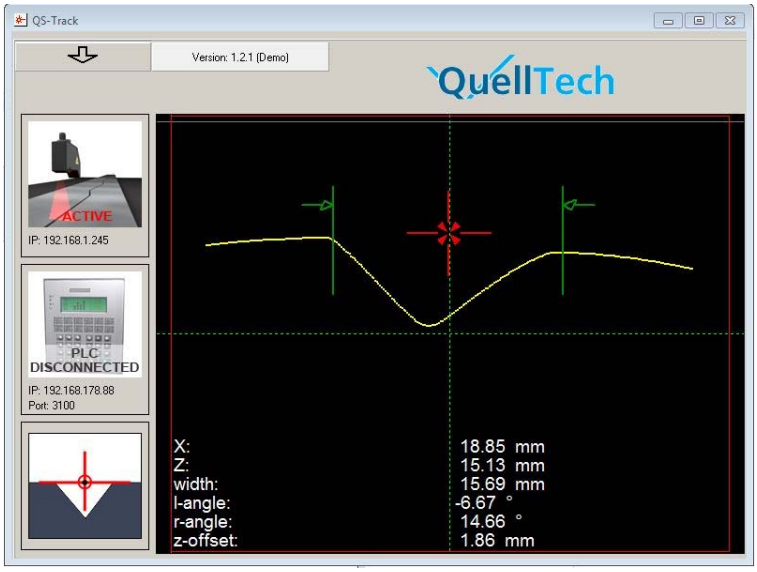
QS-Track Software

For usage with Q4 Laser-Scanner

Operators Manual



V. 1.2.4-E

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1. Scanner Connections

1.1. Ethernet connection

Connection	Pin-No.	Function	Cable colors	Note
M12 round 4-pol D-coded female	1	Tx+	green + white	Sending
	2	Rx+	red + white	Receiving
	3	Tx-	green	Sending -
	4	Rx-	red	Receiving -
	Shield			Connected with housing

1.2. Control cable

Connection	Pin-No.	Function	Cable colors	Note
M12 round 8-pol A- coded male	1	+8 - 30 V DC	white	Supply voltage
	2	Digital input. 1	brown	encoder-input 1
	3	GND, 0V	green	Gnd,
	4	Digital input. 2	yellow	encoder-input 2
	5	Sync out	grey	Synchron
	6	Sync in	orange	Synchron
	Shield			Connected with housing

1.3. Instructions

1. Connect the Ethernet cable directly or via switch to a PC.
2. Connect the supply voltage 24V DC according to above scheme. (It is highly recommended to use a high quality power supply with high EMC robustness)
3. The default IP address of the scanner is 192.168.1.245. Port 1096, adjust the PC network settings accordingly.
4. Apply power and you should see a red laser line.
5. Ping the scanner. If you see a response, ok, if not check the cable connections again, check the IP settings at the PC and the scanner. If necessary reset the scanner pressing the reset button for 5 sec.

1.4. Product labeling

Following scanner details on the cover label:

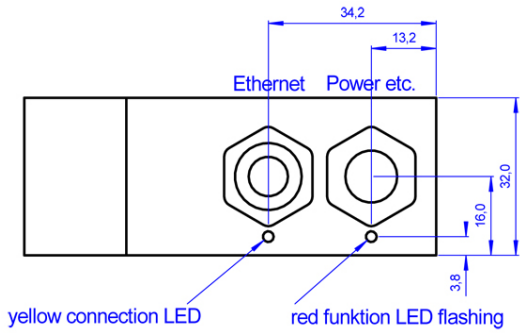
Manufacturer: QuellTech
Type: Q4-xx
Serial no.: xxxxxx

1.5. General system description

Plug the scanner with a M12-D-coded standard industrial Ethernet connecting plug, as well as an 8-pin M12-A-coded control- and power supply plug.

On the plug surface 2 system indicators are integrated with the following features of function:

Status LED's	Meaning	color	OK when
System ok	Iluminates after self check	red	flashing
LAN act.	Ethernet Link sending data	yellow	flashing



The button „reset IP“ is to be used in order to provide the scanner with the default IP-address: 192.168.1.245

The scanner includes a CCD-sensor, a line laser and the electronics for the consolidation of the cloud of points..

The scanner provides a 2D scan of an object on the measurement range.
The width of the scan will be indicated with an X-value, the depth of the measurement will be indicated with a Z-value. The linearization of the scanner has been carried out in the factory. Profile data are send in metric values. A calibration by the user is not necessary. Therefore every scanner can be exchanged on-site, without any extensive new calibration necessary.

