WORKSWELL
WIRIS COMMAND CONTROL PROTOCOL

USER MANUAL

FW Version: 1.6.24 and higher

Release date: 2nd April, 2026

Revision 260402EN

WORKSWELL®
INFRARED CAMERAS AND SYSTEMS

Contents

.

1 User Information

1.1 Typographic Conventions

Following typographic conventions are used in this User Manual:

- UPPER CASE is used for the names of keys, buttons and menu items
- COURIER is used for file names and paths
- *Italic* is used for important information and document names
- underline is used for the links to other sections, for function names or Internet sites

1.2 Help and Support

For technical questions that were not answered in this User Manual feel free to contact your dealer or visit the product website at workswell.eu, or contact our support team via support.workswell.eu.

1.3 Updates

The primary aim of Workswell s.r.o. company is to supply their products in a way that meets the current needs of its users and at the same time to remove all the weaknesses that were found in their use as quickly as possible. For this reason, Workswell s.r.o. regularly releases updates for all their products.

Visit my.workswell.eu to download the latest firmware release. The update process itself is described in a later section.

1.4 Firmware

Firmware is the „internal“ control program of the device. From the user's point of view, only the official firmware released by Workswell s.r.o. company can be used for update of the device.

2 Revision history

1.0

- Initial release

200301

- Updated the commands for the latest FW version 1.4.4

220630

- Added commands for WIRIS AGRO
- Added commands for GIS-320

220815

- Fix mistakes in WIRIS AGRO commands
- Delete unused ”set video location” command

220818

- Add commands for WWE

220825

- Add command to change HR camera resolution

221024

- New main image

220613

- New document format

- added ip setters

E-mail and Web
info@workswell.eu
www.workswell.eu

Mobile:
+420 725 877 063

ID:
Reg. No.: 29048575
VAT No.: CZ29048575

Headquarters
Na Okraji 335/42
162 00, Praha 6
Czech Republic

3 Overview

This chapter includes basic information about the WIRIS Communication Protocol.

3.1 Basic Information

Sometimes it is not possible to control the WIRIS device with RC controller. This protocol was designed as full alternative for the RC controller.

It gives the user an option to control the WIRIS with simple text based commands using different physical layers.

The protocol is currently compatible with five models of WIRIS:

- Workswell WIRIS PRO (WWP)
- Workswell WIRIS ENTERPRISE (WWE)
- Workswell WIRIS SECURITY (WWS)
- Workswell WIRIS ENTERPRISE (WWE)
- Workswell GIS-320 (GIS)
- Workswell WIRIS AGRO (CWI)

Differences between models will be noted. Commands enabled for WWP are also enabled for WWE unless specified otherwise.

3.2 Getting Help and Suggestions

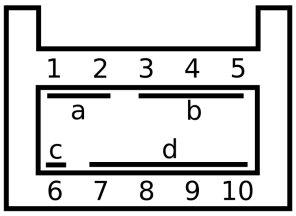
The WIRIS Ethernet SDK was created as stable and robust as possible. Still, if you find any bugs, inconveniences or if you have any suggestions for improvement, please contact us at support@workswell.eu.

4 Physical Layers

Currently only CAN bus protocol UART are supported.

4.1 CAN Bus

CAN bus is a rugged, digital serial bus designed for industrial environments. To use it with WIRIS device, connect the CAN High (CANH) and CAN Low (CANL) wires to your device.



1 - CANH
2 - CANL
3 - GND
4 - S.BUS
5 - +5V
6 - Trigger
7 - +5V
8 - Tx
9 - Rx
10 - GND

a - 1a - NC
2a - CANH (1)
3a - CANL (2)
4a - NC

b - 1b - GND (3)
2b - +5V (5)
3b - S.BUS (4)

c - 1c - Trigger (6)

d - 1d - +5V (7)
2d - Tx (8)
3d - Rx (9)
4d - GND (10)

Figure 4.1: Multicable pinout.

The CAN bus communication has following parameters:

- Bitrate 1000000 bps.
- Frame ID 0xA1 for command to the camera and ID 0xA2 for answer from the camera.
- 8 bytes of data in one frame.

4.1.1 Message Dividing

Since the protocol text command and answer could not fit into one CAN frame, it has to be divided into several frames. The following protocol describes how to do it.

Byte	Function
1	Header: 0x02
2 to 3	Size of message (little-endian): N from 0x0000 to 0xFFFF
4	1th message character byte
5	2th message character byte
...	
N + 3	Nth message character bytes
N + 4	Footer: 0x03

Table 4.1: Protocol parameters

For example, the basic command to test the functionality is `HIWS` and the answer for it is `OK`.

The communication bytes are as follows:

- Command: 0x02 | 0x05 | 0x00 | 0x48 | 0x49 | 0x57 | 0x53 | 0x0A | 0x03
- Answer: 0x02 | 0x03 | 0x00 | 0x4F | 0x4B | 0x0A | 0x03

4.2 UART

The universal asynchronous serial communication protocol can be used for WIRIS Commands. The UART has following parameters:

- Baud Rate 115200 bps.
- 5V logic.
- 8 data bits.
- No parity.
- 1 stop ans 1 start bit.
- No flow control.

The UART port is shared between MAVlink, GPS and WIRIS Command Control Protocol. Only one of these can be used in a given time. The used peripheral is automatically detected. The detection is resetted and repeated after each WIRIS reboot.

