

TLP-C500

## TOOL PRESETTER OPERATION MANUAL



www.insize.com



<https://m.insize.com/page-212-1118.html>

EN -- Please scan the QR code or visit the website for operation manual.

IT --- Scansiona il codice QR oppure visita il sito web per il manuale d'uso.

CZ -- Pro návod prosím naskenujte QR kód nebo navštivte webovou stránku.

ES -- Por favor, escanee el código QR o visite la página web para ver el manual de instrucciones.

FR -- Veuillez scanner le QR Code ou visiter notre site web pour accéder aux manuels d'utilisation.

DE -- Bitte scannen Sie den QR-Code oder besuchen Sie die Website für die Bedienungsanleitung.

PT -- Para aceder ao manual de instruções, por favor, faça a leitura do código QR ou visite o nosso site.

MN-TLP-C500-E

V0



## Safety instructions

The following instructions must be observed before installing and commissioning the imaging components.



1. Imaging components may only be installed by specially trained personnel.
2. Use the supplied power pack adapted for the components' connection data to supply power to the equipment.
3. The guarantee does not cover any damage to the device and the connected imaging components caused by using your own power supply.
4. The device's power supply must be connected last in order to protect system components from damage.

Keep this user manual carefully for later use and observe the following safety and operating instructions.



1. Do not expose the device to direct sunlight.
2. Do not expose the device to excessive damp and do not pour fluids over the equipment.
3. All maintenance work must only be carried out by authorized service personnel.

## Structure

1 Name:



1. 15 " Windows tablet
2. rapid movement of X and Z axis
3. color CCD
4. Z-axis fine adjustment knob
5. X-axis fine adjustment knob
6. ISO/SK/BT50 spindle holder (included)
7. 4x90° indexing locking
8. 360° locking

Software

1 Software interface

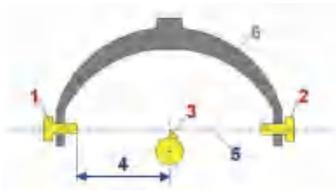


- ◆ live picture: The live picture shows the object recorded by the camera as well as adjustment aids and more detailed information: cross hairs, measuring lines(auxiliary lines), adjustment bars, evaluation window, measurement errors displayed as a red border running all the way round, measurement results.
- ◆ status area: The status area contains current information on the following topics: counter values, tool reference, enabled basic setting for imaging(total image, inverse tool), measurement results, postprocessor, operating mode, measurement procedure, measurement program, date and time.
- ◆ menu bar: The menu bar provides access to image processing, measuring programs, system, setup and output.
- ◆ Favourites' bar: Up to 12 selected menu icons can be copied to this screen area using a drag-and-drop operation.

Basic settings

1 Installing the camera and light

The measurement system (optical equipment carrier) must be designed in such a way that, ideally, the camera lenses and the light are aligned on an optical axis.



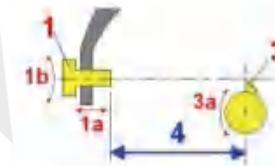
1. camera
2. illumination
3. object to be measured
4. working distance
5. optical axis
6. optical equipment carrier

Procedure:

1. Fit the camera and light to the optical equipment carrier on the measuring unit.
2. Connect the camera and light to the Multifunction counter MFC101.
3. Connect the power supply to the Multifunction counter MFC101.
4. Connect the Multifunction counter MFC101 with the PC via USB.

2 Setting the working distance / Focusing

The exact working distance (4) is preset by the design and the production tolerances of the camera lens. This measurement must be set when installing the optical components.



Procedure:

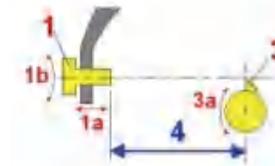
1. Loosen the camera lens clamping on the measuring unit's optical equipment carrier.
2. Measure the distance between the front edge of the lens and the object to be measured using a suitable measuring aid (ruler).
3. Set the distance based on the details in the enclosed calibration log. To do this, move the camera axially (1a) along the optical axis.
4. Lock the camera lens clamping.



The working distance must be set following the instructions in the enclosed calibration log with a permissible tolerance of  $\pm 0.1$  mm.

