



2014

minCam360 Operation Manual

MINCAM360 PAN & TILT PUSH SYSTEM
RAUSCHUSA

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2. minCam System Definition

2.1 minCam360

The minCam360 system comes with one pan & tilt camera attached to a cable reel built into one complete maintenance free CCTV push system. 9.2mm push cable connects to pan & tilt color push camera SK50, which can push through 4" (100mm) P-traps.

- Application range of 3" to 10" (up to 16" with all optional accessories)
- Cable reel: 200 ft. of 9.2mm fiberglass push cable (available up to 300 ft.)
- Tri-band 512 Hz/ 33 kHz / 640 Hz sonde
- 2 removable Lithium Ion batteries for approx. 4+ hours operation
- Built-in distance counter on screen
- 8.4" TFT-LCD sunlight readable monitor in Pelican® Stormcase housing mounted onto cable reel with SD card reader for recording videos, photos and voice
- Standard Qwerty keyboard text generator built into Stormcase lid.
- Bluetooth remote control with joystick camera control.
- 1.97" (50mm) diameter SK50 pan & tilt color push camera with 4mm sapphire glass lens.
- Lightweight stainless steel and carbon cable reel housing.
- Mechanical reel brake
- Weight: 49 lbs. ; Dimensions: 23" x 26" x 12" (L x H x W)

3. Warnings

This manual will help you become acquainted with the camera system.

- This system is made for optical pipe inspection. It is not made for medical inspection.
- Do not alter or reconstruct the system.
- Do not open the camera system.
- Do not try to repair the system on your own.
- Beware of moisture and extreme heat.
- This system is not explosion proof.
- Protect the control unit from dirt and moisture.
- Do not clean the camera with high water pressure.
- Do not clean the camera with any alcohol or alcoholic suspensions.
- Do not place heavy objects on the camera.
- Do not use the system if the cable is broken.
- Use a cloth to clean the camera cable while recoiling.
- Use Q-tips to keep the camera lens clean.

Please contact Rausch USA for repairs and service.

4. minCam360 Setup

4.1 Positioning of the system

System must be operated from an upright position – the monitor can swivel 360°, but the keyboard would be inaccessible if the system were laid on its side, as can be done with other minCam units.

1. Position the monitor in the Pelican® Stormcase.
2. Open the lid on the case to reveal the monitor, keyboard, and remote control.
3. Tighten the wheel below the case to hold swivel position.

4.2 Turn on the system

1. Verify that the camera head is connected correctly.
2. Press the “On/Off” switch.

The minCam system is ready to use.

4.3 Power management

Internal power supply of 100 – 240V AC input.

Standard system includes two (2) removable 14.4V lithium ion batteries. Battery level is indicated on each individual battery.

System can be operated with mains connections and/or battery power. When the mains supply is connected, the batteries will charge even if the camera is not connected to the system. Batteries are hot swappable while the system is operating.

Batteries can be charged with an optional external charging station.

4.4 Starting an Inspection

Basic inspection operation steps:

1. Place camera head into pipe
2. Set distance counter to 0 (Ctrl + F1)
3. Write text and title (if needed)
4. Start video recording.
5. Begin inspection.

5. Operating the Pan & Tilt camera head

Most of the camera operation can be done using the remote control. Only two functions are unique to only the control unit: sonde frequency control and system power. The other control unit functions are redundant operation controls.

5.1 Bluetooth Remote Control

The remote control is stored in the monitor case. While positioned in the case, the remote control charges wirelessly via induction, and the charging status is indicated by the red LED.

The system can be operated by leaving the remote control in the case.

To use the remote control, first it needs to be turned on (green LED) by pressing



The remote control will work as soon as the Bluetooth connection is made – a solid blue LED. The blue LED is blinking while searching for a connection.



For rotation, pan, and tilt of camera, move the joystick to the desired direction.

The remote shuts down if not used for 10 minutes.

5.2 Camera Information

5.2.1 Focus

The minCam360 has automatic mechanical focus.

5.2.2 Zoom


The minCam360 has 4 step digital zoom: 0, 1, 2, and 3

Controlled by:  or 

5.2.3 Lighting

The light intensity can be adjusted using the buttons on the remote, control unit, or via a command on the keyboard. There are 8 steps of lighting.

Controlled by:  or 

Pressing the  button turns on all 10 LEDs to maximum level.

5.2.4 Fine tuning camera sensor module

Fine tuning enables custom camera sensor settings for extreme surroundings.