4.2.1 Detection

It can take up to seconds for WIRIS to detect that the Communication Protocol is being used, so the command `HIWS` should be repeated in a loop until `OK` answer is recieved. The command should be repeated with period between 10 and 100 milliseconds.

The detection must be repeated after each WIRIS reboot.

4.2.2 Message

The commands and answers are serialized into UART protocol as follows:

Byte	Function
1	Header: 0x02
2 to 3	Size of message (little-endian): N from 0x0000 to 0xFFFF
4	1th message character byte
5	2th message character byte
...	
N + 3	Nth message character bytes
N + 4	Control sum of all message character bytes
N + 5	Footer: 0x03

Table 4.2: Protocol parameters

For example, the basic command to test the functionality is `HIWS` and the answer for it is `OK`.

The communication bytes are as follows:

- Command: 0x02 | 0x05 | 0x00 | 0x48 | 0x49 | 0x57 | 0x53 | 0x0A | 0x45 | 0x03
- Answer: 0x02 | 0x03 | 0x00 | 0x4F | 0x4B | 0x0A | 0xA4 | 0x03

5 Communication protocol description

This chapter contains information about the protocol.

The most common responses are `OK` in case of success and `ERR` in case of error. When parameters are given or returned, they are separated by one space.

> **Note**: Some commands work only for specific camera type. If so it is specified in the command description or in the header of the section describing certain command group. If unspecified the command is valid for all devices mentioned in 3.1

The parameters and return values can be either integers (denoted by [int] tag), floats (denoted by [float] tag) or strings defined as a list of discreet possibilities. The return values can also be strings (e.g. serial number, denoted by [string] tag) or lists (usually set of possible settings which can be dependent on camera calibration or current state). Lists can be consisted of strings, floats or integers (or their combination) and each entry is separated by a newline. Lists are indicated by { } around the type tags.

5.1 Command control protocol activation

Most commands from the command control protocol are initially locked behind a license. To unlock them, you need to enter correct license key. For more information about the license key for your camera, please contact the Workswell support team at support.workswell.cz. Once the license is entered, it persists through the camera restart and you do not need to enter it every ⍰me you are using the protocol.

5.1.1 Activate / get activation status

command	1st parameter	answer
ACCP	LICENCE NUMBER	▪ OK ▪ ERR
IACP		▪ TRUE ▪ FALSE

5.2 Basic commands

5.2.1 Commands delimiter

The delimiter for command messages can be either `LINE` ('\n' character) or `NULL` ('\0' character). This delimiter is used for detecting the end of a command. The `LINE` is mainly useful for manual input via some basic TELNET client, the `NULL` is better for software development. Default value is `LINE`.

command	1st parameter	answer
SDLM	▪ NULL ▪ LINE	▪ OK ▪ ERR
GDLM		▪ NULL ▪ LINE

Example:

```
SDLM  NULL
OK
GDLM
NULL
```

5.2.2 Check connection

Command used for checking the connection (”ping command”)

command	answer
HIWS	OK

5.2.3 Basic camera information

Returns string with camera information. These commands work without the SDK licence set.

command	answer
GSRN	[string]serial number
GATN	[string]article number
GFWV	[string]firmware version

Example:

```
GSRN
20062-046-2305
```

5.2.4 Camera temperature and fan power

The device internally measures temperature on several components. Each temperature value is in set temperature units see 5.5.

command	answer
GTCU	[float]CPU temperature
GTIC	[float]thermal core temperature
GTIN	[float]Internal electronic temperature
GFPW	[float]Fan power (0-1)

Example:

```
GTCU
32.2
```

5.3 Menu navigation

For using the commands in normal mode (with HDMI output active) it is possible to emulate the keyboard control using the `MOVE` commands.

command	1st parameter	answer
MOVE	▪ UP ▪ DOWN ▪ CANCEL ▪ OK	OK

Example:

```
MOVE OK
OK
```

5.4 GPS

5.4.1 Get GPS coordinates

Get the current GPS coordinates as long as it is provided to the camera; it relies on external source. Returns either `N/A` when GPS is not connected, `INVALID` when GPS data is not valid or the coordinates in following format:
`LATITUDE 14.4444 S`
`LONGITUDE 57.5555 W`

```
ALTITUDE 156.156
```

command	answer
GGPS	▪ N/A ▪ INVALID ▪ LATITUDE 14.4444 S LONGITUDE 57.5555 W ALTITUDE 156.156

Example:

```
GGPS
LATITUDE 14.4444 S
LONGITUDE 57.5555 W
ALTITUDE 156.156
```

5.5 Units

The camera can operate in Kelvins (K), degrees Celsius ($^{\circ}C$) or degrees Fahrenheit ($^{\circ}F$). All temperatures used in this protocol are in the set scale without the unit specifier unless explicitly stated otherwise.

command	1st parameter	answer
STUT	▪ K ▪ C ▪ F	▪ OK ▪ ERR
GTUT		▪ K ▪ C ▪ F

Example:

```
STUT K
OK
GTUT
K
```

5.6 Wiris Pro, Wiris Enterprise and GIS thermal parameters

Please refer to the camera User Manual for more in-depth explanation of these parameters. All parameters in this section are valid only for Wiris Pro, Wiris Enterprise and GIS 320 cameras.

