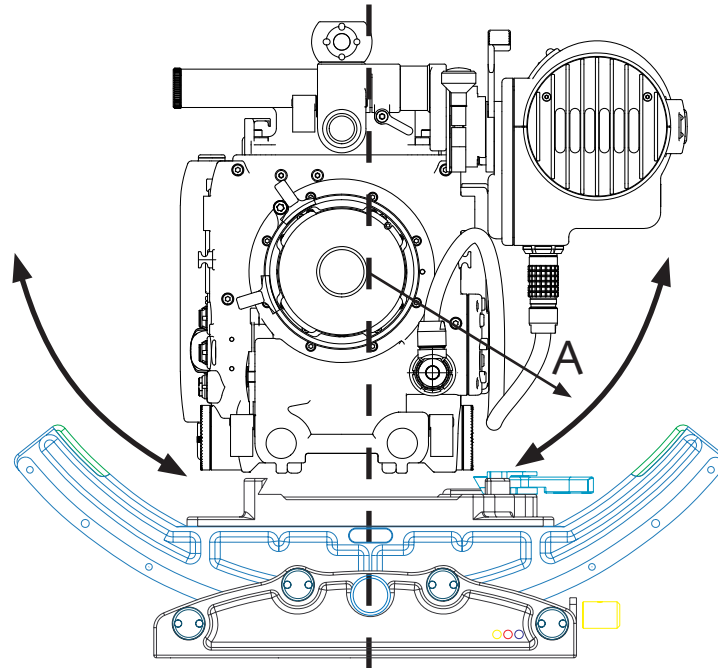# WAVE

Manual

Version 2 01/2017

Betz

betz-tools.com

The camera weight should always be adjusted in the radius of the center of gravity! (A)
This will cause a more stable and centered operating on mechanical camera stabiliser devices!

Use Motors and Accessories to keep the Cameras rotating point Balanced.

A

In upside down mode never mount the camera on its handle!
This way of mounting will cause vibration. It is easy to flip the picture.

see also https://vimeo.com/betztools

Contents

1　Camera and Wave mounting

Rear　　　A　　　Front
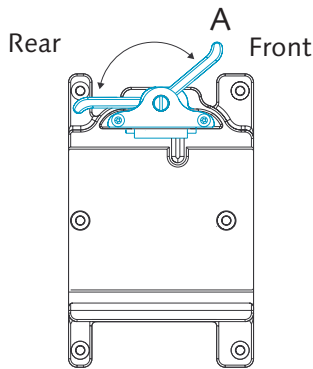
Mounting Template

142mm
5,59"

40mm
1,57"

77mm
3"
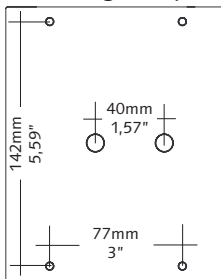
Attach camera with mounted dovetail plate and make sure that all parts and the camera itself is fixed perfect and nothing can vibrate.

Make sure that the clamp lever on the stage faces to the rear (A) so that the clamping is open. After the camera snaps in, the clamp lever snaps to the front. The camera is now protected against sliding out.
Never close or operate the closer mechanism by force.
By pulling the clamp lever towards stage rear, approximate fore/aft balance can now be achieved by sliding the camera on the stage.

The clamping lever should lock the camera even before being pressed to the final stop!

In case the camera can still be moved even though the lever is pressed until stop caused of tolerances of the different dovetailplates a spacer has to be put under the compensation.
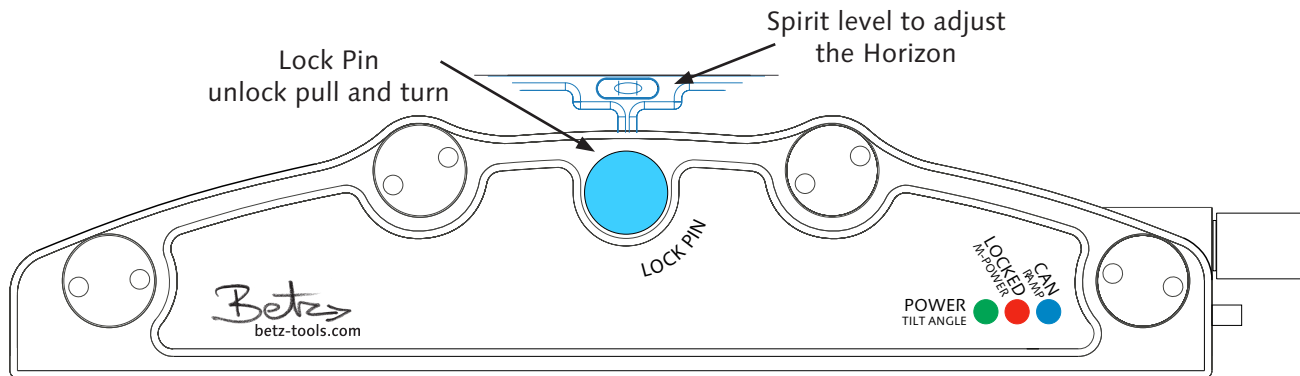(see maintenance)

