

Screen on the front

Computers front access not necessary but back connectors  
reachable

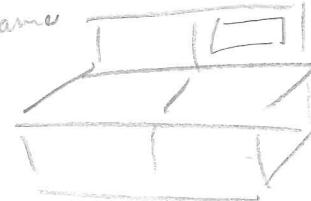
Keyboard shelf sticking out to the front (not Fauthierhan  
computer behind the screen) (Keyboard)

bay new pump with exhaust (maybe scroll pump)

backing pump might go into main frame

install venting valve (accessory  
connection)

get pressure gauge readout  
(maybe borrowed by Natalia)



ePOS piston controller see front easily (controll LED)  
(only one)

spare room for: camera controll computer  
light controller (powersupply)

tool box (make toolbar to be clipped into frame)

ask Braunschweig whether I can come to Bordeaux to see ground  
procedures for one or two days when they fly

ePOS =

Gearbox 203116 - GP42C, 15:1

Planetary gearhead GP42C, 4:3:1

front-back switch dist.: 10,5cm

# Things to buy for the Lab

- ✓ Spirit Level (Wasserwaage) 8.10.2014
- ✓ small plastic boxes (with cover) for screws
- ✓ color tape to mark our tools 9.10.2014
- ✓ vernier calliper (digital) (Messschieber) RS components 30.10.2014
- ✓ adapter flanges: CF 6 to CF  $2\frac{1}{8} \frac{3}{4}$  ←  
CF  $2\frac{1}{8} \frac{3}{4}$  to KF16 (0,75) 12.11.2014
- ✓ KF16 gaskets, blind & clamp 4.12.2014

✓ KF16 gaskets, blind & clamp

✓ CF 6 & CF  $2\frac{1}{8} \frac{3}{4}$  gaskets CF 16  
 "CF100" "CF40" CF  $2\frac{1}{8}$  is not standard → ask

✓ plastic box for screws:

↳ RS components: £ 12,56

Raaco M cell Grey PC,

PP Compartment Box,

55 mm x 241 mm x 225 mm

companies for quote

✓ P blank CF100

→ offcenter!!

22.01.2015

20.01.2015

CF 6 to CF  $2\frac{1}{8} \frac{3}{4}$   $\times$  mhsinst.com

18.11.2014

Vent-line connection hose with  $\frac{1}{2}$ " NPT connector

Membrane pump?

KF25 gaskets, blind & clamp

Bosch parts: 3 842 543 403 45x45 joint 4 x

3 842 523 57 45/90 bracket 10 x

3 842 242 113 <sup>10 pieces</sup> sliding block 3 x = 30

3 842 523 558 45/45 bracket 14 x

3 842 146 882 <sup>10 pieces</sup> M8x25 t-bolt 5 x = 50

3 842 523 583 45/180 bracket 8 x

3 842 500 924 <sup>10 pieces</sup> bolt connector 1 x = 10

profiles: 2 diagonals, 4 horizontals (chamber legs)  
 ↗ 452,6 <sup>no end</sup> finishing ↗ 500 mm with end finishing

3 842 990 520

3 842 990 648

✓ CF100 ✓ CF40

CF100

Hex-head flange screws: M4x20 : 30, M6x35: 20, M8x50 : 20 20.01.2015

Allan screw M8 screws (countersink): 30 + Plate nuts for all of them

Bosch parts: Central Industrial Automation (CIA)

Unit 4, Singer Court, Kempston,  
Bedford MK42 7AW

Tel: 01234 85 33 96

Fax: 01234 85 33 76

Email: [dbicknell@ciauto.co.uk](mailto:dbicknell@ciauto.co.uk)  
(Dave Bicknell)

Tools: RS components

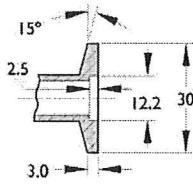
Screws: Jzfast

CF- Flange dimensions:

