the selected channel. To interrupt (cancel) saving of a preset, press any functional key (not the channel button).
If you want to create a preset before the current preset instead of after it, press Shift + Ch.16 (Enter) when you confirm.

<u>Delete a preset:</u>
– use the Ch.1...Ch.14 buttons to select a preset to be deleted;
– press and hold down the button corresponding to this preset until it starts flashing (~ 2-3 seconds);
– press the Ch.15 (Backspace) button. Press any other button to interrupt (cancel) the deletion of the preset.
If more than one preset is assigned to a channel button and you want to delete all of them, you need to repeat the deletion steps as many times as the number of presets assigned to the button.
<u>Preset selection:</u>– In presets mode – use Ch.N buttons.
– In cameras mode – the Mode button in green – Ctrl + Ch.N (Ch.1...Ch.14)</td>
</tr>
<tr>
<td>  </td>
<td>Blue</td>
<td>Tags assignment mode.
To assign tags[2] for events, use direct access buttons.
For example, the tags can have the following values:
<table><tr><td>1 – Home</td><td>3 – Red</td><td>5 – Goal</td><td>7 – Hand</td></tr><tr><td>2 – Guest</td><td>4 – Yellow</td><td>6 – Offside</td><td>8 – Fight</td></tr></table>
To assign a tag, select the event from the list of events and press the corresponding tag button. Previously used tag keys will remain brighter.
Tags can also be used when searching for events (see Search).</td>
</tr>
<tr>
<td>  </td>
<td>Yellow</td>
<td>Direct access by time code. Available in the recorded video mode (Rec | Live):
The channel keys are used for quick positioning by time code:
1) numeric keys from 0 to 9 – enter the time code value in HH:MM format,
2) key 15 [⇤] – correction of entered value (erase entered values),
3) key 16 [↲] – ENTER – confirmation of the entered value.</td>
</tr>
</table>

1. If no preset(s) have previously been assigned to the button, it flashes purple and white. If a preset(s) has already been assigned to the button, it flashes purple and yellow.
2. The tags depend on the sport.

Video control buttons

Key	Function
► (Play)	Start playback. Loop playback of the desired moment (flexible duration): – find the beginning of the moment; – start playback with the ► button; – play the moment to the desired end and press the ► button again[1]. The duration of the replay will be equal to the time between presses of the ► button[2]. Shift + ► – playback of the moment with a fixed duration of 1 second. Press ■ twice to stop loop playback.
■ (Stop) ■ (2 times)	Stop playback. Disable loop playback.
►► (Forward)	Move to the next mark. If there is no subsequent mark, the system goes to the end of the recording. Attempting to use [►►] in Live mode will make the system go into the search mode on the recorded video.
◄◄ (Backward)	Move to the previous mark. If there is no preceding mark, the system goes to the beginning of the recording. Attempting to use [◄◄] in Live mode will make the system go into the search mode on the recorded video.

Active

For a single workplace in MultiSkin mode, switches the interfaces displayed on the monitor. No color indication.

For two or more referee workplaces with control panels pressing the **Active** button for the first time transfers the control to the referee who pressed it. After that, the system will be controlled from the active referee workplace. No operations will be available for the inactive control panel. Pressing the **Active** button on another referee's control panel will transfer control to that referee workplace.
Color indication:

1. There is a software restriction on creating a loop of very short duration. Your loop will automatically be increased to the minimum possible.
2. The indicator in the info bar at the bottom left of the screen (after the time and operating mode) informs you that loop playback is activated.

- Green – console is active;
- Red – console is inactive.

Buttons for markup and display control

Mark

Mark – Manual creation of a mark in the event list[1]
Mark + **Ch.15** – Delete the selected mark. Operates in recorded video mode only (see "Rec | Live").

Marks can be created both when working with live or recorded video. The moment will be marked:

- in real time, when working with live video;
- corresponding to the recorded time, when working with recorded video.

It should be remembered that in addition to the manual marks made by the referee, a number of events registered by the match-controller are marked automatically.