The evaluation electronics in the head of the scanner will carry out all settings automatically, in order to provide always the optimal profile.

1.6. Encoder data for position

The encoder data for position are only available when an incremental encoder is connected to the inputs 1+2. The position value is registered at the end of a scan, in order to receive for every profile the corresponding encoder data for position.
Values are in binary complement.

Encoder inputs:

Protocol	Incremental Signal A+B 90° Phase shifted
Input level	Low = 0 ... 2 V High = 5 ... 30 V

1.7. Technical Specifications

Ethernet Interface:

Default IP-address	192.168.1.245
Default Port	1096
Default Subnet mask	255.255.255.0
Transmission rate	100 Mbit
Protocol	TCP/IP-Protocol
Auto negotiation	yes
Auto MDIX	yes
DHCP	no

Other:

Temperature probe	Value range -55°C to +126°C in 1 grade steps
Operating hours counter	counting interval = 250 ms
Switch-on counter	Every time the sensor is turned on, the value will increase to 1.

1.8. Description of Web-Interface

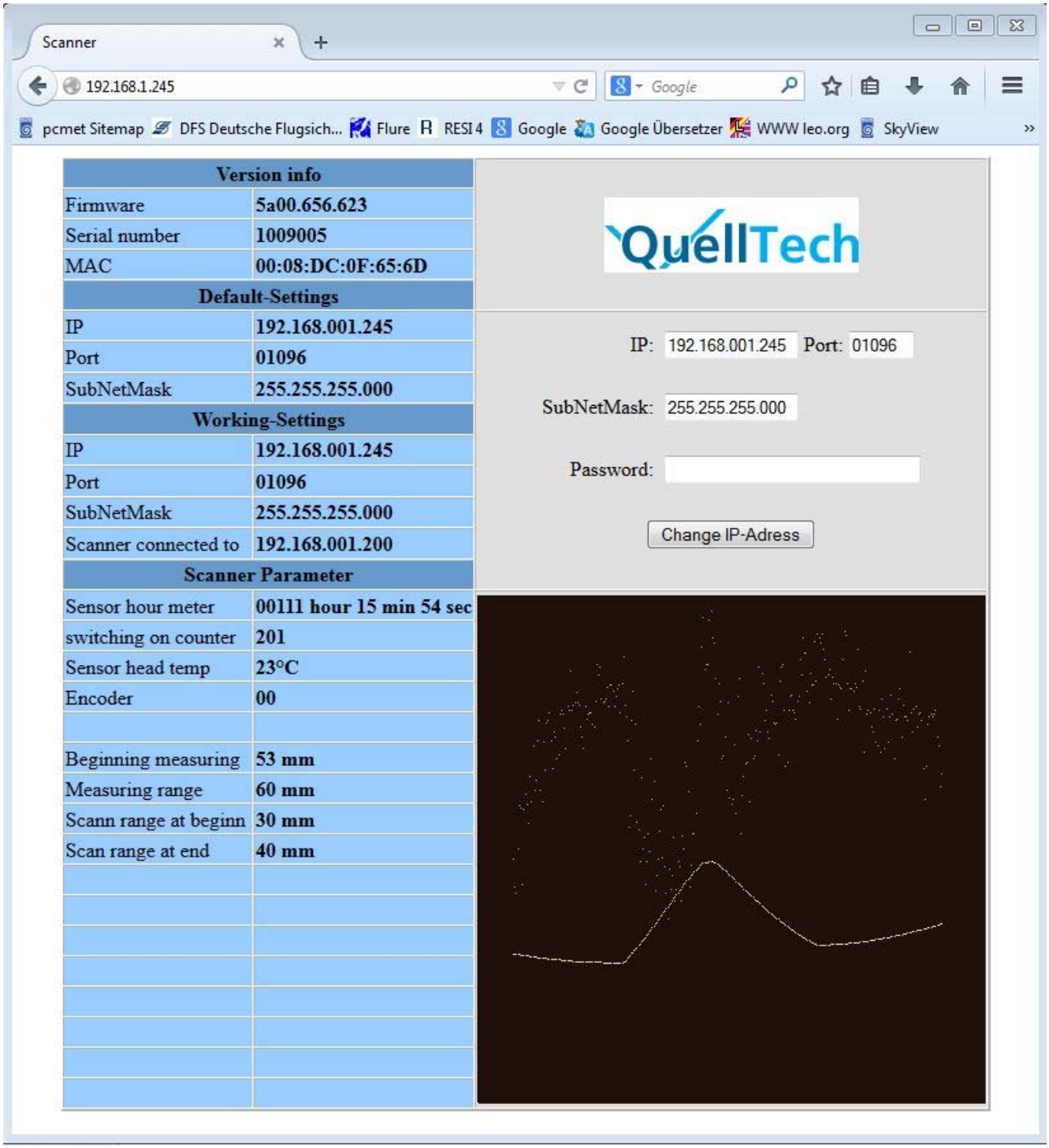
Address the scanner by using the integrated Web-Interface with the help of a web-browser. Input the Scanners IP address into the web-browsers address field.
The parameters as well as the scan profile will be indicated.