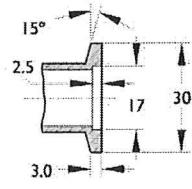
Nennweite	DN16	DN40	DN63	DN100	DN160	DN200
Außendurchmesser	34,0	69,9	113,5	152,0	202,4	253,2
Typische Rohrgröße	18x1	40x1,5	70x2	108x2	159x2	205x2,5
Flanschdicke	7,75	12,7	17,5	19,8	22,2	24,5
Schrauben	6xM4	6xM6	8xM8	16xM8	20xM8	24xM8
Lochkreisdurchmesser	27,0	58,7	92,1	130,3	181,0	231,8

KF- Flange dimensions:

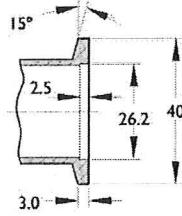
Dimensions with ISO industry cross-references



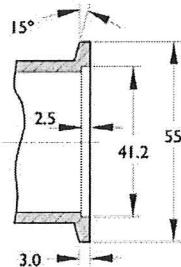
DN10KF



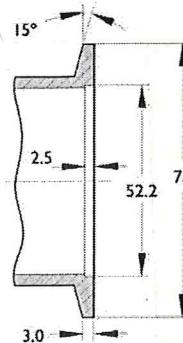
DN16KF



DN25KF



DN40KF

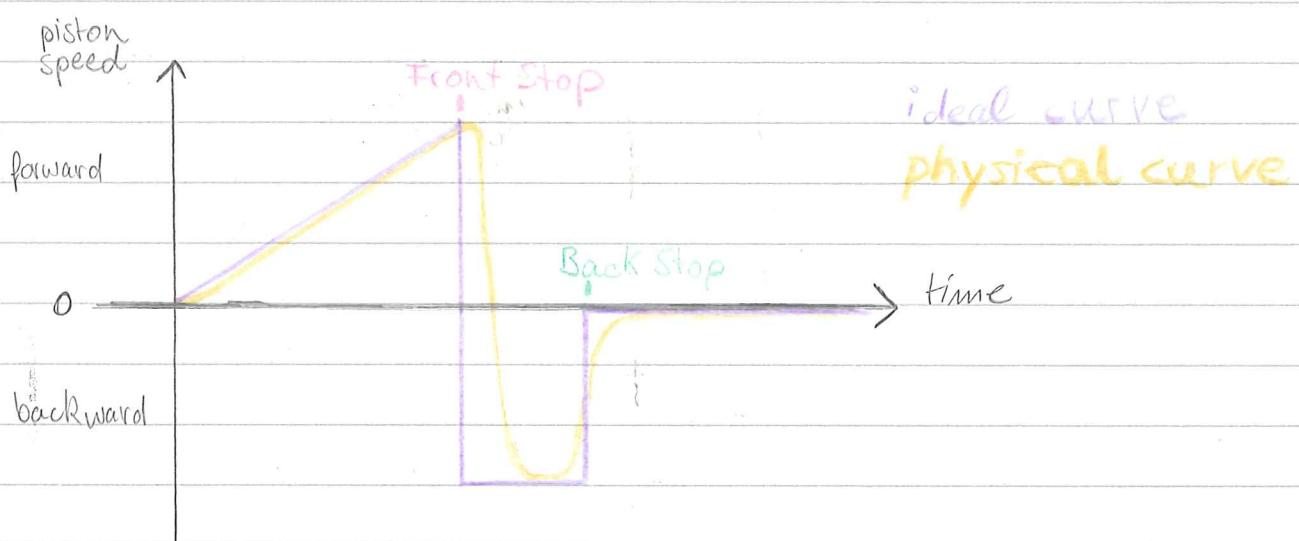
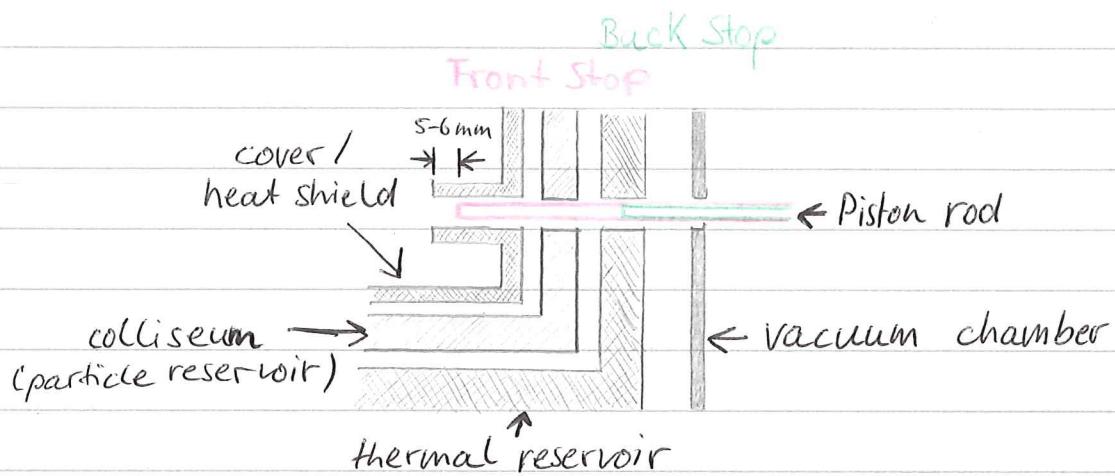