To remove the camera, the dovetail clamp must be opened by pulling the clamp lever fully to stage Rear.

Mounting the Wave onto a device:
Bottom side you will find two 3/8" threads and also four M5 threads.

- Wave should be in a more or less leveled position before connecting to power.
- Green Power LED flashes keep Wave in position "Zero" Initialisation runs for about 5 sec.
- When the Lock Pin is mechanical engaged the Red LED **must** be on which says motor power is off
  (if not see trouble shooting).
- "Upside Down mode" Lock Pin must be engaged before turning 180°.

Spirit level to adjust
the Horizon

Lock Pin
unlock pull and turn

LOCK PIN

LOCKED
RAMP
CAN
M1-POWER

POWER
TILT ANGLE

betz-tools.com

Power LED: On = Ready to go
             Flashing = "Zero" Initialisation (ca. 5 sec.).
Locked LED: On = Must be ON when Lock Pin is engaged.
             Flashing = Fault (see trouble shooting) or Restart.
CAN LED: On = External CAN-Device is connected.
             Restart after unplugging CAN-Device.

Fine adjustment Horizon
and Menu Setups

Menu Button and
Adjustment Knob for Setup

DC Power Input:
10 - 36 Volt
Power Consumption:
500mA peak 2,5A

M-POWER
RAMP →

Horizon

↓
max.

Setup

Made in Germany

#160313

SD-Card   USB   CAN   10-36 V DC IN

CE

Serial#

Slot Micro SD-Card
for Software upgrades
use max. 32GB

USB-B
for factory Set Up

GND   CANL

+12V   CANH

Lemo 0B 304
soldering side connector

+12V

GND

Lemo 1B 303
soldering side connector

BT CAN-BUS
External control via our
CAN-Velo
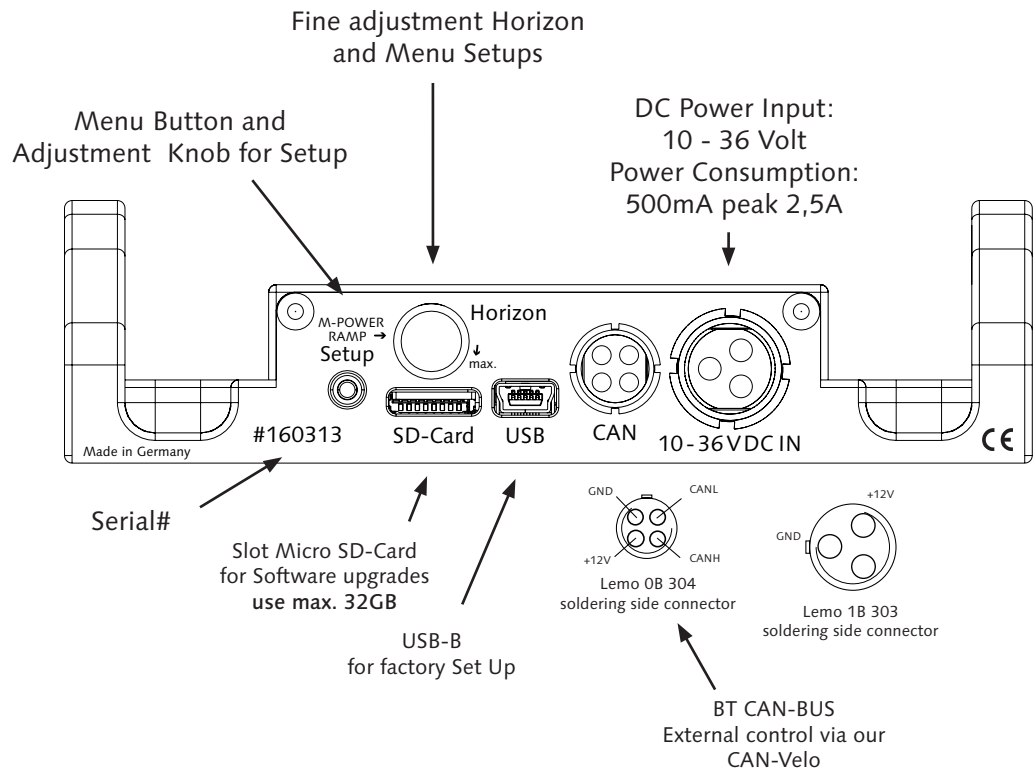
From a certain point of the Tilt Angle it doesn't make sense to stabilize the horizon. For this reason the stabilization of the horizon will be frozen in a defined Tilt Angle.
The Tilt Angle can be adjusted individually as follows.