5.6.1 Range mode settings

Get/set the range mode

command	1st parameter	answer
SRMD	▪ AUTOMATIC ▪ MANUAL ▪ SPAN	▪ OK ▪ ERR
GRMD		▪ AUTOMATIC ▪ MANUAL ▪ SPAN

Example:

```
SRMD SPAN
OK
GRMD
SPAN
```

5.6.2 Manual range settings

Returns the currently set manual thermal range minimum and maximum (values for Manual Range).

command	1st parameter	2nd parameter	answer
SRMM	[float]min	[float]max	▪ OK ▪ ERR
GRMM			[float]min [float]max

Example:

```
SRMM 20.0 30.0
OK
GRMM
20.0 30.0
```

5.6.3 Span range settings

command	1st parameter	2nd parameter	answer
SRWC	[float]center	[float]window	▪ OK ▪ ERR
GRWC			[float]center [float]window

Example:

```
SRWC 20.0 30.0
OK
GRWC
20.0 30.0
```

5.6.4 Environment settings

Note: The possible settings depends on the unit lenses and calibration. Only values returned by 5.6.4.1 command are possible

command	1st parameter	2nd parameter	answer
SREN	[float]min	[float]max	▪ OK ▪ ERR
GREN			[float]min [float]max

Example:

```
SREN -25.0 150.0
OK
GREN
-25.0 150.0
```

5.6.4.1 Get possible environment settings

command	answer
GREL	{[float]min [float]max}

Example:

```
GREL
-25.0  150.0
-40.0  550.0
100.0  1000.0
400.0  1500.0
```

5.7 WIRIS Security thermal parameters

Specific parameters for WWS thermal camera. All parameters in this section are valid only for Wiris Security devices.

5.7.1 Time stabilization settings

command	1st parameter	answer
STST	[float]<0s-5s>stabilization time	▪ OK ▪ ERR
GTST		[float]stabilization time

Example:

```
STST   2.4
OK
GTST
2.4
```

5.7.2 Hot/cold rejection settings

command	1st parameter	answer
SHRJ	[float]<0%-30%>Hot rejection	▪ OK ▪ ERR
GHRJ		[float]Hot rejection
SCRJ	[float]<0%-30%>Cold rejection	▪ OK ▪ ERR
GCRJ		[float]Cold rejection

Example:

```
SHRJ   25
OK
SCRJ  30
OK
GHRJ
25.0
GCRJ
30.0
```

5.8 WIRIS AGRO thermal parameters

Specific parameters for WIRIS AGRO thermal camera. All parameters in this section are valid only for Wiris Agro.

5.8.1 CWSI mode settings

command	1st parameter	answer
SCWM	▪ THEORETIC ▪ EMPIRICAL ▪ DIFFERENTIAL	▪ OK ▪ ERR
GCWM		▪ THEORETIC ▪ EMPIRICAL ▪ DIFFERENTIAL

Example:

```
SCWM   EMPIRICAL
OK
GCWM
EMPIRICAL
```

5.8.2 Air temperature

Note: Works only for `THEORETIC` and `DIFFERENTIAL` mode

command	1st parameter	answer
SCAT	[float]air temperature	▪ OK ▪ ERR
GCAT		[float]air temperature

Example:

```
SCAT 20.0
OK
GCAT
20.0
```

5.8.3 Stress level settings

Note: Stress level settings works only in `EMPIRICAL` mode

Note: When setting the stress level no argument is accepted. The currently measured temperature at CENTER CROSS is taken as the new stress level

Note: There is minimal difference of $5^{\circ}C$ between 100% and 0% stress level

5.8.3.1 100 % stress level

command	answer
SUSL	▪ OK ▪ ERR
GUSL	[float]stress level temperature

Example:

```
SUSL
OK
GUSL
20.0
```

5.8.3.2 0 % stress level

command	answer
SLSL	▪ OK ▪ ERR
GLSL	[float]stress level temperature

Example:

```
SLSL
OK
GLSL
25.0
```

5.8.4 Crop settings

Note: Crop settings works only in `THEORETIC` mode

command	1st parameter	answer
SCRP	[int]<1-3>crop index	▪ OK ▪ ERR
GRCP		[int]<1-3>crop index

Example:

```
SCRP 2
OK
GCRP
2
```

5.8.5 Relative humidity settings

Note: Relative humidity settings works only in `THEORETIC` mode

command	1st parameter	answer
SCHY	[float] % relative humidity	▪ OK ▪ ERR
GCHY		[float] % relative humidity

Example:

```
SCHY 50.0
OK
GCHY
50.0
```

5.8.6 Intercept baseline settings

Note: Intercept baseline settings works only in `THEORETIC` mode

command	1st parameter	answer
SINB	[float] <0-10> intercept baseline	▪ OK ▪ ERR
GINB		[float] intercept baseline

Example:

```
SINB 2.0
OK
GINB
2.0
```

5.8.7 Slope baseline settings

Note: Slope baseline settings works only in `THEORETIC` mode

command	1st parameter	answer
SSLB	[float] <-5-0> Slope baseline	▪ OK ▪ ERR
GSLB		[float] Slope baseline