A scan profile update will not be performed automatically. A scan profile update will only be indicated new after having updated the website.

Additionally, the access with the web-browser allows the possibility to set up directly the working IP-address, the Port and the Subnet mask.

1.9. Changing the IP-address

In order to be able to change the IP-address, include the new data into the entry mask.
The password is: **q4**
After having sent the data with „Change IP-address“, the scanner will provide a report with a new screen page on which the new data are being confirmed. Do not forget to set your PCs address accordingly.



Version info	
Firmware	5a00.656.623
Serial number	1009005
MAC	00:08:DC:0F:65:6D
Default-Settings	
IP	192.168.001.245
Port	01096
SubNetMask	255.255.255.000
Working-Settings	
IP	192.168.001.245
Port	01096
SubNetMask	255.255.255.000
Scanner connected to	192.168.001.200
Scanner Parameter	
Sensor hour meter	00111 hour 15 min 54 sec
switching on counter	201
Sensor head temp	23°C
Encoder	00
Beginning measuring	53 mm
Measuring range	60 mm
Scann range at beginn	30 mm
Scan range at end	40 mm

2. Software QS Track

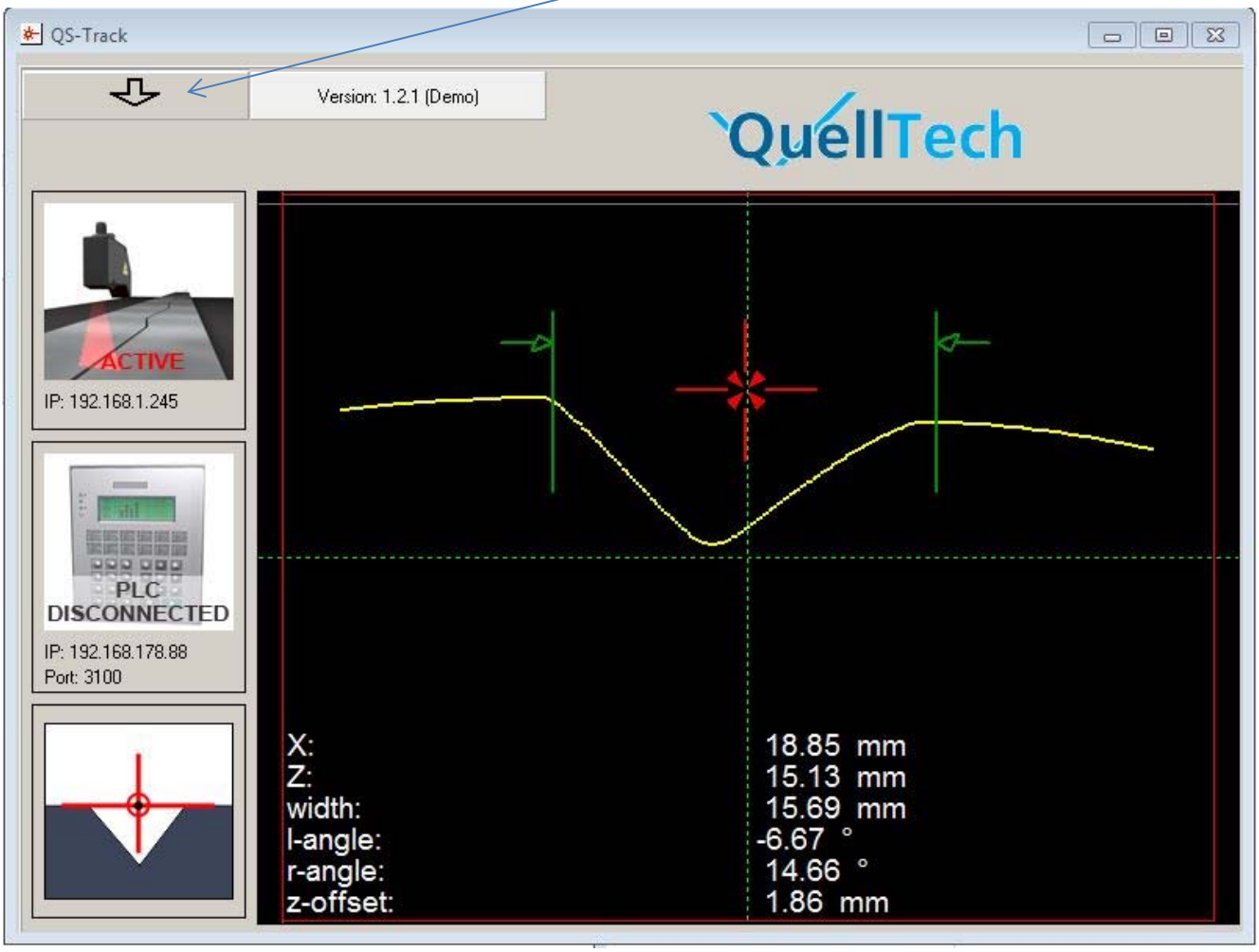
2.1. Installation

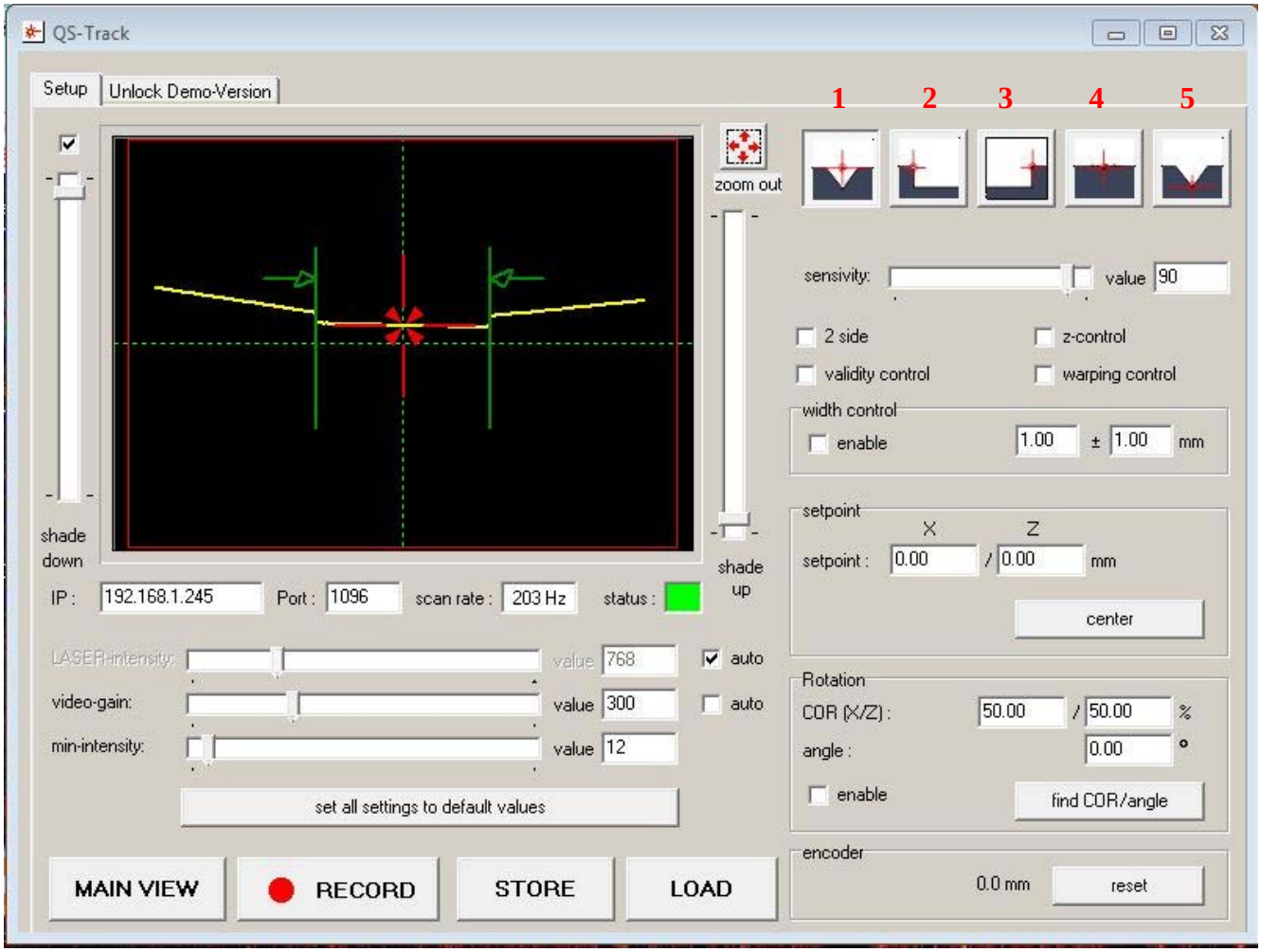
There is no installation necessary, copy the program file into a folder and double-click it

2.2. Enter settings mode

Connect a Q4 scanner and verify its IP No and port No as described above.