3 Aligning the camera

A straight, perpendicular contour of the object to be measured must also be visible in the Pos-Cam VI live picture as a perpendicular contour. For this, the camera must be aligned precisely. This is achieved using an object having an exact vertical or horizontal edge after insertion into the tool holder.



Procedure:

1. Choose <Setup / Imaging / Aligning the camera>.
2. Move the object (a calibrating mandrel for instance) into the camera's visual range.
3. Select horizontal or vertical orientation from the shortcut menu.
4. Loosen the camera lens clamping on the optical equipment carrier and position the camera in such a way that this position (indicated in colour) deviates as little as possible from the ideal setting. Turn the camera (1b) around the optical axis.

5. Lock the camera lens clamping onto the optical equipment carrier and make sure you do not modify the working distance (4) when aligning the camera.



The camera is aligned to its optimum level when the indicated angle is  $\leq \pm 0.02^\circ$ .

#### 4 Setting the illumination

After the camera is aligned, the homogeneity and intensity of the illumination must be checked and set (if necessary). To do this, check the intensity distribution across the camera sensor (top, centre, bottom). 3 differently coloured lines must be visible.



Intensity can only be set automatically if there is nothing in the camera's visual range.



Procedure:

1. Move the object to be measured out of the camera's visual range.
2. Choose <Setup / Imaging / Lighting>.
3. Open the live picture shortcut menu (right click on the live picture in lighting mode) and choose the new "Intensity" command.
4. Modify the intensity setting manually using the slider or choose "Automatic" to set the intensity automatically.



The illumination reaches its optimum setting if the coloured lines are as horizontal as possible and within the upper horizontal tolerance range. If the light cannot be adjusted by performing the steps described above, the mechanical setup of the optical equipment carrier must be checked.

### Measuring with imaging



In order to obtain an exact measurement, the optical components must be aligned precisely. You will find a detailed description in the chapter entitled "Basic setting (hardware setup)".



For each measurement procedure you have to ensure that the edges of the object to be measured are not dirty, because this could lead to incorrect measurement results.

#### 1 Tool reference

The system enables you to create, save and manage up to 999 tool references.

#### 2 Measurement

Procedure:

1. Move the object into the camera's visual range (Insert).
2. The imaging system analyses the contour of the object automatically and recommends a particular measurement procedure. Other measurement procedures can be selected manually (<Imaging / Meas. procedures>).



The last selected measurement procedure remains selected, if "Meas. procedure" under <Setup / Options> is set "on".

3. If the relevant contour of the object is not clear, define the shape and size of the evaluation window manually.

4. Turn the object to be measured on the measuring unit's holder around its rotation axis to determine the greatest deviation and thus the focus level: While the object is being turned, the red frame around the live picture disappears as soon as the measurement is correct, i.e. the greatest deviation has been determined. Here you must ensure that the turning speed is not too high. The most precise focus level can be determined with the "Maximum" measuring method (<Imaging / Maximum>) or with the focusing function in <Setup / Imaging / Focusing>



If the red measurement error display does not disappear, the turning speed is too high.

5. The analysis results are shown in the live picture and in the status area. The measurement is now complete.

#### 3 Measurement result

The analysis result is shown in the live picture and in the status area.



The settings in Setup, the counter configuration, selected tool reference and the set measurement procedure are included in the calculation of the displayed result values.

### Imaging

#### 1 Measuring methods

Measuring methods describe the basic imaging system operation principles.

- ◆ Measurement using "fixed cross hairs"
- ◆ Measurement using "flying cross hairs"

In the case of measurements with fixed cross hairs, all measurements relate to the coordinate origin point of the displayed cross hairs.

In the flying cross hairs measuring method, measuring lines are created on the contour of the object to be measured. Adjustment bars are only shown with the "Maximum" measuring method. The offset of the measuring lines and the fixed cross hairs in the X and Z direction is taken into account with the current position. Measuring lines are displayed.

#### 2 Measurement procedures

Measurement procedures describe how an object's contour is analyzed.