Example:

```
SSLB -2.0
OK
GINB
-2.0
```

5.8.8 CWSI getters

5.8.8.1 d1 and d2 calculation parameters

Note: The parameters are valid only in `THEORETIC` mode

command	answer
GEDF	[float] d1
GEDS	[float] d2

Example:

```
GEDF
1.40
GEDS
-0.40
```

5.8.8.2 CWSI extremes value

Returns the percents of CWSI for each extreme, similarly to GTEX command. The extreme consists out of value designation (MIN/MAX/CENTER) and the CWSI value (can be `OUT_OF_RANGE` or `OFF` in case values are not displayed, see 5.8.9). Each extreme takes one line.

command	answer
GCWP	[string]image values

Example:

```
GCWP
MAXIMUM 30.1
MINIMUM OUT\_OF\_RANGE
CENTER OUT\_OF\_RANGE
```

5.8.8.3 CWSI graph ratios

Returns the percents for each part of the CWSI graph or `NOT_ENOUGH_DATA`.

command	answer
GCGR	▪ [float]low [float]low medium [float]medium high [float]high [float]extremely high ▪ NOT_ENOUGH_DATA

Example:

```
GCGR
10.0 20.0 30.0 40.0 0.0
```

Following commands refer to UI settings available only for WIRIS AGRO.

5.8.9 Display CWSI Value

This sets whether the CWSI value is being calculated and shown in the HDMI at the extreme cross position.

command	1st parameter	answer
SCWV	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GCWV		▪ TRUE ▪ FALSE

Example:

```
SCWV TRUE
OK
GCWV
TRUE
```

5.9 Appearance

These commands sets the HDMI output features.

5.9.1 Set layout

Set layout for the HDMI output.

command	1st parameter	answer
SLAY	▪ INSPECTION [1] ▪ SECURITY ▪ FULLSCREEN ▪ PIP	▪ OK ▪ ERR

[1] not available for WIRIS Security

Example:

```
SLAY SECURITY
OK
```

5.9.1.1 Picture in picture transparency

The PiP layout has optional opacity for the thermo camera overlay in range from 10 to 100 in percent.

command	1st parameter	answer
STTY	[int]<10;100>opacity	▪ OK ▪ ERR

Example:

```
STTY 50
OK
```

5.9.2 Main camera settings

command	1st parameter	answer
SMCA	▪ THERMO ▪ VISIBLE	▪ OK ▪ ERR
GMCA		▪ THERMO ▪ VISIBLE

Example:

```
SMCA THERMO
OK
GMCA
THERMO
```

5.9.3 GPS info settings

command	1st parameter	answer
SGPI	▪ POSITION ▪ ALTITUDE_SPEED	▪ OK ▪ ERR
GGPI		▪ POSITION ▪ ALTITUDE_SPEED

Example:

```
SGPI POSITION
OK
GGPI
POSITION
```

5.10 Zoom

Note: While optical zoom (used on the visible spectrum camera) affects both the displayed video and encoded streams, the digital zoom used on the thermal camera only affect the HDMI output, the encoded RTSP stream and recorded video are NOT zoomed in.

5.10.1 Zoom in/zoom out

Zooms current main camera in (or both if the ”zoom simultaneously” is chosen) one step.

command	answer
SZIN	▪ OK ▪ ERR
SZOT	▪ OK ▪ ERR

Example:

```
SZIN
OK
```

5.10.2 Zoom simultaneously

command	1st parameter	answer
SZSM	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GZSM		▪ TRUE ▪ FALSE

Example:

```
SZSM  TRUE
OK
GZSM
TRUE
```

5.10.3 Thermal camera zoom

The discrete zoom steps can be defined either by zoom ration or by index of the zoom step. Only certain ratios are possible (see 5.10.3.1).

command	1st parameter	answer
SZTN	[int]index	▪ OK ▪ ERR
GZTV		[int]index [float]ratio

Example:

```
SZTN 4
OK
GZTV
5 4.000000
```

5.10.3.1 Get list of possible thermal camera zooms

command	answer
GZTL	{[int]index [float]ratio}

Example:

```
GZTL
0 1.000000
1 1.200000
2 1.600000
3 2.000000
4 3.000000
5 4.000000
6 5.000000
7 6.000000
8 8.000000
9 10.000000
10 12.000000
```

5.10.4 Visible camera zoom

The discrete zoom steps can be defined either by zoom ration or by index of the zoom step. Only certain ratios are possible (see 5.10.4.1).

command	1st parameter	answer
SZVN	[int]index	▪ OK ▪ ERR
GZVV		[int]index [float]ratio

Example:

```
SZVN  4
OK
GZVV
4  3.000000
```

5.10.4.1 Get list of possible visible camera zooms

command	answer
GZVL	{[int]index [float]ratio}

Example:

```
GZVL
0  1.000000
1  1.200000
2  1.500000
3  2.000000
4  3.000000
5  4.000000
6  5.000000
7  6.000000
8  8.000000
9  10.000000
10  12.000000
11  16.000000
12  20.000000
13  25.000000
14  30.000000
```

5.11 GIS 320 specefic settings

5.11.1 Autofocus

command	answer
SGFA	▪ OK ▪ ERR

Example:

```
SGFA
OK
```

5.11.2 Focus to infinity

command	answer
SGFI	▪ OK ▪ ERR

Example:

```
SGFI
OK
```

5.11.3 Get remaining cooling time

command	answer
GCDT	[int]estimate of remaining time to cool down (in seconds)