To enter the settings click on the arrow button and enter “qst1” into the field, hit return

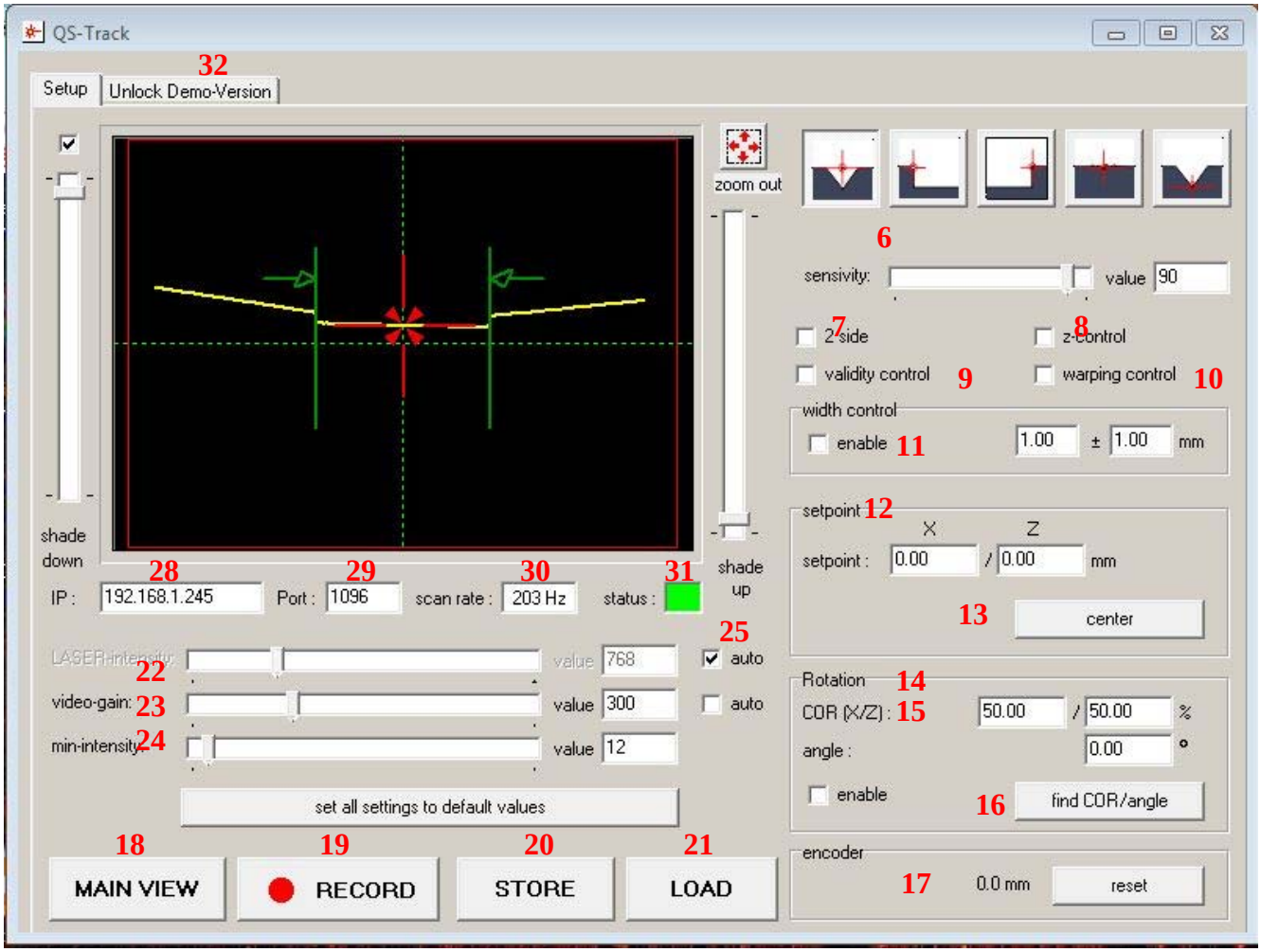




The red numbers refer to the functions/settings described here

2.3. Select the desired program function:

1. Center of gap
2. Left edge
3. Right edge
4. Flat gap