- ◆ Point measurement
- ◆ Line measurement

In point measurement, the value (length, diameter) of the object's greatest deviation in the corresponding axis is determined.

Line measurement analyses one or more of the object's straight contour sections and determines the relevant angles.

Both measurement procedures can be combined and also used with the available measuring methods.

- ◆ Point measurement with fixed cross hairs:

The user positions the point of the object's greatest deviation on the corresponding axis of the cross hairs. Adjustment aids (adjustment bars) provide you with an impression of the accuracy involved.

- ◆ Point measurement with flying cross hairs:

The position of the object's greatest deviation is determined automatically when the object is in the camera's visual range. Vertical and horizontal measuring lines are then created at this position on the object contour.

- ◆ Line measurement with fixed cross hairs:

Measuring lines which pass through the displayed fixed cross hairs' origin point and run parallel to the determined straight contour sections are drawn and their angles to the cross hairs displayed. The user positions the object's straight contour section on the corresponding measuring line. The adjustment bars inform the user about the distance between a contour section and a particular measuring line.

◆ Line measurement with flying cross hairs:

Here the measuring lines are positioned and drawn directly above the object's straight contour sections. The results and the current position of the optical equipment carrier are taken into account together.



When setting a user-defined measurement point, the imaging program looks for an edge pixel in the proximity. If an edge near the selected point is found, the next edge pixel will be taken as the display and analysis point, in accordance with the selected measurement program. If no edge is found, the exact position of the selected point will be used for display and analysis. This applies to all measurement programs.



The required measurement points are set by clicking on it with the left mouse button. The measurement points should be defined from the centre of the screen to the screen's edge.

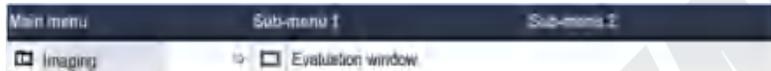
The last defined measurement point can be deleted via the shortcut menu (right mouse button) or by pressing the "delete" key on the keyboard.

The factory settings for e.g. Angle range and Reference Axis can be modified in <Setup / View>.

The "Capture edge" function works in image processing both in transmissive light mode and in incident light mode. It can be deactivated in <Setup / Options> for measurements in incident light mode.

3 Auxiliary functions

◆ Evaluation window



The "Evaluation window" function creates a new evaluation window. You can define any size and position it anywhere in the live picture.

Procedure:

1. Choose <Imaging / Evaluation window>.

2. Specify the starting point for the new evaluation window in the live picture with the mouse and drag it to the required size.

3. Choose "Evaluation window max." in the live picture shortcut menu to reset the evaluation window to its maximum size (i. e. the camera's whole visual range).



When the contour of the object to be measured is clear (line - radius - line), select the whole object field as the evaluation window. If several cutting edges or complex contours are visible, restrict the evaluation window.



If the currently selected operating mode enables you to select the "Evaluation window" command, you can create the window directly in the live picture. In this case you need not start the function via the menu.

◆ Total image



The "Total image" function determines the outer contours of an object to be measured, i.e. the actual contour of a rotational tool in a work piece.

Procedure:

1. Choose <Imaging / Total image>.

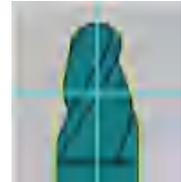
2. The contours of the object (cutting edge) in transmissive light mode are drawn in colour and the Total image icon appears in the lower status area.

3. Turn the object to be measured around its rotational axis (at least once).

While turning the object, its outer contours are determined and displayed in colour.

4. Then use the available measurement programs such as Angle, Line, Radius to carry out further measurements on the object's contours.

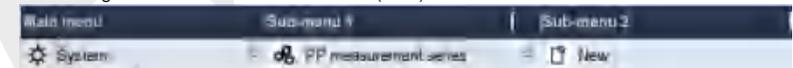
5. Use the Total image icon in the status area to terminate the "Total image" function.



Extended functions(licensed functions)

1 Controller-specific data output "Postprocessor (PP)"

◆ Creating a new PP measurement series (New)

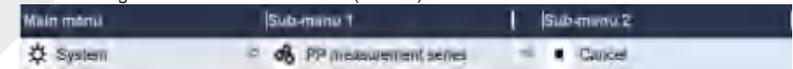


You use this function to start a new measurement series and transfer one or more measurements in a controller-specific output format.