Horizon

Setup

max.

SD-Card   USB

Push Button
Setup

POWER
TILT ANGLE

CAN
LOCKED
M-POWER

Push Button Setup ➤ Push Button Setup ➤ Push Button Setup 3 sec. ➤ Push Button Setup

All LEDs on Menu started	Green Tilt Angle	Green flashes Bring device in desired Tilt-position	short flashing Tilt Angle stored

POWER
TILT ANGLE

CAN
LOCKED
M-POWER

see also https://vimeo.com/betztools
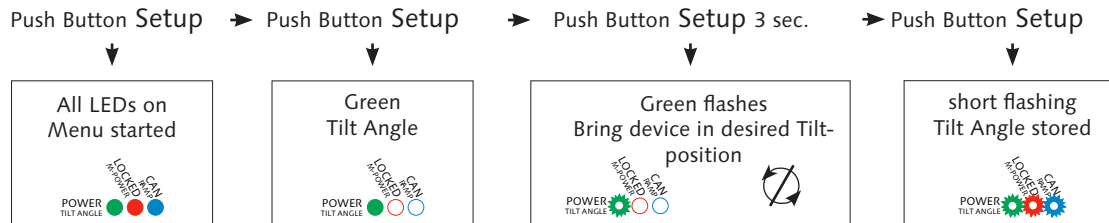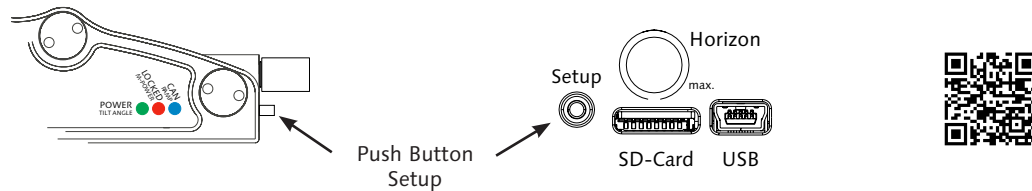
The basic setting for the motor power is fine for a wide range of camera weights.
If the power is adjusted too strong you will feel it in jerkily movements or a vibration.
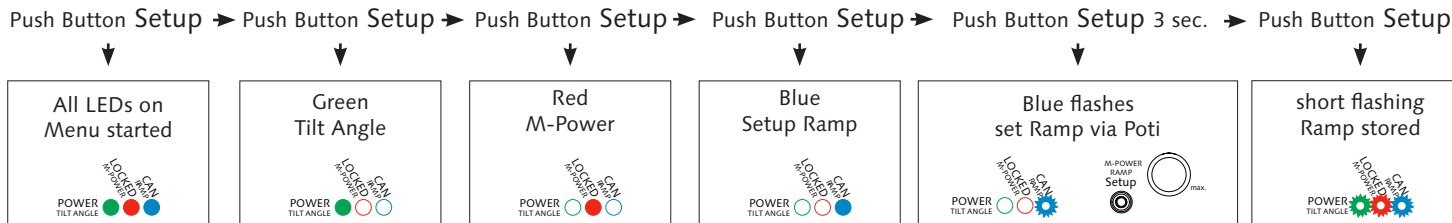If the power is adjusted too weak you will see it in creeping movements to the end point.
The motor power can be adjusted very easily as follows.