5. Bottom of Gap



The red numbers refer to the functions/settings described here

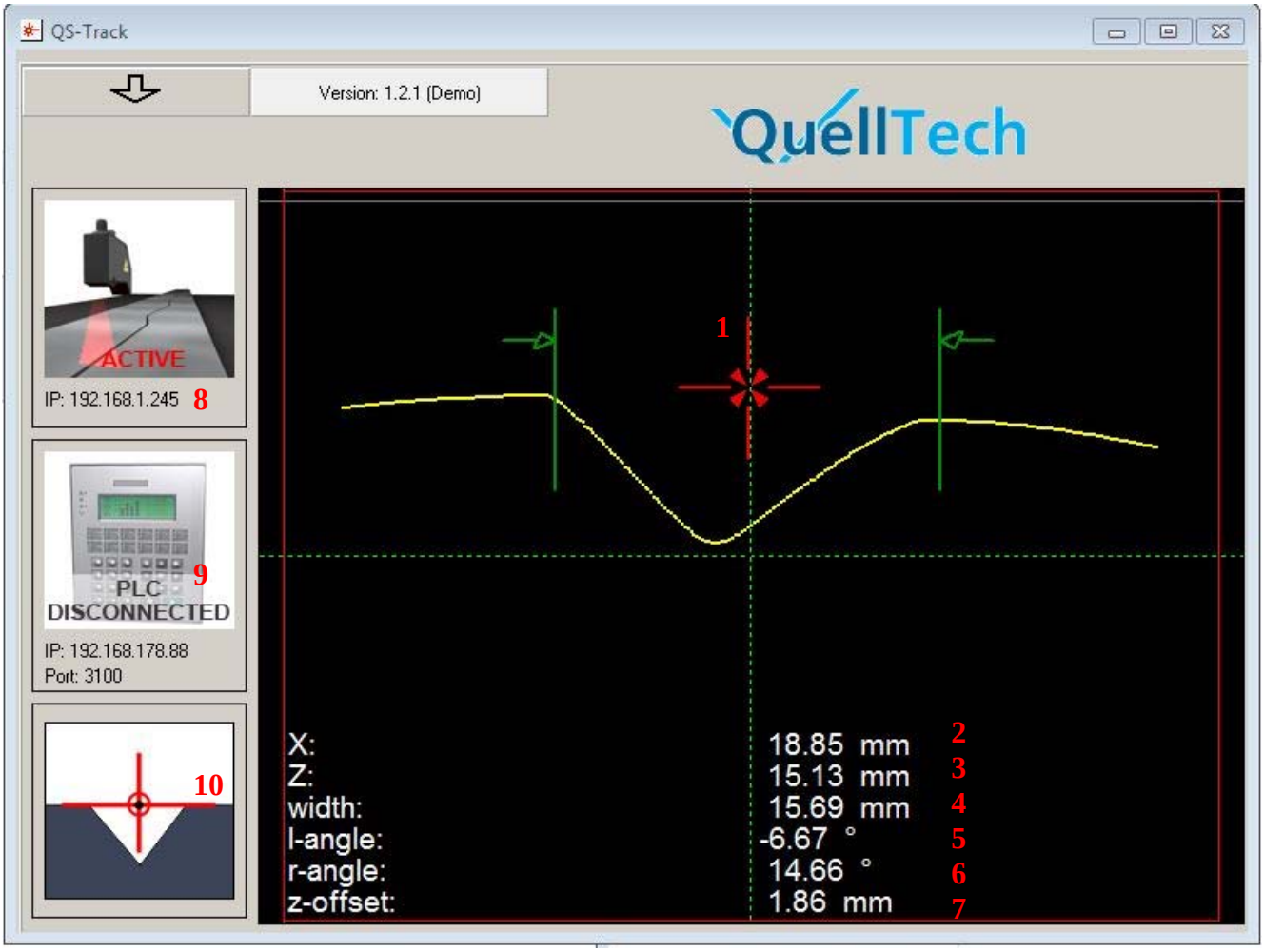
2.4. Input optional Settings

For all these values: try to use the default settings first, if these do not work sufficiently, then try to optimize altering these settings