DN50KF

# Lab Information

## Assembling and Adjusting Pistons:

8.10.2014



Ideally the pistons would accelerate linearly, hard stop retract at full speed and hard stop again.

As they do not, the front stop is set to 5-6 mm before the exit of guiding tubes, so that particles can exit the tubes without touching the piston even if it does not stop at the exactly right position.

The back stop has to be in the middle of the hole in the thermal reservoir, to have safety to both sides.

If the piston would stop inside the colliseum, it would block rotation. If it would stop outside the thermal reservoir, it would heat up (radiational heating).

To take out (put back in) the piston drivers and pistons, first remove (unscrew) the rods from the driving unit. Then take out the driving unit and then take out the rod from its guiding in the chamber. (Put back the other way around).

For slipping the experiment to the parabolic flights, the piston rods have to be removed, to prevent damage.

### Levelling the Setup:

For parabolic flight missions, the setup will be fixed to the aircraft floor by bolts going through the Bosch rods in the bottom of the frame.

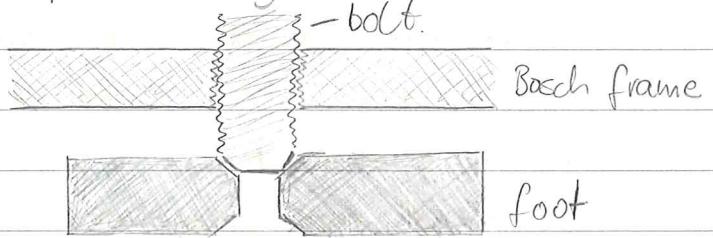
For preflight adjustments at Novespace site, the setup will be levelled by levelling threaded feet, that will go into the same holes like the fixing bolts for the aircraft.

? Question: Can we use the same bolts and have removable feet, instead of screwing in and out the bolts all the time?