Adjustment Knob

Horizon

Setup

max.

Push Button
Setup

SD-Card   USB

Push Button Setup ➤ Push Button Setup ➤ Push Button Setup ➤ Push Button Setup 3 sec. ➤ Push Button Setup

All LEDs on Menu started	Green Tilt Angle	Red Setup M-Power	Red flashes set M-Power via Poti	short flashing M-Power stored

see also https://vimeo.com/betztools
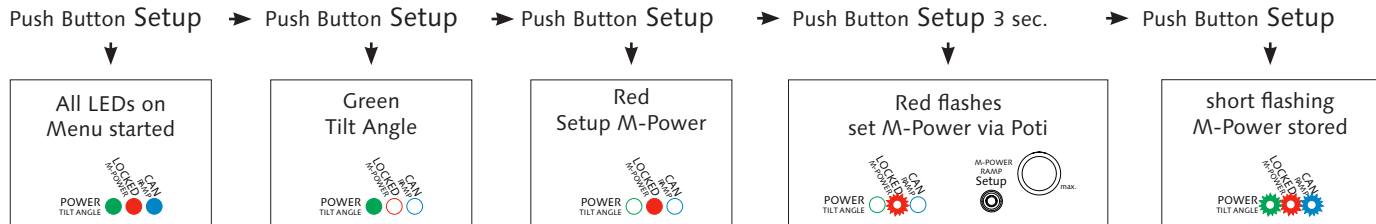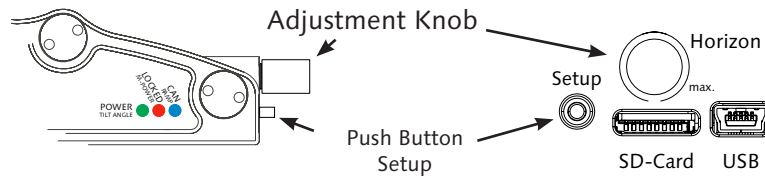
Ramp is the speed when the frozen Horizon switches from the adjusted Tilt Angle back to stabilization.
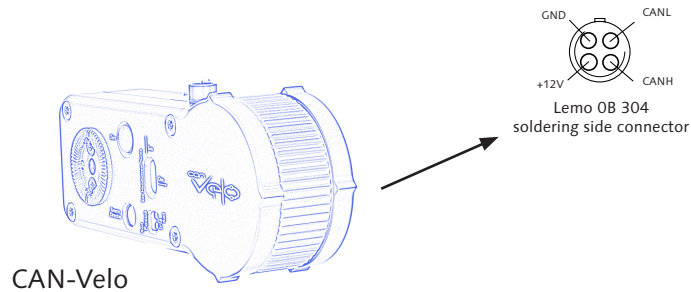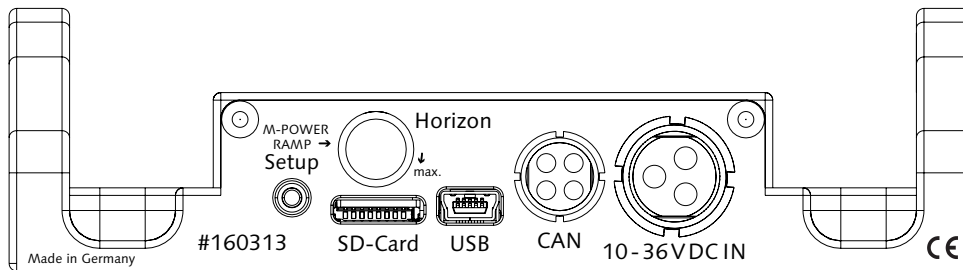Ramp can be adjusted very easily as follows:

Adjustment Knob

Horizon

Setup

max.

Push Button
Setup

SD-Card   USB

POWER
TILT ANGLE

Push Button Setup ➤	Push Button Setup ➤	Push Button Setup ➤	Push Button Setup ➤	Push Button Setup 3 sec. ➤	Push Button Setup
All LEDs on Menu started	Green Tilt Angle	Red M-Power	Blue Setup Ramp	Blue flashes set Ramp via Poti	short flashing Ramp stored

POWER
TILT ANGLE

POWER
TILT ANGLE

POWER
TILT ANGLE

POWER
TILT ANGLE

POWER
TILT ANGLE

M-POWER
RAMP
Setup

max.