The marks are used to note the important moments of the game – goal scoring and controversial moments in and out of the goal area. The marked events of the match are included in the video report.
Also, to quickly find the previously marked event you can navigate through the video by "jumping" from mark to mark – see "Forward", "Backward".

Rec | Live

Switch between live and recorded video modes.

- Live (green) – live video.
- Rec (yellow) – search for the desired moment of a recorded video, view single frames, or manually rewind forward or backward through the recorded video. The video recording can be played back at normal or slow speed.

The search mode (as well as automatic marking) is triggered automatically if the **Jog** wheel has been activated.

Shift + **Rec | Live** – Enable/disable video delay in the engineering and referee interfaces[2].

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1. In addition to the manual tags placed by the referee, there are tags generated automatically.
2. The events will also be created considering this delay.

Last

Display of the last 2 cameras used. Pressing **Last** (blue lighting) takes the user to the **Quad** view, which shows the last 2 direct accessed cameras. It is possible to change these cameras by pressing other buttons of direct access. They will be changed from the bottom right corner of the **Quad**.
The subsequent pressing of the **Last** button changes the number of displayed cameras – 2, 3 or 4.
When you press **Last**, the **Quad** key will automatically glow light blue, because **Last** activates the **Quad** view mode.

Quad

Toggles the display mode on the referee monitor – one / four channels.
When the **Quad** view is turned on, the key turns light blue.
If **Last** is not enabled, the **Quad** will display cameras of the “right” and “left” half of the field[1].

Shift + **Quad** – toggles the number of displayed channels – 2, 3 or 4.

Additional control buttons

(Search)

Search for an event by the specified search tags.

When using Control-VR, it is possible to form a list of events with certain names (tags), i.e. the list will not include all events, but only those selected using the tags.

After pressing the  button the backlight changes to orange for the  , **MODE** and direct access buttons **1...16** (if any tags are assigned to them).
To select an event with a specific tag, press the event button – the backlight becomes brighter. To cancel the selection, press the button again.
The buttons with a dim glow indicate the tags that have been used before. Brightly backlit buttons are the currently selected tags. After pressing the tag button, only the events that correspond to the selected tag will remain in the list of events.
To navigate through the selected events, use the following buttons:

- ◄◄ – backward;
- ►► – forward.

1. This layout is set upon delivery of the system and can be changed by contacting the technical support.

S1 | S2

Additional buttons. The purpose of these buttons depends on the sport and the operating mode of the system. They are usually used to mark events to be included in the video report.
For ice hockey:

S1 – left half of the field + panoramic cameras;	**S2** – right half of the field + panoramic cameras.

For other sports:

S1 – one active camera;	**S2** – all cameras.

Pressing the button again removes the corresponding mark.
The **S1** or/and **S2** marks indicate to the *videoReferee®* system that the marked event and the camera group(s) for it should be included in the video report.
If there are no **S1** and/or **S2** marks, the marked event will not be included in the video report.

Switching the speed change mode

Alt + **S1** – Toggles the speed change mode – smooth / stepped. The button is blue when the stepped mode is selected.

Help | Display

When you press the **Help** button, a brief hints on how to use the remote control is displayed on the referee's monitor – an image of the remote control and indication of the buttons' functions. When pressing the button again, the image disappears. To quickly exit the hint – **Shift** + **Help**.

Shift + **Display** – displays/hides the game data and information about operating mode on the referee's monitor. The information displayed (the same information is recorded in the video report as a subtitle track) depends on the sports the system is set up for and may include such parameters as:

1. astronomical time (set on the system before starting the application)
2. status of the recording process:
   - ® – recording is in progress,
   - a crossed-out symbol – the recording is not in progress.
3. operation mode:
   - "Live" – live video is displayed on the monitor,
   - "Recorded" – positioning on the recorded video,
   - "Play" – playback.

4. project name[1],
5. camera name,
6. fouls, 24-second possession countdown[2],
7. period,
8. time left to the end of the game,
9. score.

When viewing the indicators, please note that in the Recorded mode the recorded values of the indicators are displayed, i.e., their state at the time of recording, not at the time of viewing.

VOL

Enable / disable the display of virtual offside lines (used in football).