Brightness:  and  or 

Color:  and  or 

AGC:  and  or 

Mirror Image:  and  or 

Restarting the system resets all camera sensor adjustments to the original parameters.

5.2.5 Sonde (location transmitter)

After activating the sonde, the frequency is shown in the middle of the bottom line.

1 Press: 512 Hz active

2 Press: 33 kHz active

3 Press: 640 Hz active

Controlled by: 

5.2.6 Camera head pressure

The camera head is nitrogen-pressurized for leak prevention.

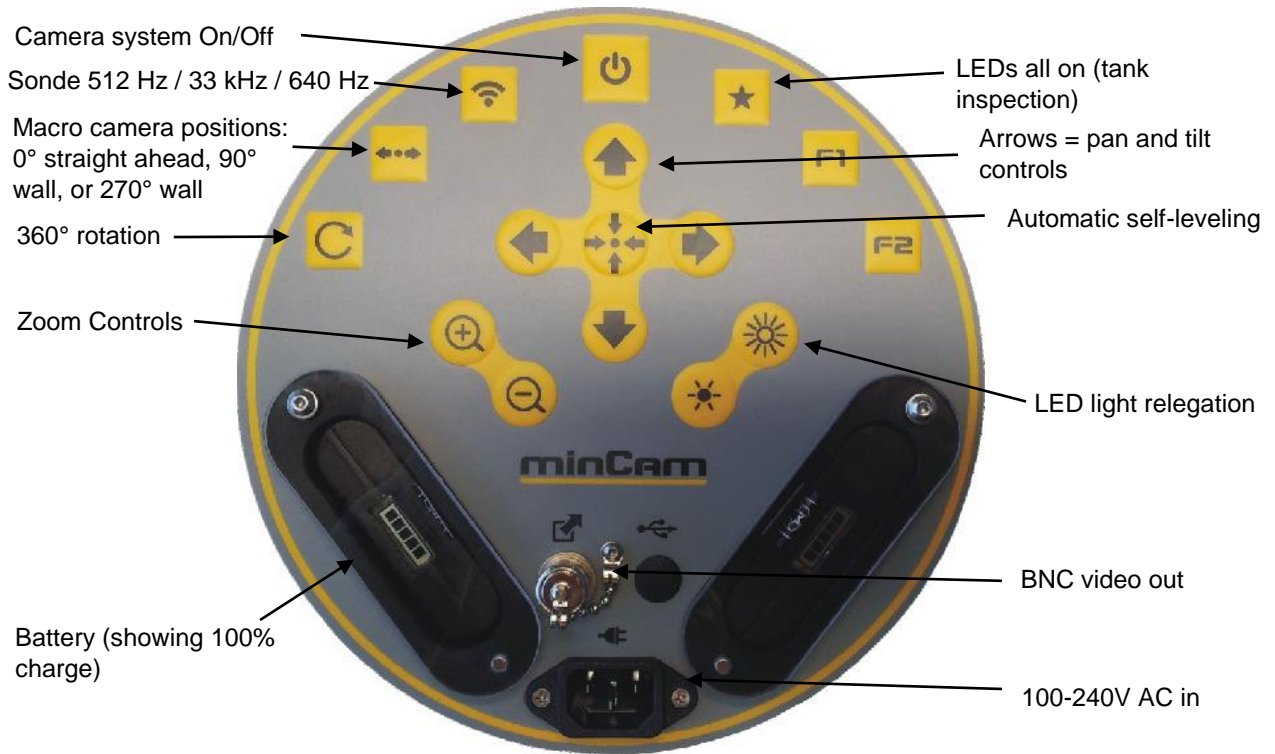
Pump up the camera head with nitrogen when there is a decrease in camera head pressure.

There is an on-screen indicator accessed via the keyboard (Shift + F1), or you can use the included air pump with pressure indicator.

The air pump included in the accessory case should be used in warm air environments only.

6. Control Unit Panel

The control unit is the core of the minCam video camera system. Figure 4.a is the control unit of the mC50.



7. minCam Recording Unit / Monitor

7.1 System Setup

By default, the live camera feed is sent to the monitor directly with 4:3 picture format. (See figure 7.1.a)

To record video, the live camera feed must first be passed through the SD card.

This is controlled by the “Toggle Button”.



A green light is lit on the button when “Direct Feed” is chosen.

Pressing the toggle button alternates between:

- “Direct Feed” to the monitor, or
- “Pass Through” feed through the SD card.

When Toggle has been pressed, two black bars appear on the left and right of the screen and information about the current video recording settings appear in grey boxes (See Figure 7.1.b).