Example:

```
GCDT
60
```

5.11.4 Gis filter mode

Note: Differential gas mode and High sensitivity mode can not be combined

command	1st parameter	answer
SGFM	▪ NORMAL ▪ HSM ▪ DGM	▪ OK ▪ ERR
GGFM		▪ NORMAL ▪ HSM ▪ DGM

Example:

```
SGFM  DGM
OK
GGFM
DGM
```

5.11.5 High sensitivity mode

Note: Differential gas mode and High sensitivity mode can not be combined

command	1st parameter	answer
SHSM	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GHSM		▪ TRUE ▪ FALSE

Example:

```
SHSM  TRUE
OK
GHSM
TRUE
```

5.12 Palettes of thermal video stream

Note: These in this section are not valid for WIRIS AGRO

Note: Only palettes returned by get palette list command (5.12.1) can be set

command	1st parameter	answer
GPTE		[int] current palette index [string]current palette name
SPTE	[string] palette name	▪ OK ▪ ERR
SPTI	[int]palette index	▪ OK ▪ ERR

Example:

```
SPTE  GRAY
OK
GPTE
9  GRAY
```

5.12.1 Get camera palettes

command	answer
GPTL	{ [int]palette index [string]palette name }

Example:

```
GPTL
0  BLACKRED
1  BLUERED
2  BWIRON
3  BWIRONI
4  BWRAINBOW
```

5.12.2 Get pallete Look-up table

Color pallete is a look-up table of 8-bit RGB values for 8-bit normalized one channel image (temperature intensity). it is possible to download the currently used look-up table from the camera using following command. The first line is the representing the color for the hottest pixels, the last the coldest ones. There are 256 lines of the answer.

command	answer
GPLV	{ [int]R [int]G [int]B}

Example:

```
GPLV
0  0  0
2  0  2
4  0  4
 . . .
```

5.13 Colourmap

Note: These commands work only for WIRIS AGRO

Note: Only palettes returned by get colourmap list command (5.13.1) can be set

command	1st parameter	answer
GCMP		[int] current palette index [string]current palette name
SCMP	[int]colourmap index	▪ OK ▪ ERR

Example:

```
SCMP  1
OK
GCMP
CROPSTEP_MAP
```

5.13.1 Get colourmap list

Get all available colourmap in list.

command	answer
GCML	{ [int]colourmap index [string]colourmap index }

Example:

```
GCML
1  CROPSTEP_MAP
2  WATER_MAP
3  WATERSTEP_MAP
```

5.14 Capture and record

5.14.1 Capture

The commands returns an acknowledgement right away, but the capture itself can take up to several seconds depending on the settings. Returns `NOT_READY` in the case the capture cannot be initiated due to the last one not being finished yet.

command	answer
CPTR	▪ OK ▪ NOT_READY

Example:

```
CPTR
OK
```

5.14.2 Is capturing

command	answer
ICPT	▪ TRUE ▪ FALSE

Example:

```
ICPT
FALSE
```

5.14.3 Recording start

Start recording thermal and visible video according to settings. The acknowledgement is returned right away, however the recording takes place until RCRF (5.14.4) is recieved or the memory is full. If recording is already taking place, ”NOT_READY” answer is returned.

command	answer
RCRS	▪ OK ▪ NOT_READY

Example:

```
RCRS
OK
```

5.14.4 Recording finish

Stops recording of thermal and visible video. If no recording is currently running the ”NOT_READY” answer is returned.

command	answer
RCRF	▪ OK ▪ NOT_READY

Example:

```
RCRS
OK
```

5.14.5 Is recording

Returns whether any video is being recorded.

command	answer
IRCR	▪ TRUE ▪ FALSE

Example:

```
IRCR
FALSE
```

5.14.6 Periodic image capture settings

command	1st parameter	answer
SPIC	[int]<0s-60s>period[1]	▪ OK ▪ ERR
GPIC		▪ OFF ▪ [int]<1s-60s>period

[1] 0 denotes periodic capturing OFF

Example:

```
SPIC 0
OK
GPIC
OFF
```

5.14.7 Geofencing trigger settings

command	1st parameter	answer
GGFT		▪ ON ▪ OFF
SGFT	▪ ON ▪ OFF	▪ OK ▪ ERR
SBFL[1]	[float]<40m-400m>[2]maximum altitude	▪ OK ▪ ERR
GBFL[1]		[float]maximum altitude in meters
SEFL[1]	[float]<0m-400m>[2]minimum altitude	▪ OK ▪ ERR
GEFL[1]		[float]minimum altitude in meters
SCSB[1]	[float]<0,1m/s-10m/s>maximum capture speed	▪ OK ▪ ERR
GCSB[1]		[float]maximum capture speed

[1]Works only if geofencing trigger is `ON`
[2] minimum can not be set above maximum

Example:

```
SGFT ON
OK
SBFL 50
OK
SEFL 100
OK
SCSB 5
OK
```

5.15 Temperature values

5.15.1 Alarm mode settings

command	1st parameter	answer
SALM	▪ ABOVE ▪ BELOW ▪ BETWEEN ▪ OUTSIDE ▪ OFF	▪ OK ▪ ERR
GALM		▪ ABOVE ▪ BELOW ▪ BETWEEN ▪ OUTSIDE ▪ OFF

Example:

```
SALM  OFF
OK
GALM
OFF
```

5.15.2 Alarm values settings

command	1st parameter	2nd parameter	answer
SALV	[float]Above value	[float]below value	▪ OK ▪ ERR
GALV			[float]Above value [float]below value