POWER
TILT ANGLE

see also https://vimeo.com/betztools

7   CAN BUS   External Control

- If the device CAN-Velo is connected you can control following functions:
- Control the Horizon +- 25° and keep it stabilized in the chosen position.
- Control the Horizon +- 25° and keep it fixed in the chosen position.

M-POWER
RAMP ➔
Horizon
Setup
max.
Made in Germany
#160313   SD-Card   USB   CAN   10 - 36 V DC IN
CE

GND   CANL
+12V   CANH
Lemo 0B 304
soldering side connector

CAN-Velo

8   Zero-Recalibrating

**BEFORE STARTING PLEASE BE AWARE NEGLECTING ONE OF THE FOLLOWING POINTS
CAN ERASE THE FIRMWARE AND WAVE HAS TO BE SEND BACK TO THE FACTORY.**
- NEVER UNPLUG OR SWITCH OFF THE POWER SUPPLY WHILST DOING ZERO ADJUSTMENT
  (WHICH YOU ALWAYS HAVE TO DO AFTER SOFTWARE UPGRADE)!
- CHECK LOCK PIN OF PROPER WORKING (RED LED MUST BE ON WHEN LOCKED)!

Zero-Recalibrating:
If in any case you cannot bring the horizon in a leveled position whilst the Wave itself is on a leveled
surface, means the level is not anymore adjustable in its range with the "fine adjustment horizon knop".

Preperation for recalibrating the "zero position":
It is very Important that the power supply is designed for 3 Amp. at 14 Volt.
It is very Important that the Wave is placed on a solid and horizon oriented level surface.
The Quicklockplate has to be placed in mechanical "zero position" (see spirit level 2)
The Lock Pin must not be locked. Power supply is switched off.

- Push "Set up" Button and hold, switch on power.
- Release "Set up" Button when Green and Blue LED is permanent on.
- The electronical "Zero Position" will now be adjusted.
- When Red LED flashes fast, engage Lock Pin, Red LED must be permanent on.
- Wave determines now the mechanical "Zero Position" and stores it into the flash-memory.
- Wait until Green LED flashes slow and the Red LED is permanent on.
- Setup is now finished. Switch off power supply and restart the Wave.

see also https://vimeo.com/betztools

9   Software-Update

**BEFORE STARTING PLEASE BE AWARE NEGLECTING ONE OF THE FOLLOWING POINTS
CAN ERASE THE FIRMWARE AND WAVE HAS TO BE SEND BACK TO THE FACTORY.**
- NEVER UNPLUG OR SWITCH OFF THE POWER SUPPLY WHILST LOADING THE SOFTWARE FROM SD-CARD!
- THE SD-CARD MUST BE COMPLETELY EMPTY ONLY THE fw_wave.hex FILE SHOULD BE SHOWN.

Updating via "micro" SD-Card
- Upload the software (hexfile) which you got via e-mail from us onto your SD-Card
- The card mustn't be a higher storage than 32GB ! More GB doesn't work.
- Be aware that only this file f**w_wave.hex** is on your card.
- Power supply should be designed for 3 Amp. at 14 Volt.
- Lock Pin must not be locked. Power supply is switched off.

- Slide the SD-Card into the slot (right side control panel see 3).
- Connect Wave onto power.
- Green and Blue LED must be on. Software will be uploaded. (If not see trouble shooting 10)
- Blue LED off Green LED on software is uploaded disconnect SD-Card from slot.
- Finish now by switch off power.

A Zero-Recalibrating has to be done by following the points see 8

see also https://vimeo.com/betztools

10   **Trouble Shooting**

Green-Red-Blue LED permanent on when powering up Wave.
- Software in flash not found - Upload software again via micro SD-Card - make Zero Recalibration.

Green LED flashes / Red Locked LED flashes 1 or 2 times.
- Switch off Wave - Upload software again via micro SD-Card - make Zero Recalibration.
- If the error remains please contact the manufacturer.

Red LED not on when Lock Pin is mechanical locked.
- Problem of electrical contact pin - Push Lock Pin more in.
- Small pin on Lock Pin damaged - Send-in for service.

Software-Update Green and Blue LED on but Red LED is flashing constantly.
- Software on SD-Card not found - check on card for a proper file writing fw_wave.hex
- Erase all other software on this SD-Card.