Always ensure the video is set to “Pass through” before recording video.



Figure 7.1.a – “Direct Feed” camera signal to monitor



Figure 7.1.b – toggle “Pass Through” to enable video recording

7.2 Record Video Footage

The video button starts/stops recording video:



This button is used to pause the video:



7.2.1 Start Recording Video

Press the “Video” button to start recording.

As soon as you start recording, a red square appears in the upper left edge. See Figure 7.2.1.a



Figure 7.2.1.a – Red square designates recording now

7.2.2 Pause Video Recording

Press the “Pause” button to pause the video.

As soon as you press pause, the red square changes to the pause symbol. See Figure 7.2.1.b



Figure 7.2.1.b – Red pause emblem designates recording paused

7.2.3 Stop Recording Video

Press the “Video” button again to stop recording.

7.2.4 Take a Picture

Press the camera button to store a picture:



While the picture is stored, a yellow square is displayed in the middle of the screen. (See Figure 5.3.a)

Taking a picture while recording video will stop the video stream for about 2 seconds.



Figure 7.3.a – Yellow square appears when storing a photo.

7.3 Screen Adjustment

Pressing the “Toggle Button” while recording video will switch to direct camera feed.

This removes the black bars from the side.

Although you no longer see the red square, you are still recording.

7.4 File Management




Filename is stored as: “YYYYMMDDhhmmss”

Year Month Day Hour Minute Second

Pictures have the extension *.BMP

Videos have the extension *.avi

Accessing Files: *Important: the file menu will not open when the “Toggle” is set to “Direct Feed”.*

1. Press the folder button to enter the File Menu: 
2. Use the arrow keys to choose between the two options:
 - Search by date and time (see figure 5.4.a)
 - View All, to open all files (see figure 5.4.b)
3. Press this button to “SELECT”: 
4. Press this button to “GO BACK”: 

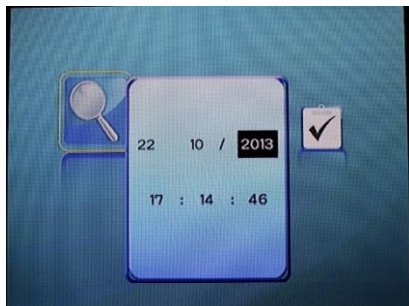


Figure 7.4.a – Search Function

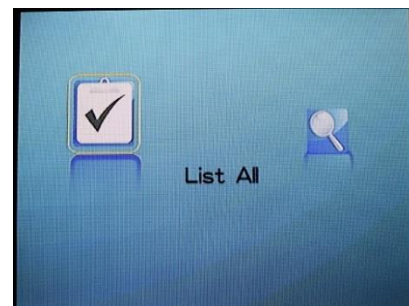



Figure 7.4.b – File Menu



7.4.1 Preview videos


Videos are stored in the HVR folder in the file browser.

1. Enter the File Menu: 
2. Choose "View All"
3. Choose folder "HVR" (See figure 7.4.1.a)

Videos are further organized into two subfolders: DATE and HOUR

4. Choose "DATE"
5. Choose "HOUR"

Use  ,  to go to prior or next file.

Hit "SELECT" to choose: 

6. Choose the video you wish to view. (See figure 7.4.1.b)

7. Hit "SELECT" to view: 



Figure 7.4.1.a – HVR Folder

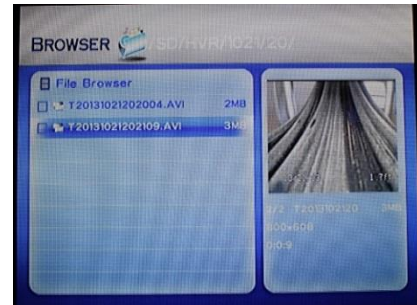





Figure 7.4.1.b – Video *.avi Files


7.4.2 Preview photos

Photos are stored in the PICTURE folder in the file browser.

1. Enter the File Menu: 
2. Choose "View All"
3. Choose folder "PICTURE"

Use  ,  to go to prior or next picture.