Example:

```
SALV  40.0  50.0
OK
GALV
40.0  50.0
```

5.15.3 Alarm color settings

The colors are set and returned in order ”COLOR BELOW COLOR BETWEEN COLOR ABOVE”

command	1st parameter	2nd parameter	3rd parameter	answer
SALC	▪ RED ▪ GREEN ▪ BLUE	▪ RED ▪ GREEN ▪ BLUE	▪ RED ▪ GREEN ▪ BLUE	▪ OK ▪ ERR
GALC				▪ RED [three times] ▪ GREEN ▪ BLUE

Example:

```
SALC GREEN RED GREEN
OK
GALC
GREEN RED GREEN
```

5.15.4 Get extremes

Return the current thermal camera extremes. The extreme consists out of value designation (MIN/MAX/CENTER), coordinates X and Y and the extreme value in set units ($°C, K, °F$). Each extreme takes one line like:

```
MAXIMUM X Y VALUE
MINIMUM 300 100 10.000
CENTER 320 256 25.555
```

command	answer
GTEX	[string]image values

Note: This commands works for all cameras, on Wiris Security the temperature value is not present in the answer

Example:

```
GTEX
MAXIMUM 572 90 49.575001
MINIMUM 384 193 23.650000
CENTER 320 256 25.850000
```

5.15.5 Get ROI temperature

Gets statistical values from rectangular region of interest (ROI) defined by its coordinates ($x_{start}, y_{start}, x_{end}, y_{end}$; coordinate (0,0) is upper left corner). The result consists out of value designation (MIN/MAX/AREA AVG), coordinates X and Y for min and max, and the temperature value.

Note: This message can be queried with maximal frequency of 3Hz

Note: Wiris Security does not support this message.

command	1st parameter	2nd parameter	3rd parameter	4th parameter	answer
GROT	[int]column[1] start	[int]line start	[int]column end	[int]line end	[string]ROI statistic

Coordinates starts from upper left corner ([0, 0]) and ends in left down corner ([width-1, height-1]) of the image.

Example:

```
GROT 0 0 200 200
AREA AVG 30.573807
MAXIMUM 0 0 31.750000
MINIMUM 10 12 29.500000
```

5.15.6 Get one pixel temperature

Return the measured value of a pixel on given coordinates (coordinate (0,0) is upper left corner) in set temperature units. This message can be queried with maximal frequency of 3Hz.

Note: Wiris Security does not support this message.

command	1st parameter	2nd parameter	answer
GOPT	[int]column[1]	[int]line	[float]temperature

Coordinates starts from upper left corner ([0, 0]) and ends in left down corner ([width-1, height-1]) of the image.

Example:

```
GOPT 120 200
38.1
```

5.16 Update

The update file needs to be uploaded to the camera by physically connecting memory with it (SD card), or using the FTP acces to the camera.

command	answer
CUPD[1]	▪ OK ▪ ERR
IUPD[2]	▪ OK ▪ ERR

[1]Searches for the update file, might take several minutes to answer
[2] only accessible if CUPD was send and returned OK on given telnet instance. Reboots the camera and install the update

Example:

```
CUPD
OK
IUPD
OK
```

5.17 Thermal camera parameters

Note: Commands in this section are not valid for Wiris Security devices. Any other device-specific changes to the commands

5.17.1 Environment variables

command	1st parameter	answer
STEM[1]	[float]<0.5-1> emissivity	▪ OK ▪ ERR
GTEM[1]		[float]emissivity
STRT[1]	[float][2]reflected temperature	▪ OK ▪ ERR
GTRT[1]		[float][2]reflected temperature
STAT[1]	[float][2]atmospheric temperature	▪ OK ▪ ERR
GTAT[1]		[float][2]atmospheric temperature

Note:
[1] not valid for Wiris Agro
[2] settings is passed in set units (see 5.5), valid range is from $-40^{\circ}C$ to $100^{\circ}C$

Example:

```
STEM 0.6
OK
GTEM
0.600000
```

5.17.2 Image interpolation

command	1st parameter	answer
STII	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GTII		▪ TRUE ▪ FALSE

Example:

```
STII TRUE
OK
GTII
```

```
TRUE
```

5.17.3 Shutter

5.17.4 Synchronous shutter settings

command	1st parameter	answer
STSC[1] [2]	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GTSC[1] [2]		▪ TRUE ▪ FALSE
STCP[1]	[int]<120s-1800s>shutter period (synchronous shutter)	▪ OK ▪ ERR
GTCP[1]		[int]camera shutter period
GTSL		[int]seconds elapsed from last shutter
GTSN [1]		▪ [int]seconds to next shutter (synchronous shutter) ▪ N/A (asynchronous shutter)

Note: [1] not valid for GIS 320
[2] TRUE denotes the synchronous shutter settings, FALSE asynchronous

Example:

```
STSC FALSE
OK
GTSC
FALSE
```

5.17.5 Perform thermal camera shutter

Performs the thermal camera shutter immediately. On GIS 320 shutter must be placed in front of the lens when sending this command for the GIS 320 camera (cap of the lens). GIS 320 does not have integrated shutter.

command	answer
IMCR	▪ OK ▪ ERR

Example:

```
IMCR
OK
```

5.17.6 Current lens

Note: Camera can be calibrated for more than one thermal lens. If so, following parameters are valid

command	1st parameter	answer
SLEN	[int]Lens index	▪ OK ▪ ERR
GLEN		[int]Lens index
GLEL		{[string] lens}

Example:

```
GLEL
640P-45D-13MM
640P-32D-19MM
OK
SLEN 0
GLEN
0
```

5.18 Image and video settings

Note: Each WIRIS and GIS device only support a subset of the mentioned image formats. Please refer to your device user manual.