Pan joystick / Zoom

Pan – magnifies the image on the monitor (2x) and allows you to navigate through it: up (↑), down (↓), left (←), right (→).

Zoom – pressing the center of the joystick-button activates the zoom (up to 12x). You can navigate through the magnified image using left (←) / right (→) / down (↓) / up (↑).

- **Shift** + tilt the joystick diagonally to the right upwards – zoom in;
- **Shift** + tilt the joystick diagonally to the left downwards – zoom out.

Jog / Shuttle

Jog – smooth scrolling of frames[3] / precise positioning on the desired frame.
Activation of the **Jog** in Live mode triggers the Search mode (see "Rec | Live").
Clockwise rotation scrolls frames forward (right indicator lights blue).
Counter-clockwise rotation scrolls frames backward (left indicator lights blue).
When you stop rotating the **Jog** the image on the monitor will also stop.
If you accidentally activate the **Jog** during playback, don't be alarmed and resume playback.

Shuttle – controls the playback speed; stop/start of the video playback.
Available only in Search mode (see "Rec | Live").
Shuttle allows for clockwise and counterclockwise deviation up to 45°.
In the neutral position it is secured with a soft click, both indicators under the **Shuttle** glow green at the same time.

1. Video engineers usually include the name of the teams in the name of the project.
2. For basketball.
3. If you rotate the wheel quickly, frames may be skipped, unlike in the Playback mode, when all the frames are displayed.

The playback speed in the neutral position is 50%.
Rotate clockwise to increase speed[1] (right indicator glows green).
Rotate counter-clockwise to reduce the playback speed[2] (left indicator glows green).
Leftmost position stops the playback (as when you press Stop).

Start / Stop video recording

Alt + **Ctrl** + **Shift** + **Mark** – Start recording.
Alt + **Ctrl** + **Shift** + ■ – Stop recording.

RRA option

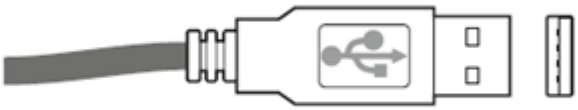
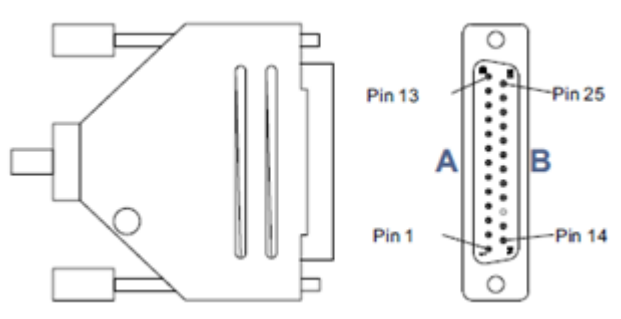
RRA option – synchronous display of the referee output or preset graphics on a separate video output.
When RRA is activated, the referee output or the preset graphics, if available, will be duplicated on a separate video output.

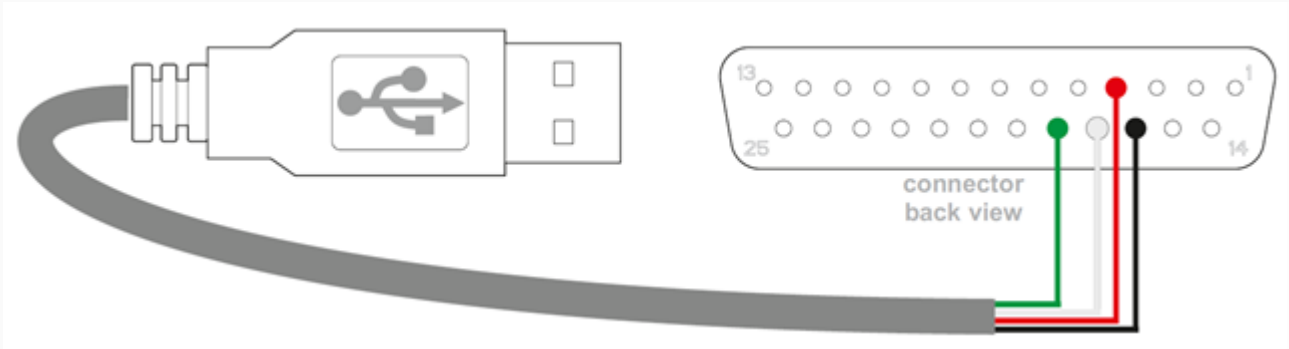
Key	Function
Alt + **Cmd** + **Rec** | **Live**	Activates the RRA output to duplicate the referee output. When the RRA output is inactive, a background image (screensaver) is displayed on the RRA monitor.
Alt + **Cmd** + **Ch.N**	Selects a pre-loaded graphical information to be displayed on the RRA output (up to 16 images). The selected image will disappear automatically after 30 seconds if no next image has been selected, and a screensaver will be displayed instead.