→ check Novespace documents

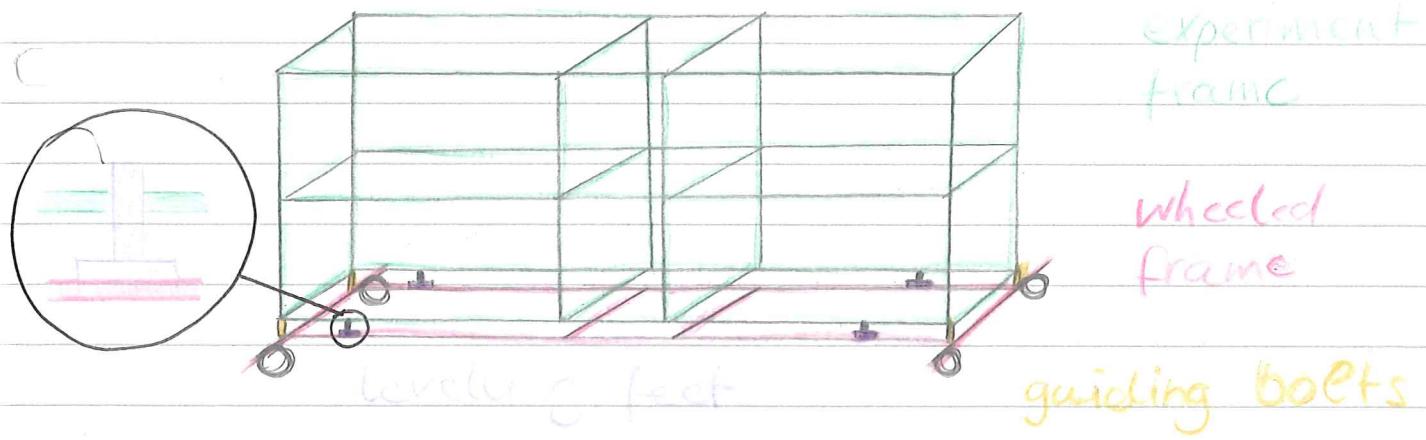
→ NO!!! for fixing the frame

to the aircraft, the bolt has to



slide through the frame. Two threads on top of each other will get stuck!!!

When the experiment is in the lab, it will be sitting on a wheeled wireframe, the levelling feet on top the wheeled frame, so that it can be levelled after each relocation easily.



On each corner of the wheeled frame will be a guiding bolt, to keep the setup from slipping to the side.

These bolts will go into the boxes with holes, that fix the ends of the frame (corners).

Probably the setup will need  $\approx 8$  wheels and feet.

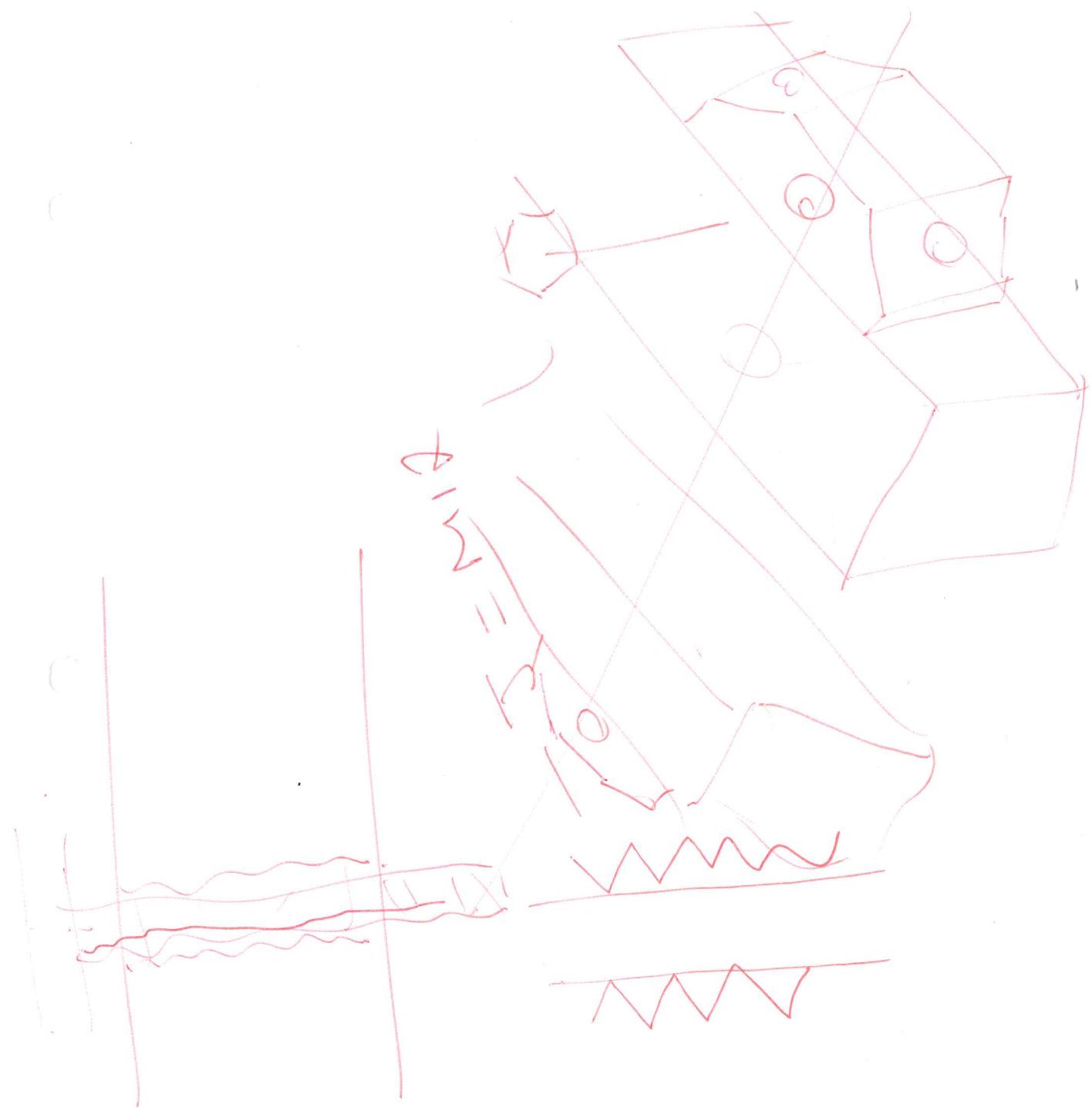
- To Do:
- Get the specifications for the positions of the fixing bolts (preferably before Tuesday afternoon).
  - Meet Chris Tuesday afternoon to discuss the next steps.
  - Have all Bosch rods sorted by that time  
(if available)