6. Sensitivity: set sensitivity of detection
7. 2 side: check for detecting rising and falling edges, uncheck for only falling edges
8. Z control: if no gap, old x position will be continued
9. Validity control: Eliminates singular effects like sputter
10. Warping control: excludes edges left/right of gap
11. Width control: measure gap with and set nominal value and tolerance
12. Setpoint: set the coordinates of the reference point
13. Center: sets the current measured point as reference point
14. Rotation: compensates possible scanner inclination
15. COR: set position of center of rotation (COR)find COR
16. Find COR/angle: tries to find the optimal COR
17. Encoder: reset encoder value
18. Main View: after settings input change to the Main View window
19. Record: records all profiles until untoggled
20. Store: all settings in settings.ini
21. Load: loads all previously stored settings from settings.ini
22. Laser-intensity: regulates how much laser light will be output, best to keep on auto
23. Video-gain: set video gain, standard setting should be 300
24. Min-intensity: sets threshold for min. intensity of pixel
25. Check these boxes to use default values of the scanner (recommended for Laser-intensity, not recommended for video-gain)
26. Set all setting back to default values
27. reserved

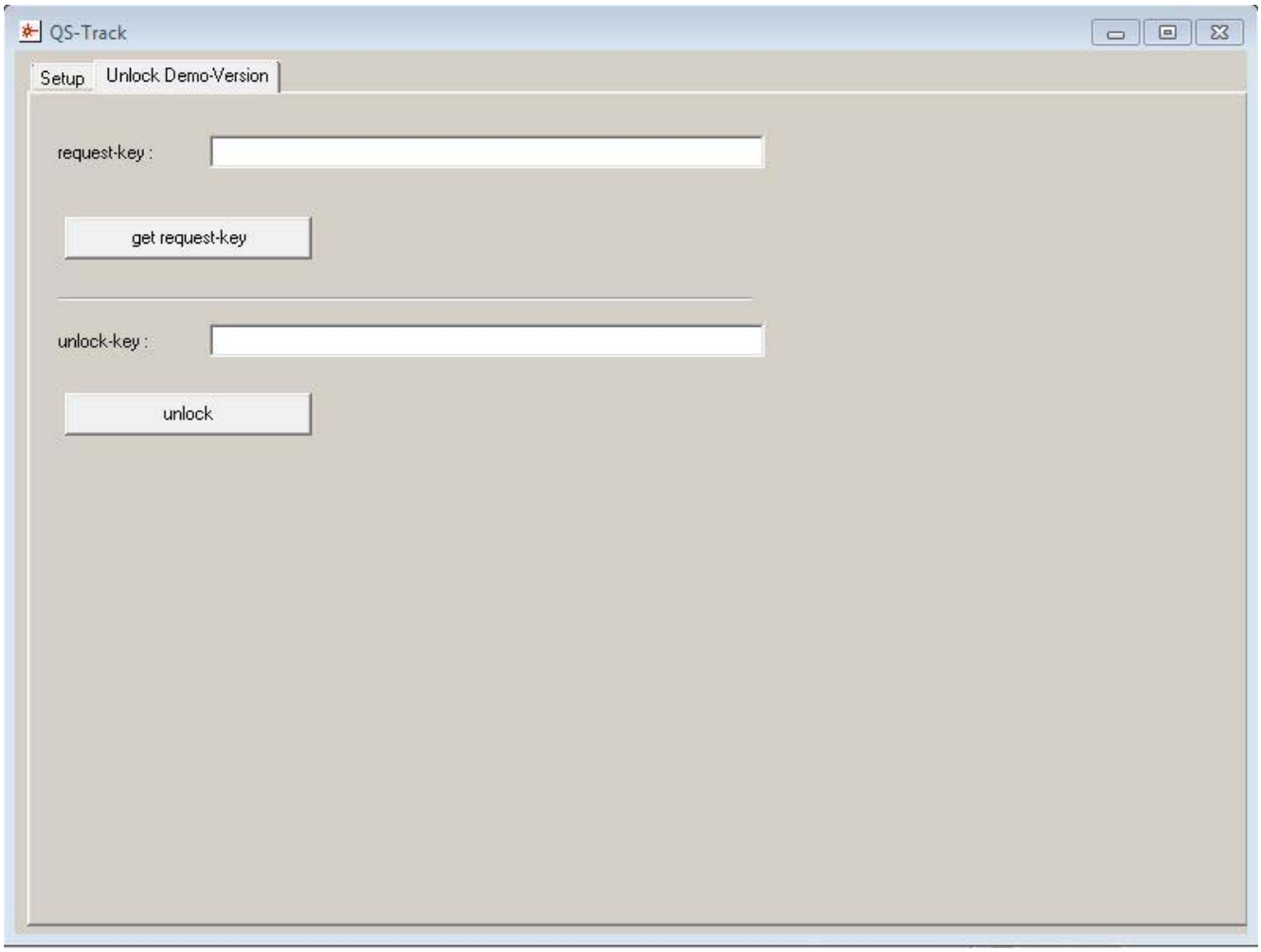
28. IP: use IP which the scanner is running on (default or working IP)
29. Port: use port which the scanner is using (see web interface of scanner)
30. Scan rate: shows current rate of profiles/s
31. Status: green if scanner is running and connected to software, red if no connection.
32. Unlock Demo Version: insert unlock code if communication to external systems needs to be activated.