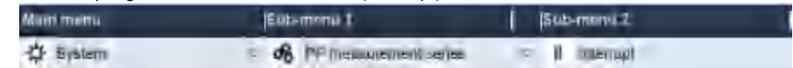
A PP measurement series may not contain any more than 50 data records.

◆ Cancelling a PP measurement series (Cancel)



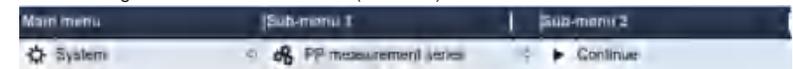
The measurement series is cancelled. All data records which have been stored so far in the measurement series are deleted.

◆ Interrupting a PP measurement series (Interrupt)



Saving further data records for the measuring series is interrupted. All data records which have been stored so far in the measurement series are retained.

◆ Continuing a PP measurement series (Continue)

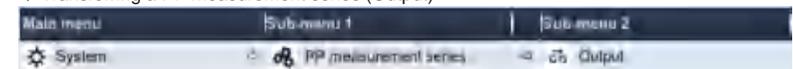


The interrupted and stored measurement series continues and further data records are added.



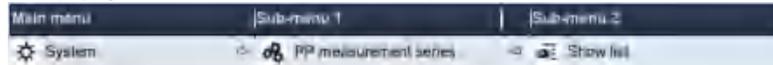
A PP measurement series may not contain any more than 50 data records.

◆ Transferring a PP measurement series (Output)



A dialogue box opens to select the destination for the transfer of data in the specified controller-specific output format. A different drive can be selected or a new subfolder can be created via the shortcut menu (right-click). <New> saves the measurement series in a file with a new name to be assigned. To start the transmission to an existing file, choose <Select> and confirm the security message

◆ Displaying the PP measurement series as a list (Show list)

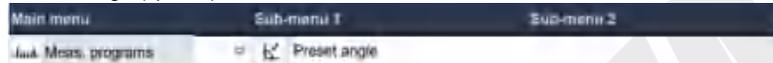


You see a list with all the data that has been stored up till now. In the shortcut menu (right-click) you find the following options:

Commands	Explanation
Edit	Makes the selected data record's parameters that can be modified available for editing.
New measurement	Uses the selected data record for a new measurement.
Delete	Confirm the security message with <OK>. The selected data record is deleted.
Send list	A dialogue box opens to select the destination for the transfer of data in the specified controller-specific output format. Choose <Select> to start the transmission.
Show list	Displays the measurement series on the screen in the specified controller-specific format.
Header	Displays header information for this measurement series. Parameters that can be modified are made available for editing. The display of header data depends on the PP transfer format.

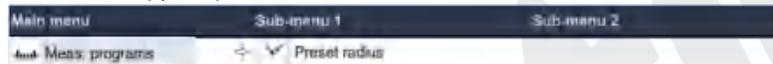
2 Preset values

◆ Preset angle (optional)



The "Preset angle" measurement program draws two measuring lines. Both measuring lines run to the fixed cross hairs' point of origin. Any angle can be defined. This enables you to compare the actual angles of an object contour with nominal angles.

◆ Preset radius (optional)



The "Preset radius" measurement program draws a circle symmetrically around the cross hairs' origin point. This enables you to compare the arcs of the object contour displayed with nominal radii.

**Configuration (Software setup)**

1 System information / Licensing



The Info dialogue box displays information about the imaging system and options for enhancing system functions.

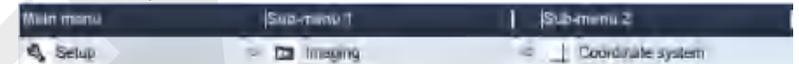
2 Imaging

◆ Focusing, aligning the camera, setting the illumination



For precise measurements it is essential that you set the working distance correctly, align the camera and set the illumination (light distribution and intensity).

◆ Coordinate system



You use this function to set how the imaging results are to be included with the gauges' counter values. When using the Pos-Cam VI on a horizontal setting unit for example, the axes' assignment and counting direction must be adjusted.