### Electronics Rack:

The electronics rack will probably be fixed to the experiment frame to form an L-shape.

It will be removed for transport, so we need to have quick and easy connections (mechanical and electrical).

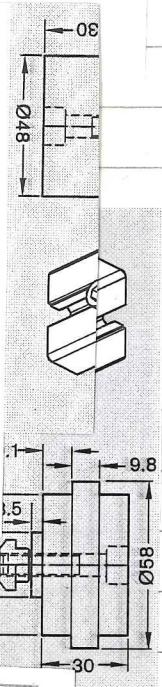
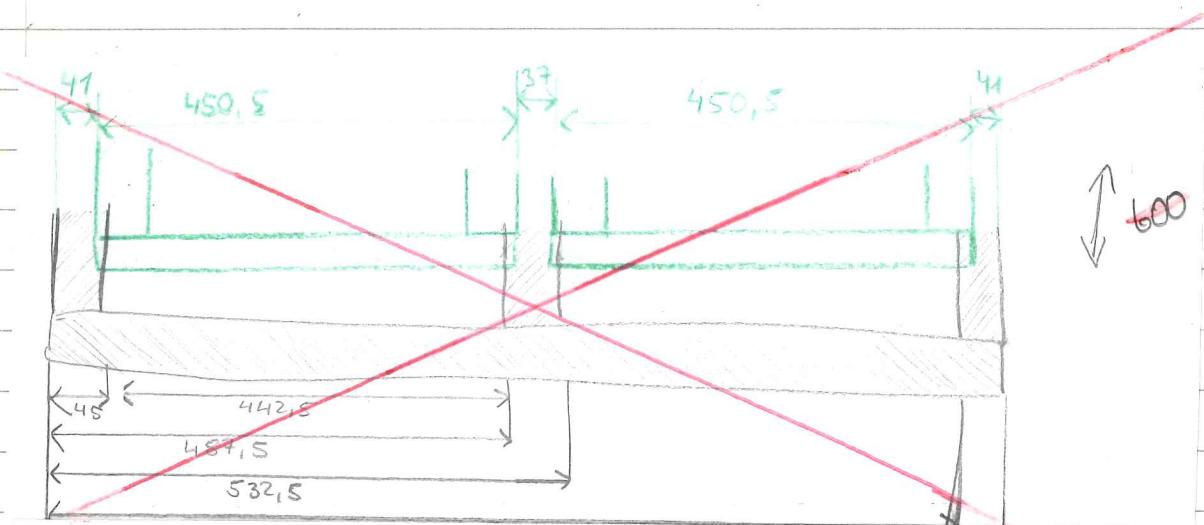
Chris Hall  
14. 10. 2014