2.5. Main View



1. Shows reference point (center point of gap)
2. X coordinates of center point
3. Z coordinates of center point
4. Width of gap
5. Angle of adjacent surface to the left relative to the horizon
6. Angle of adjacent surface to the right relative to the horizon
7. Shows offset relative to center point previously set in the settings
8. Shows if scanner is active
9. Shows if PLC is connected
10. Shows currently selected program function

2.6. Unlock Demo Version



To be able to communicate via the TCP Interface Port 3100 with external systems, it is necessary to obtain a unlock key from the manufacturer.

On the target system generate a request key by clicking on “get request-key” button. Mail this request key to info23@quelltech.de

If you are authorized for an unlock key you will then receive an unlock-key which you must insert into the field and click “unlock”

3. QS-Track TCP/IP –PLC Interface Structure

Default-TCP-Port between PLC and Software: 3100

3.1. Data Request Commands from PLC to Software:

After connection between PLC and Software the PLC should send (PLC has to be programmed accordingly) this inquiry:

"Get Custom Values" |G|V|C|CR| = `47:56:43:0d` `//Hex`

G = Get = 47 //Hex
V = Values = 56 //Hex
C = Custom = 43 //Hex, selected values set in settings.ini below [Results over Ethernet]
CR = Carriage Return = 0x0D //Hex

3.2. QS-Track answer to PLC, Return String:

|Header |Length|Result Value 00 |Result Value 01 |Status |

Only results which have been set in the QS-Track settings and stored in the settings.ini file with =1 under the section [Results over Ethernet] will be transmitted as Active

[Results over Ethernet]
V00: Center=1
V01: Distance=1
V02: L-Distance=0
V03: R-Distance=0
V04: Z-Offset=0
V05: Width=1
V06: Slope=0
V07: L-Angle=0
V08: R-Angle=0
V10: Seam_Height=0
V20: Encoder=0
V62: Temperature=0
V31: Setpoint_X=0
V44: Setpoint_Z=0
V30: Hysteresis=0
V32: Min_Height=0
V46: Width_Setpoint=0
V47: Width_Tolerance=0
V33: Angle_Setpoint=0
V15: Profile_Intensity=0

CR = Carriage Return = 0x0D

3.3. Example answer

|0xFF|0xFE|xx|yy|V|0|0|A|>|+|0|0|1|.|2|3|CR|V|0|1|A|>|-|0|0|1|.|2|3|CR|V|0|5|A|>|-|0|0|1|.|1|2|CR V|0|6|I|>|-|0|0|5|.|0|0| C|0|0|0|0|0|M|0|0|CR|

// 76 bytes max. length. Once defined, the length should be kept constant in PLC

The length starts after 0xFF and 0xFE bytes.
xx Length of Return-String lo-Byte // set by system
yy Length of Return-String hi-Byte // set by system

3.4. Returned results

V00A>+001.23 +CR
// Value 00 (Tracking Point X) Active result +1.23 mm, A = active result (value measured), > delimiter sign)

V06I>-005.00 +CR
// Value 06 (Slope) In-Active result -5.00 mm, I = Inactive (value will not be measured), if values are not used in changed settings to a specific program.

3.5. Status

C|0|0|0|0|0|M|0|0|CR|

C00000M00 +CR // Dec. 5 bytes decimal value, shows status of scanner

// Binary 2 Bytes = 16 bits = 00000000 00000000 converted to decimal value

Bit 0 (1) -> Scanner OK
Bit 1 (2) -> Scanner connected
Bit 2 (4) -> Profile
Bit 3 (8) -> Recognition OK
Bit 4 (16) -> Intensity > 25%
Bit 5 (32) -> Intensity > 50%
Bit 6 (64) -> Intensity > 75%
Bit 7 (128) -> Heartbeat
Bit 8 (256) -> Position too right
Bit 9 (512) -> Position OK
Bit 10 (1024) -> Position too left
Bit 11 (2048) -> FIFO load, performance problems
Bit 12 (4096) -> Recording
Bit 13 (8192) -> reserved
Bit 14(16384) -> Position Centered
Bit 15(32768) -> reserved

3.6. Selected Measurement Program

C00000**M00** +CR // values after M define selected measurement program

M03: center of gap
M08: left edge
M09: right edge
M06: flat gap
M10: bottom of gap