1, 2 If the playback was stopped when you started rotating the Shuttle, it would resume.

Appendix A. Cable 900.026.300.01

use USB3.0 cable length 3 m

to VideoServer USB3.0	to Remote Control DB-25M
	 Stickers: side **A** – **Remote Control** side **B** – **900.026.200.01**

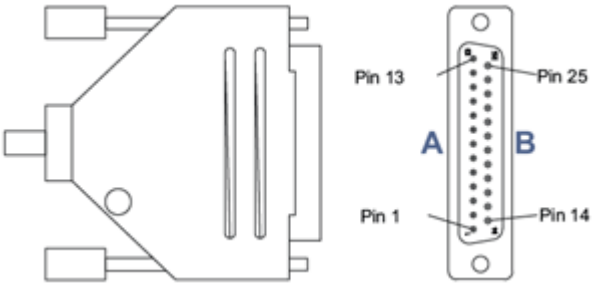


USB		Cable	DB-25M
1	5V	Red	4
2	Data	White	17
3	Data	Green	18
4	GND	Black	16

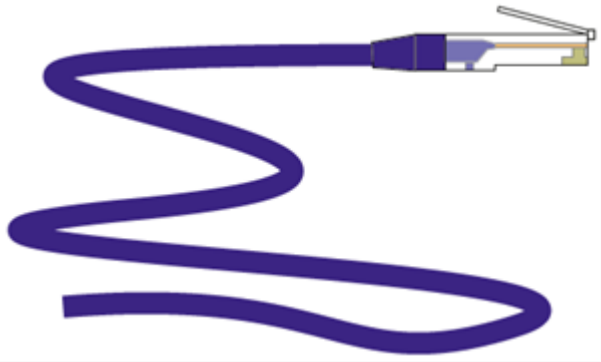
Appendix B. Cable 900.029.150.01

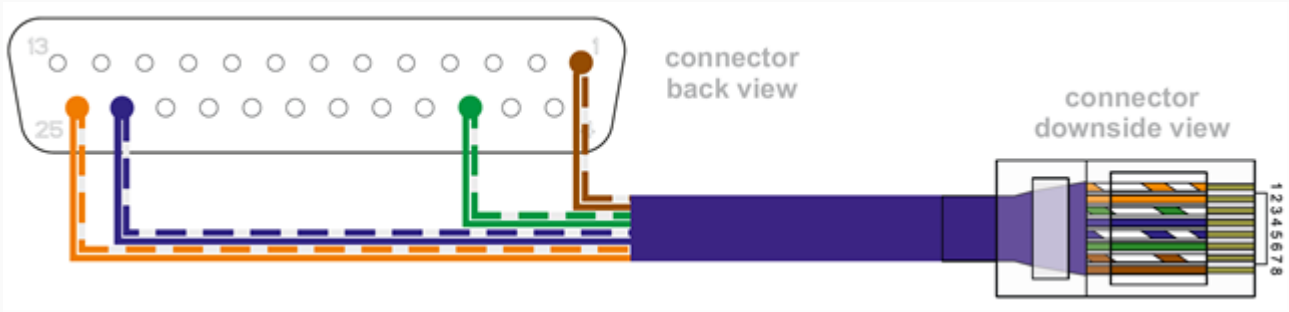
vR remote console 25 pin RS-232 cable
use BLUE Ethernet network LAN patch cable
length 1,5 m