5.18.1 Images

Whether to save given image type

5.18.1.1 Radiometric JPEG

command	1st parameter	answer
SIRJ	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GIRJ		▪ TRUE ▪ FALSE

Example:

```
SIRJ FALSE
OK
GIRJ
FALSE
```

5.18.1.2 Radiometric TIFF

command	1st parameter	answer
SIRT	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GIRT		▪ TRUE ▪ FALSE

Example:

```
GIRT FALSE
OK
SIRT
FALSE
```

5.18.1.3 CWSI TIFF

command	1st parameter	answer
SICT	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GICT		▪ TRUE ▪ FALSE

Example:

```
SICT FALSE
OK
GICT
FALSE
```

5.18.1.4 Super-resolution

command	1st parameter	answer
SISR	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GISR		▪ TRUE ▪ FALSE

Example:

```
SISR FALSE
OK
GISR
FALSE
```

5.18.1.5 Screenshot

command	1st parameter	answer
SISS	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GISS		▪ TRUE ▪ FALSE

Example:

```
SISS FALSE
OK
GISS
FALSE
```

5.18.1.6 Visible (OZ) image

Note: Resolution of image 1920 x 1080

command	1st parameter	answer
SIVI	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GIVI		▪ TRUE ▪ FALSE

Example:

```
SIVI FALSE
OK
GIVI
FALSE
```

5.18.1.7 Visble High Resolution image

Note: Resolution of image depends on Wiris Enterprise settings

command	1st parameter	answer
SIHR	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GIHR		▪ TRUE ▪ FALSE

Example:

```
SIHR FALSE
OK
GIHR
FALSE
```

5.18.2 Videos

5.18.2.1 Radiometric video

Also known as sequence.

Note: It is not possible to record Radiometric Video and Thermal encoded video at the same time

command	1st parameter	answer
SVTH	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GVTH		▪ TRUE ▪ FALSE

Example:

```
SVTH FALSE
OK
GVTH
FALSE
```

5.18.2.2 Thermal encoded video

Note: It is not possible to record Radiometric Video and Thermal encoded video at the same time

command	1st parameter	answer
SVTE	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GVTE		▪ TRUE ▪ FALSE

Example:

```
SVTE FALSE
OK
GVTE
FALSE
```

5.18.2.3 Visible (OZ) video

Note: Resolution of video 1280x720

command	1st parameter	answer
SVVI	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GVVI		▪ TRUE ▪ FALSE

Example:

```
SVVI FALSE
OK
GVVI
FALSE
```

5.18.3 Visble High Resolution video

Note: Resolution of video depends on Wiris Enterprise settings. To settings above 4000x3000 only images are available

command	1st parameter	answer
SVHR	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GVHR		▪ TRUE ▪ FALSE

Example:

```
SVHR FALSE
OK
GVHR
FALSE
```

5.18.4 Image location

command	1st parameter	answer
SILC	▪ SSD ▪ SD_CARD ▪ FLASH_DRIVE	▪ OK ▪ ERR
GILC		▪ SSD ▪ SD_CARD ▪ FLASH_DRIVE

Example:

```
SILC SSD
OK
GILC
```

SSD

5.18.5 Wiris Enterprise HR camera resolution

5.18.6 Get HR camera resolution

Returns the current resolution setting of the HR camera. This command only works for WWE.

command	1st parameter	answer
SHRR[1]	▪ 4656x3496 ▪ 2320x1744 ▪ 1920x1080	▪ OK ▪ ERR
GHRR		▪ 4656x3496@10 ▪ 2320x1744@30 ▪ 1920x1080@30

[1] sets the resolution and reboots the device

Example:

```
SHRR 2320x1744
OK
GHRR
2320x1744@30
```

5.19 Laser rangefinder

Laser Range Finder is on demand option on Wiris Enterprise. These commands work only for certain models of WWE.

5.19.1 Show position on HDMI

command	1st parameter	answer
SLRF	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GLRF		▪ TRUE ▪ FALSE

Example:

```
SLRF TRUE
OK
GLRF
TRUE
```

5.19.2 Get laser distance

Returns distance in meters of the surface reflecting back the laser. If the camera is not equipped with laser rangefinder, returns ERR.

command	answer
GLRD	[float]distance

Example:

```
GLRD
20.4
```

5.20 Date and time

command	1st parameter	2nd parameter	answer
SDTI	[string]yyyy/MM/dd-hh:mm:ss		▪ OK ▪ ERR
GDTI			[string]yyyy/MM/dd-hh:mm:ss
STUS [1]	[int]seconds since epoch [2]	[int]microseconds 1st parameter	▪ OK ▪ ERR

[1] Not saved across reboots
[2] 1.1.1970 00:00

Example:

```
SDTI 2023/06/5-14:52:35
OK
GDTI
2023/06/5-14:52:38
```

5.21 Memory

Thera are three types of memory: `SSD`, `SD_CARD` or `FLASH_DRIVE`.