4. Choose the picture you wish to view. (See figure 7.4.2.a)

5. Hit "SELECT" to choose: 

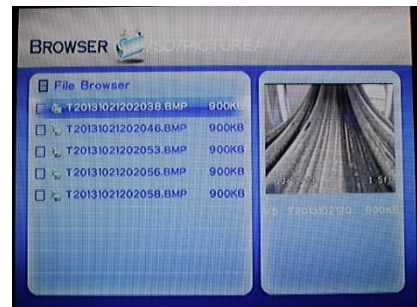



Figure 7.4.2.a – Photo *.BMP Files


7.4.3 Delete files

To delete a photo or video file from a SD-card (Figure 7.4.3.a):

1. Use  ,  to choose a file.

2. Press the "Menu Button" to open the shell menu: 

3. Use  ,  to select "Delete" in the menu.

4. Hit "SELECT" and "YES": 

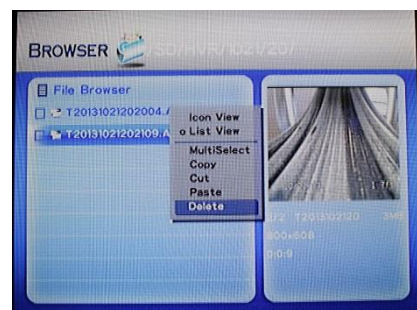


Figure 7.4.3.a – Deleting a file

7.5 Settings Menu

Open the Settings Menu by pressing the “Menu Button” from the “Pass Through” video recording feed. *The menu will not open when Toggle is set to “Direct Feed.”*

The menu has 3 settings:

1. Microphone On/Off
2. Storage Card Default: Full Stop
 - *Erase all files from SD card*
3. System
 - *Set Date/Time*
 - *Choose language*
 - *Status Display On / Hide Info Box / Off*

8. Keyboard Text Generator

Each on-screen text page has 12 lines and 26 characters per line. The title line appears at the very top of the screen. There are two Status Lines which show different inputs on-screen, which can be controlled by the user. One is at the top, below the title. The other is at the very bottom of the screen.

10 text pages can be saved. To load a saved page, hold Alt and type a 2 digit number (ex. 04) up to 10. 100 fixed text lines can be saved. To insert a fixed line at the cursor, hold Ctrl and type a 3 digit number (ex. 034) up to 100.

Warning: While recording video, all actions on the screen are recorded, including making and fixing mistakes while typing or changing menu settings.

8.1 Essential Instruction

8.1.1 Set distance counter

Ctrl + F1 opens up the menu for setting the value on distance counter.

F8 sets the distance counter to 0.

8.1.2 Set date & time

Ctrl + F3 opens the date menu.

Ctrl + F4 opens the time menu.

8.1.3 Typing

By default the keyboard is enabled, so that whichever key you press will appear on the screen.

F5 turns the on-screen cursor on/off.

Ctrl + F6 allows you to change the title text.

8.1.4 Troubleshooting

By default, the date, distance counter, title, and zoom level status are displayed.

If no text-overlay is shown, the overlay may have been turned off: **Press F7.**

If the date is showing but nothing happens when you type, the text editor may be turned off. **Press F6.**

8.2 Basic Commands:

F1 – Help

F2 – Title Line Show/Hide

F3 – Top Status Line Show/Hide

F4 – Bottom Status Line Show/Hide

F5 – Cursor On/Off

F6 – Text Editor On/Off

F7 – Overlay On/Off

F8 – Set Distance Counter to 0

NOTE:

F7 = Fn + F1

F8 = Fn + F2

F9 = Fn + F3

F10 = Fn + F4

F11 = Fn + F5

F12 = Fn + F6

8.3 Display Options:

Status information can be displayed on the status lines. The following functions toggle the information displayed in each status line.

Shift + F1 – Top Left status display: Horizontal rotation (HR) in degrees / Internal pressure in hPa

Shift + F3 – Top Right status display: Tilt (T) in degrees / camera temperature in Celsius

Shift + F4 – Bottom Left status display: Inclination in degrees / Date

Shift + F5 – Bottom Center status display: Time / Sonde frequency (if on)

Shift + F6 – Bottom Right status display: Meter / ??

Alt + F1 – Top Left Show/Hide

Alt + F2 – Top Center Show/Hide (Zoom level)

Alt + F3 – Top Right Show/Hide

Alt + F4 – Bottom Left Show/Hide

Alt + F5 – Bottom Center Show/Hide

Alt + F6 – Bottom Right Show/Hide

8.4 Input Control:

Options for adjusting information displayed on the text overlay.