To Remote Control (RC) DB-25M	To *videoReferee®* (VR) patch cable with RJ-45



Stickers:
side **A** – **Control VR**
side **B** – **900.029.150.01**



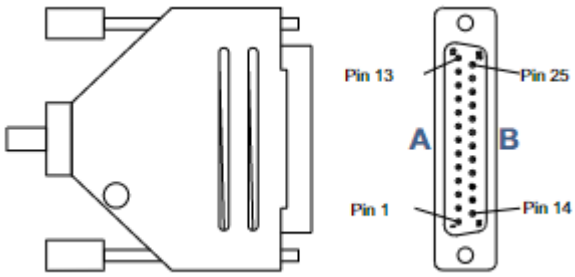


DB-25M		RJ-45
1	9V	7 (w.brown), 8 (brown)
16	GND	3 (w. green), 6 (green)
24	RX	4 (w.blue), 5 (blue)
25	TX	1 (w.orange), 2 (orange)

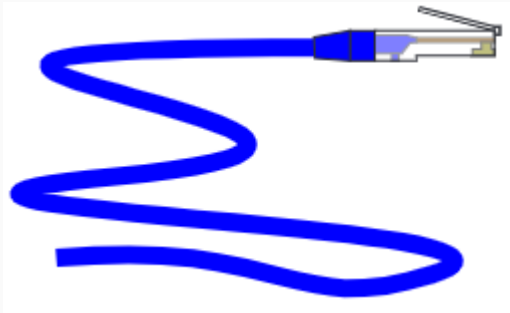
Appendix C. Cable 900.012.150.01

vR remote console 25 pin 2-way RS-232 cable
use BLUE Ethernet network LAN patch cable 2 pcs
length 1,5 m

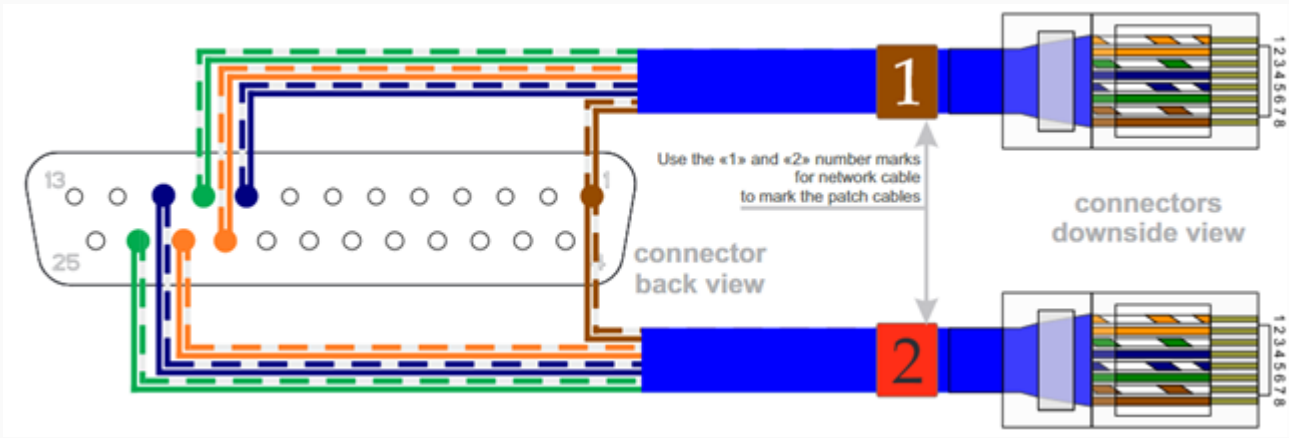
to *videoReferee®* (VR) DB-25M	to remote control (RC) patch cable with RJ-45