◆ Incident light



This function specifies whether an object and its contour are to be displayed and analyzed in transmissive light mode or incident light mode. It is also available in the live picture shortcut menu.

◆ Intensity



This function enables you to modify the intensity of the live picture in incident light mode (setting the camera's sensitivity).

If a ring light is connected, it is also possible to switch individual quadrants of the ringshaped incident light on and off to further enhance the object's illumination.

◆ Inverse tool



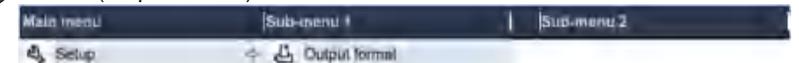
This function enables you to determine the position with the greatest deviation on tools with cutting edges pointing inwards as is the case with bell tools for example.

◆ With Measure centre (specifying measurement points)



When the function "With Measure centre" is enabled, the measurement points required for the measurement programs are not approached and selected by clicking on.

3 Printer (output format)



You use this function to select the printers for measurement value and measurement series output and to specify the output formats for labels and lists.

◆ Label format (Label)

Parameter	Value [unit]	Description
Format	1-6	You can choose from six format templates (see Format template catalogue).
Margin	[characters]	Number of characters for the left margin.
Length	[line(s)]	Number of lines per label.

◆ Format template catalogue

Format template	Printer	Type
1	Standard	Default template
2	DPS	Customer specific template
3	Dymo	310, 320, 400, 450
4	Zebra	LP 2824 / EPL1 mode
5	Seiko	
6	Zebra	LP 2824 / EPL2 mode

◆ List format / Table format (List)

Parameter	Value [unit]	Description
Margin	[characters]	Number of characters for the left margin.
Length	[line(s)]	Number of lines per worksheet.

4 Counter

◆ Counter configuration

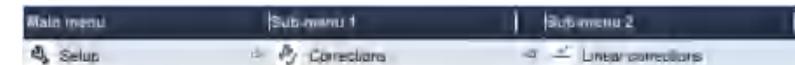
Parameter	Value [unit]	Description
Name	A,B,C,L,Q, X,Y,Z,D,R	Select one of these letters to describe the counter value display axis.
Signal type	off	Hides the counter value display in the status area.
	1 Vss	The connected signal transmitter sends sinusoidal 1 Vpp voltage signals.
	TTL	The connected signal transmitter sends rectangular TTL signals.
Reference mode	without	When the device is switched on, a reference travel need not be carried out to display counter values.
	once	When the device is switched on, a signal transmitter reference point must be passed. The reference point is analysed once.
	multiple	When the device is switched on, a signal transmitter reference point must be passed. The reference point is analyzed each time it is passed.

Counter parameter description continued:

Parameter	Value [unit]	Description
Reference mode	coded	This setting must be selected for distance coded signal transmitters.
counter dir.	+	Reverses the counter direction (change of sign).
	-	
signal period	[µm]	The length of a complete signal period of the connected signal transmitter, e.g. 20 µm.
Interpolation	[Factor]	With sinusoidal signal transmitters the factor is 256. Normally, a factor of 20 should be selected for TTL signal transmitters.
Distance	[mm]	Basic reference mark distance for distance encoded signal transmitters, e.g. 20 mm.
Start	[mm]	Distance of the first reference mark from the start of the measured length (distance encoded signal transmitters)
Base	+	Plus: basic counting direction with distance encoded signal transmitters (e.g. Heidenhain)
	-	Minus: basic counting direction with distance encoded signal transmitters (e.g. ACU-RITE)
Resolution	[mm]	Counter value display resolution (mm setting)
	[inch]	Counter value display resolution (inch setting)

5 Corrections

◆ Linear Corrections

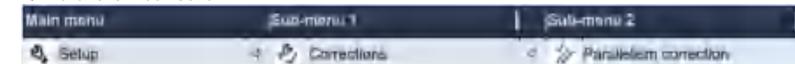


You use this function to correct linearity errors on individual axes.