Zero Calibrating flashing Red LED keeps flashing.
- Electrical contact missing - Always check Lock Pin for electrical contact befor starting to calibrate.
- Without electrical contact no calibrating - send-in for service.

Warning!
Disassembling the Wave will result that the unit has to be returned to the manufacturer for an electronical and mechanical reset.

The Wave is a maintenance-free sturdy electromechanical device. To guarantee a proper function you have to comply the following points:
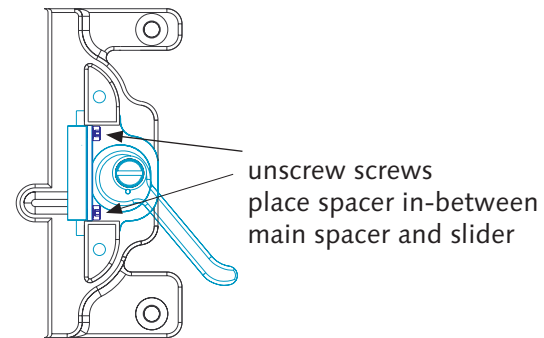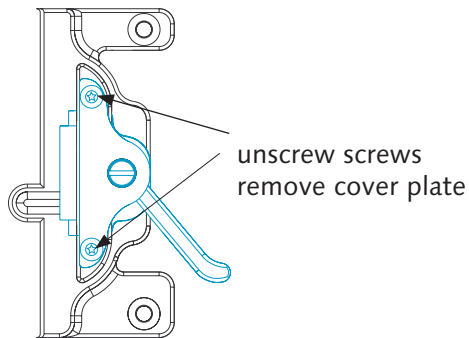- Keep the eight roller guidance and the roller track clean!
- If the camera rocker hooks or the roller guidance gets loose please ask how to service and to adjust.

Isn't that easy?

Quicklockplate:
The locking mechanism should be treated/cleaned occasionally with a resin-free oil (e.g. gun oil).

Placing a spacer which can be ordered at Betz-Tools (Spacer for Quicklock) in the locking mechanism:

unscrew screws
remove cover plate

unscrew screws
place spacer in-between
main spacer and slider

12 **Technical Datas**

Power source: DC 10 - 18 Volt Wave Version # 1603xx
Power source: DC 10 - 36 Volt Wave Version # 1604xx / 170xxx

Power consumption: 500mA peak 1,8A

Horizon Stabilisation: +25° / -25°

Dovetailplates size: PRO / Steadicam Tiffen / Betz-Tools / MK-V

Weight: 1,45 Kg (3lb)

Overall size: 29 x 13 x 9 cm (11.4" x 5.1" x 3.5")

FCC Compliance:
Wave complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) Wave may not cause harmful interference, and (2) Wave accepts any interference received, including interference that may cause undesired operation.

CE Compliance:

Wave complies with NF EN 50081-1 Emissions / NF EN 50081-1 Immunity. Operation is subject to the following conditions: Wave may not cause harmful interference, and Wave accepts any interference

Any Question?

https://vimeo.com/betztools
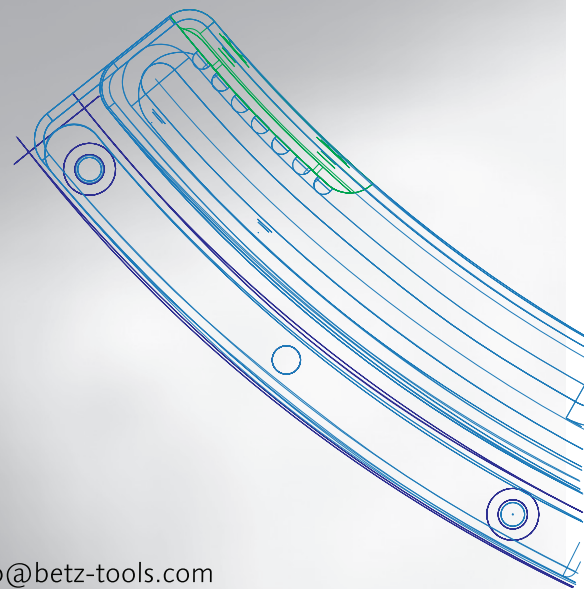
Munich Germany **phone** +49 (0) 89 65 11 32 20 **mail** info@betz-tools.com