Ctrl + F1 – Set distance counter

Ctrl + F3 – Set date

Ctrl + F4 – Set time

Ctrl + F6 – Edit title line text

Ctrl + F7 – Save text page, up to 10

Ctrl + F8 – Save fixed text line, up to 100 (comments)

Ctrl + F9 – Load saved text page

Ctrl + F10 – Insert fixed text line at cursor

Ctrl + Insert – Browse list of all fixed text lines with Up/Down; insert by hitting enter

Alt + Insert – Browse list of all saved text pages with Up/Down; load by hitting enter

Backspace – Backspace delete

Del – Delete selected character

Shift + Del – Delete from cursor to end of line

Ctrl + Del – Delete complete line

Alt + Del – Delete entire page text area

Alt + 01-10 – Load saved text page

Alt + 001-100 – Insert fixed text line at cursor

9. minCam Camera Centering Kits

The various center guide kits position the camera in the middle of the pipe.

9.1 SK50 Center Guide (*greater than 3"*)

The SK50 plastic center guide is a two piece installation.

1. Separate the threaded back piece from the guide.
2. Fit the opening in the back piece over the cable behind the springs (See figure 9.1.a) and slide forward to the back of the camera.
3. Place the guide over the camera head.
4. Re-thread the back piece to the guide (See figure 9.1.b).



Figure 9.2.a – fit the back piece over the cable behind the springs.



Figure 9.2.b – SK50 3" Center Guide

9.2 SK50 Roller Skid (*greater than 5"*)

The SK50 roller skid has a two-step installation procedure (See figure 9.2.a):

1. Slide the SK50 camera into the back of the skid.
2. Spin the screws on the bottom of the skid to hold the camera in place.



Figure 9.2.a – SK50 5" Roller Skid

9.3 SK50 exchange rolls (*greater than 8"*)

The exchange rolls are larger diameter wheels for the SK50 Roller Skid. (Figure 9.3.1.a)

1. Use a 3mm hex screwdriver to remove the screws that mount the 5" rolls to the skid.
2. Mount the six 8" rolls using the supplied 3mm hex screws in place of each of the 5" rolls.
3. Slide the SK50 camera into the back of the skid.
4. Spin the screws to hold the camera in place on the bottom of the skid.



Figure 9.3.1.a – SK50 8" Roller Skid

10. minCam System Specifications

10.1 minCam360 Cable Reel

- Cable: 200 ft. (60m) of 9.2mm fiberglass push cable, up to 300 ft. (90m)
- Tri-band location transmitter 512 Hz, 33 kHz, 640 Hz
- Electronic on-screen distance counter.
- 2 removable Lithium Ion 14.4V batteries for more than 4 hours operation.
- Power Supply: 100 - 240V AC
- Lightweight stainless steel & carbon reel cage.
- Control unit: On/off switch, sonde frequency control, preset camera macros, pan & tilt controls, zoom controls, light regulation, BNC video out.
- Mechanical reel brake.
- Weight: 49 lbs.; Dimensions: 23" x 26" x 12" (L x H x W)

10.2 Monitor & Recording

- 8.4" TFT LCD sunlight readable, records video, voice & photo.
- Pelican® StormCase heavy-duty housing
- SD card reader (SDHC class 6 and higher), max. 32 GB for approx. 20 hours of video
- MPEG-4 Video (.avi, 800x608); Pictures (.bmp 640x480)
- Qwerty keyboard text generator integrated in StormCase
- Bluetooth remote control with wireless charging.
- On-screen temperature, pressure, distance counter and inclination; On-screen pan & tilt positioning in degrees
- 10 fixed text page and 100 fixed lines can be saved in system.

10.3 SK50 pan & tilt color camera

- Range: 3" - 16"
- Infinite 360° rotation / tilt range: 150° viewing angle
- Resolution: 520 TVL video
- Illumination: 0.05 lux at *f*/1.2
- Lighting: 10 self-adjusting 'smart' LEDs
- Water tight up to 85 psi (6 bar)
- Size: outer diameter – 1.96" (50 mm); cylindrical length – 1.25" (30 mm); total length – 3.2" (80 mm)
- 4mm sapphire glass lens; 136° wide angle lens
- 4-step digital zoom
- Automatic mechanical focus

10.4 Accessory Case – Pelican® Stormcase

- 3.35" (85 mm) center guide; 2.28" (58 mm) center guide mounted on camera
- Roller skid with exchange rolls
- Spare O-rings
- SD-card & USB SD-card reader
- Sunshield protection for monitor
- Air pump with pressure indicator
- Carrying Strap

10.5 Optional Accessories

- Maximum upgrade to 300 ft. (90 m) of 9.2mm push rod
- External minCam charging stand
- Spare 14.4V Lithium Ion battery
- Roller skids for pipes > 250 mm (10")
- Trolley with wheels for Cable Reel