Procedure:

1. Insert a reference gauge (e.g. setting mandrel) into the measuring unit's holder.
2. Choose <Setup / Corrections / Linear corrections>.
3. Select the axis you want to correct with <Change>.
4. Start recording the actual values with <Record>.
5. On the relevant axis, approach two measurement points the nominal distance of which is known one after the other (the adjustment bar pointer is in the middle of the green area) and confirm each point with <OK>.
6. The system displays the measured actual value (actual distance).
7. Enter the nominal distance in the "Nominal" box.
8. The values are accepted when the window is closed.
9. Proceed in the same way for the other axis.

◆ Parallelism correction

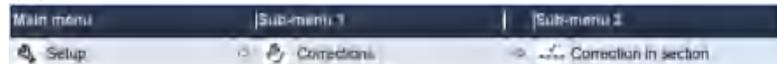


You use this function to correct errors involving parallelism and rectangularity to an object's rotation axis.

Procedure:

1. Insert a reference gauge (e.g. setting mandrel) into the measuring unit's holder.
2. Choose <Setup / Corrections / Parallelism correction>.
3. Start recording the actual values with <Record>.
4. Approach two measurement points on one axis one after the other (the adjustment bar pointer is in the middle of the green area) and confirm each point with <OK>.
5. The system shows the calculated deviation in µm/mm of travel.
6. The values are accepted when the window is closed.

◆ Correction in section



You use this function to correct linearity errors on individual measuring axes in sections. The correction sections may be freely selected by the user.

Each axis can be corrected individually.

Procedure:

1. Choose <Setup / Corrections / Correction in section>.
2. Use the "Correction" button to call up the list display of the correction value pairs for the axis to be corrected.
3. Right-click on a list item (or on the empty list if no values are saved yet) to bring up the shortcut menu with the following options:

Commands	Explanation
New measurement	Selects the marked nominal/actual value pair for editing.
Delete	Sets the selected nominal/actual value pair to zero.
Delete all	Sets all nominal/actual value pairs to zero.
Add	A new nominal/actual value pair can be recorded. It is automatically placed in the correct position in the list.

4. Choose <Add> to begin the list or add a pair of values.
5. Approach the point to be recorded with the fixed cross hairs' origin point.
6. Accept the measured value at the approached position with <Playback>.
7. Enter the associated nominal value.
8. The value pair is accepted when the window is closed.
9. Proceed in the same way for all other measuring points and complete the recording of the nominal/actual value pairs by closing the list window. Thus the value pairs are saved and you return to the correction in sections window.

6 Options



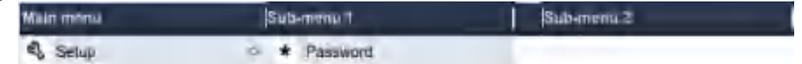
You use this function to save specific system settings permanently so that they are automatically selected after the system is restarted.

7 Live picture display (View)



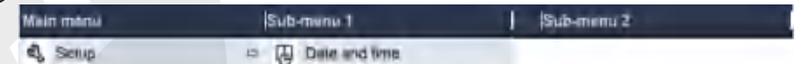
8 User password

You use this function to set specific live picture views. They are saved permanently and so they are automatically selected after the system is restarted.



You use this function to protect important system functions from unauthorized access and tampering. If this function is enabled, you will be prompted to enter a password each time you want to access a protected function.