Stickers:
side **A** – **VR**
side **B** – **900.012.150.01**



Mark by the «1» and «2» number marks for network cable

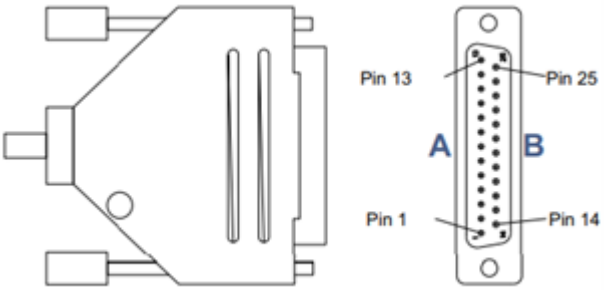
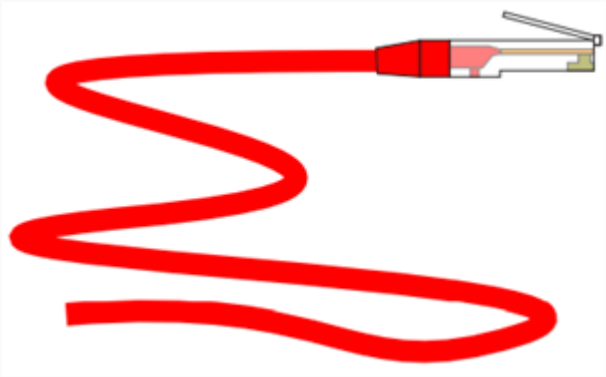


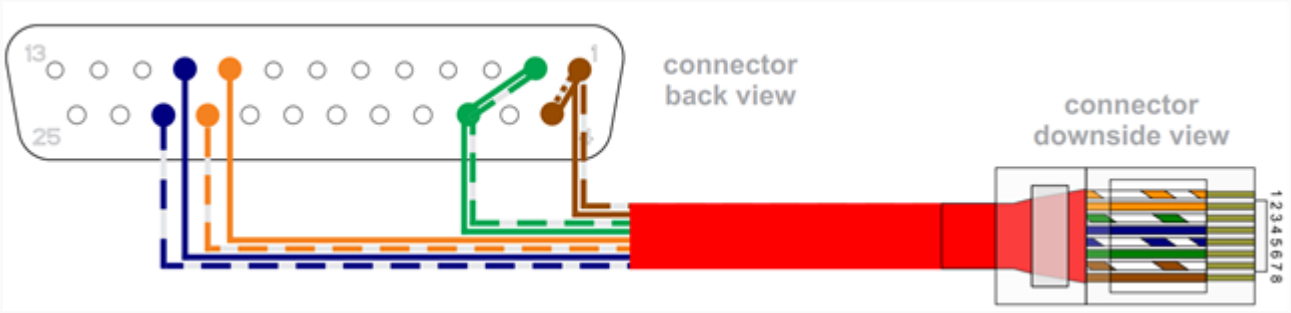
DB-25M		RJ-45 #1	RJ-45 #2
1	9V	7 (w.brown), 8 (brown)	7 (w.brown), 8 (brown)
9	P3_RX	4 (w.blue), 5 (blue)	–
10	GND	3 (w. green), 6 (green)	–

11	P4_RX	–	4 (w.blue), 5 (blue)
22	P3_TX	1 (w.orange), 2 (orange)	–
23	P4_TX	–	1 (w.orange), 2 (orange)
24	GND	–	3 (w. green), 6 (green)

Appendix D. Cable 900.030.150.01

vR remote console 25 pin RS-422/485 cable
use RED Ethernet network LAN patch cable
length 1,5 m

to *videoReferee®* remote console DB-25M	to *videoReferee®* (VR) patch cable with RJ-45
	
Stickers: side **A** – **Control VR** side **B** – **900.030.150.01**	

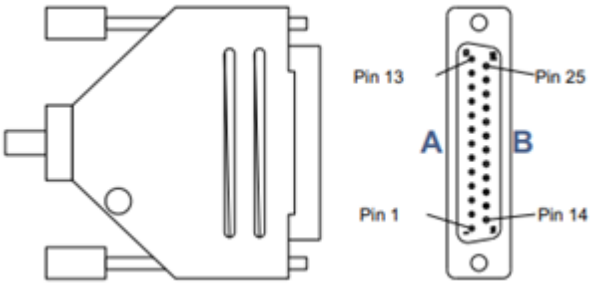
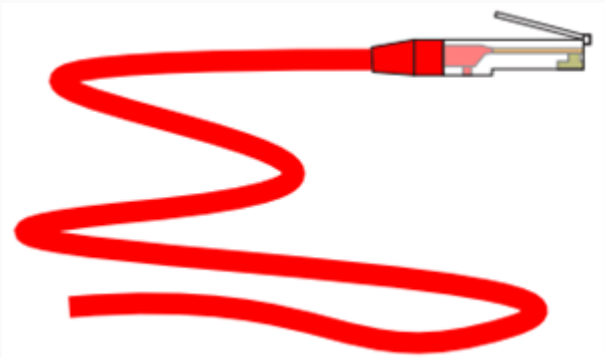