5.21.1 Memory status

The following commands returns the status of each memory on one line like:
`SSD SOME_STATUS`
`SD_CARD SOME_STATUS`
`FLASH_DRIVE SOME_STATUS`

command	answer
GMST	▪ READY ▪ CONNECTED ▪ N/A
GMSI	▪ [int]size in bytes ▪ N/A
GMFR	▪ [float] percent free ▪ N/A
GMCP	[int]captured images

Example:

```
GMSI
SSD 251599224832
FLASH_DRIVE N/A
SD_CARD 31784960000
GMCP
SSD 22
FLASH_DRIVE 0
SD_CARD 0
GMSI
```

5.21.1.1 Recorded video

Video can only be saved into the internal (SSD) memory. These commands returns only the integer.

command	answer
GTRC	[int]seconds of thermal video
GMCP	[int]seconds of visible video

Example:

```
GTRC
689
GVRC
38
```

5.21.2 Get saving time

Return the current estimated saving time in seconds.

Note: Saving time is affected by chosen memory for images and chosen formats to be saved.

command	answer
GEST	[float]seconds of estimate saving duration

Example:

```
GEST
1.2
```

5.21.3 Data transfer

5.21.4 Copy data

Copy all data from SSD to other memory, either SD card, or USB flash disk. This operation can take a lot of time (up to hours in case of full SSD disk). Thus this commands has two parts. Firstly, start the copying. Then periodically check the status. Please check that the memory has enough space, otherwise the `ERROR` answer is returned.

command	1st parameter	answer
CPST	▪ SD_CARD ▪ FLASH_DRIVE	▪ OK ▪ ERR ▪ N/A
CPSS		▪ OK ▪ [int] progress percent ▪ ERR

Example:

```
CPST FLASH_DRIVE
OK
```

```
CPSS
40
CPSS 60
CPSS
OK
```

5.22 Stream

5.22.1 Get thermal camera resolution

command	answer
GTRE	[int]width [int]height

Example:

```
GTRE
640 512
```

5.22.2 Encoder parameters settings

Note: The encoder settings will affect both recorded encoded videos and the RTSP strems

Note: it is not possible to change the encoder settings when encoded video is being saved. RTSP stream will be paused in order to change the settings, if running.

command	1st parameter	2nd parameter	answer
SEBR	▪ THERMO ▪ VISIBLE	[int]<0-$2^{32}-1$>encoder bitrate[1]	▪ OK ▪ ERR
GEBR	▪ THERMO ▪ VISIBLE		[int]encoder bitrate[1]
SEGS	▪ THERMO ▪ VISIBLE	[int]<0-32767>GOP size	▪ OK ▪ ERR
GEGS	▪ THERMO ▪ VISIBLE		[int]GOP size
SEIR	▪ THERMO ▪ VISIBLE	[int]<0-$2^{32}-1$>IDR interval	▪ OK ▪ ERR
GEIR	▪ THERMO ▪ VISIBLE		[int]IDR interval
SEQZ	▪ THERMO ▪ VISIBLE	[int]<0-51> quantization quality parameter [2]	▪ OK ▪ ERR
GEQZ	▪ THERMO ▪ VISIBLE		[int] quantization quality parameter

Table 5.1: [1]0 = no bitrate control; constant quality mode is used
[2]ignored if bitrate set to non-zero value

Example:

```
SEBR VISIBLE 0
OK
GEBR VISIBLE
0
```

5.23 Trigger

command	1st parameter	answer
STRG	▪ CORRECTION ▪ CAPTURE ▪ RECORD ▪ NA	▪ OK ▪ ERR
GTRG		▪ CORRECTION ▪ CAPTURE ▪ RECORD ▪ NA

Example:

```
STRG  RECORD
OK
GTRG
RECORD
```

5.24 System

5.24.1 IP

Note: IP settings is changed and TELNET control disconnected as result

command	1st parameter	answer
STIP	[string]IPv4	▪ OK ▪ ERR
STMS	[string]IPv4 mask	▪ OK ▪ ERR
GTMS		[string]IPv4 mask
STGW	[string]IPv4 gateway	▪ OK ▪ ERR
GTGW		[string]IPv4 gateway
SMGW[1]	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GMGW		▪ TRUE ▪ FALSE

[1] Use manual gateway settings - if set to false (default) the set gateway has no effect

Example:

```
STIP  10.0.0.230
OK
```

5.24.2 Default settings

Set the default settings, can take up to 10 seconds. This command will exit the Ethernet Mode and changes the IP..

command	answer
SDST	▪ OK ▪ ERR

Example:

```
SDST
OK
```

5.24.3 Shut down

command	answer
SHDW	▪ OK ▪ ERR

Example:

```
SHDW
OK
```

5.24.4 Reboot

command	answer
REBT	▪ OK ▪ ERR

Example:

```
REBT
OK
```

Contacts

Sales Department

Mobile: +420 725 955 464

E-mail: sales@workswell.eu

Headquarters

Workswell s.r.o.

Na Okraji 335/42

162 00, Praha 6

Czech Republic

Technical support

my.workswell.eu

support.workswell.cz

Company contact details

Mobile: +420 725 877 063

E-mail: info@workswell.eu

Web: workswell.eu

WORKSWELL®

INFRARED CAMERAS AND SYSTEMS