9 Date and time

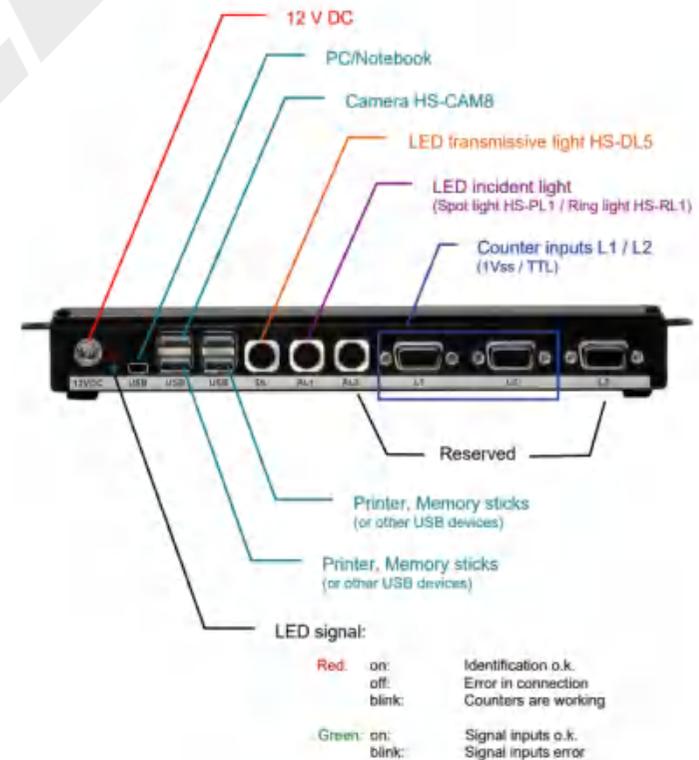


You use the date and time function to modify the display format of date and time. The display can also be switched on and off.

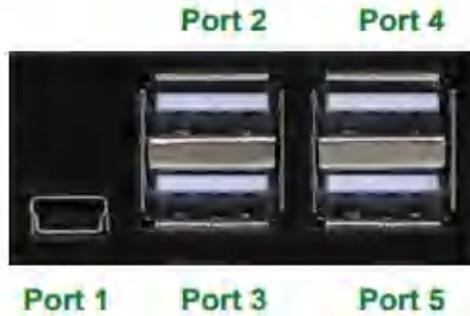
Technical data

1 Multifunction counter MFC101

◆ Connector layout



◆ USB ports



◆ Lighting interfaces

Pin	Signal	Notes
1	+ 12 V	<p>Mini-DIN 4 pin socket</p>
2	SCL	
3	SDA	
4	GND	

◆ TTL input

Pin	Signal	Notes
1	$\overline{U_{a1}}$	<p>Sub-D 9 pin socket board</p>
2	0 V	
3	$\overline{U_{a2}}$	
4	$\overline{U_{aS (Error)}}$	
5	$\overline{U_{aR1 (Reference)}}$	
6	$U_{a1}$	
7	+ 5 V	
8	$U_{a2}$	
9	$U_{a0 (Reference)}$	

- Signal:  $U_H \geq 2 \text{ V}$ ,  $U_L \leq 0.8 \text{ V}$  (EIA Standard RS422)
- Signal division: Interpolation by factor 4
- Reference signals:  $U_H \geq 2 \text{ V}$ ,  $U_L \leq 0.8 \text{ V}$  (EIA Standard RS422)
- Counter width: 28 bits
- Input frequency: 0 - 1 MHz

◆ Voltage signal inputs (~ 1 VSS)

Pin	Signal	Notes
1	A-	<p>Sub-D 9 pin socket board</p>
2	0 V	
3	B-	
4	$\overline{U_{aS (Error)}}$	
5	R-	
6	A+	
7	+ 5 V	
8	B+	
9	R+	

- Signal: 0.6 – 1.2 V<sub>PP</sub>, typ. 1 V<sub>PP</sub> (sinusoidal)
- Signal division: 256 x interpolation
- Reference signals: 0.2 – 0.85 V<sub>PP</sub>
- Counter width: 32 bits
- A / B phase angle: 90° ± 10°
- Input frequency: 0 - 100 kHz

2 Camera

◆ Connection

Pin	Signal	Colour	
1	+5 V		<p>4 3 2 1 USB 4 pin plug</p>
2	D -		
3	D +		
4	GND		

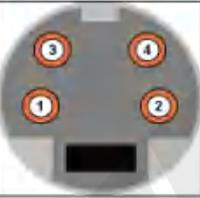
3 Transmissive light

◆ Connection

Pin	Signal	Colour	Notes
1	+ 12 V		 Mini-DIN 4 pin plug
2	SCL		
3	SDA		
4	GND		

4 Incident light (optional)

◆ Connection

Pin	Signal	Colour	Notes
1	+ 12 V		 Mini-DIN 4 pin plug
2	SCL		
3	SDA		
4	GND		