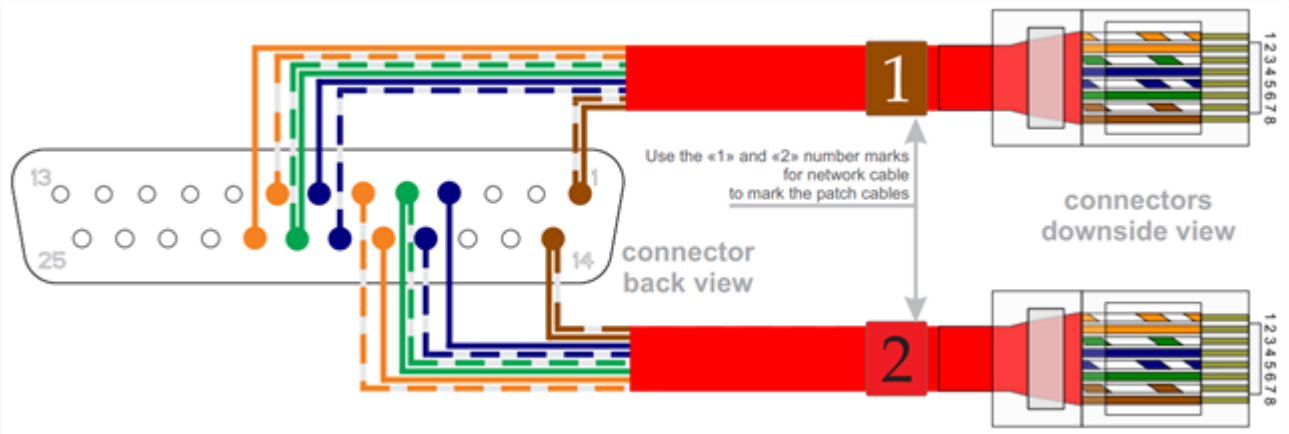
DB-25M		RJ-45
1, 14	9V	7 (w.brown), 8 (brown)
2, 16	GND	3 (w. green), 6 (green)
9	TX+	2 (orange)
10	RX+	5 (blue)
22	TX-	1 (w.orange)

23	RX-	4 (w.blue)

Appendix E. Cable 900.024.150.01

vR remote console 25 pin 2-way RS-422/485 cable
use RED Ethernet network LAN patch cable 2 pcs
length 1,5 m

to *videoReferee®* (VR) DB-25M	to remote console (RC) patch cable with RJ-45
 Stickers: side **A** – **VR** side **B** – **900.024.150.01**	 Mark by the «1» and «2» number marks for network cable



DB-25M		RJ-45 #1	RJ-45 #2
1	9V	7 (w.brown), 8 (brown)	–
4	P4_RX+	–	5 (blue)
5	GND	–	3 (w. green), 6 (green)

6	P4_TX-	–	1 (w.orange)
7	P3_RX+	5 (blue)	–
8	P3_TX-	1 (w.orange)	–
14	9V	–	7 (w.brown), 8 (brown)
17	P4_RX-	–	4 (w.blue)
18	P4_TX+	–	2 (orange)
19	P3_RX-	4 (w.blue)	–
20	GND	3 (w. green), 6 (green)	–
21	P3_TX+	2 (orange)	–

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slomo.tv software is continuously evolving, therefore, there may be differences between documentation and implemented functionality.
Please report any found discrepancies with your comments to support@slomo.tv.
Your comments and suggestions help improve our products and are very much appreciated.