# Lab Info

continue with construction of Support Rail:

## Keyboard Drawer Shelf:



Description	Lot Size	Part Number
Support roller with side shoulder	1	3 842 218 941
Support roller with center shoulder	1	3 842 218 940
Support roller without shoulder		

## Roller positions:

Rollers can't be in

$$600 - 2 \cdot 140 \rightarrow 320$$

$$320 - 2 \cdot \text{roller-radius}$$



$$dth = 443 \text{ mm}$$

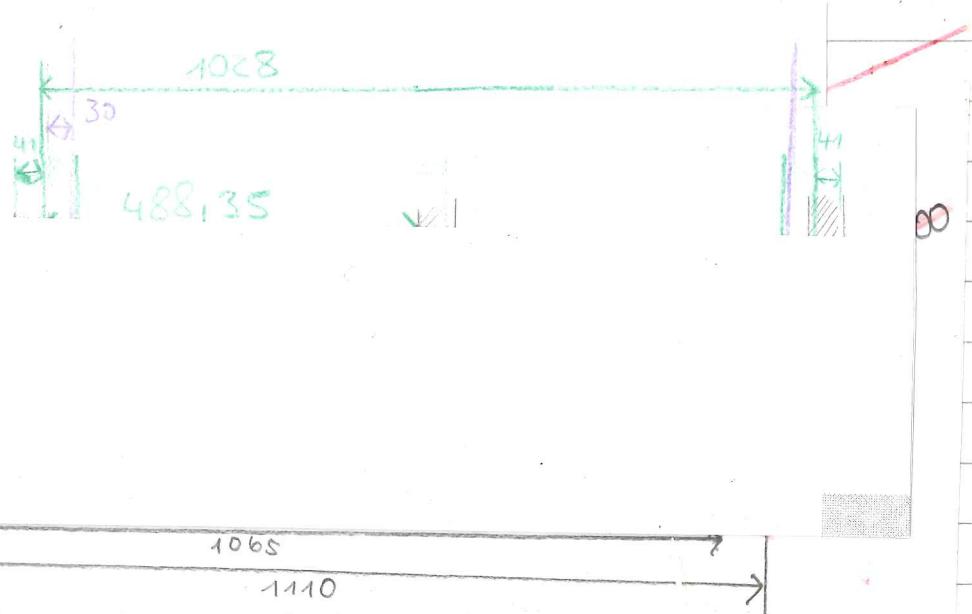
m

8

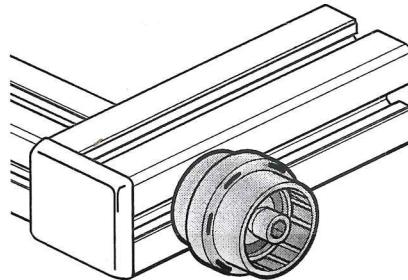
# Lab Info

continue with construction of Support Rail:

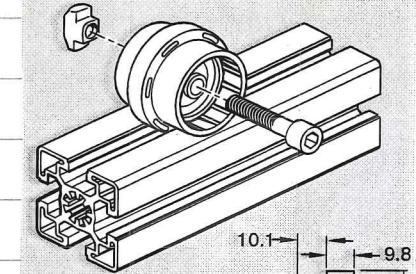
## Keyboard Drawer Shelf:



### Support Rollers <sup>10</sup>



Center Shoulder



Description	Lot Size	Part Number
Support roller with side shoulder	1	3 842 218 941
Support roller with center shoulder	1	3 842 218 940
Support roller without shoulder	1	3 842 218 942

Roller positions: Keyboard depth = 140 mm, width = 443 mm

Rollers can't be in the front and back 140 mm.

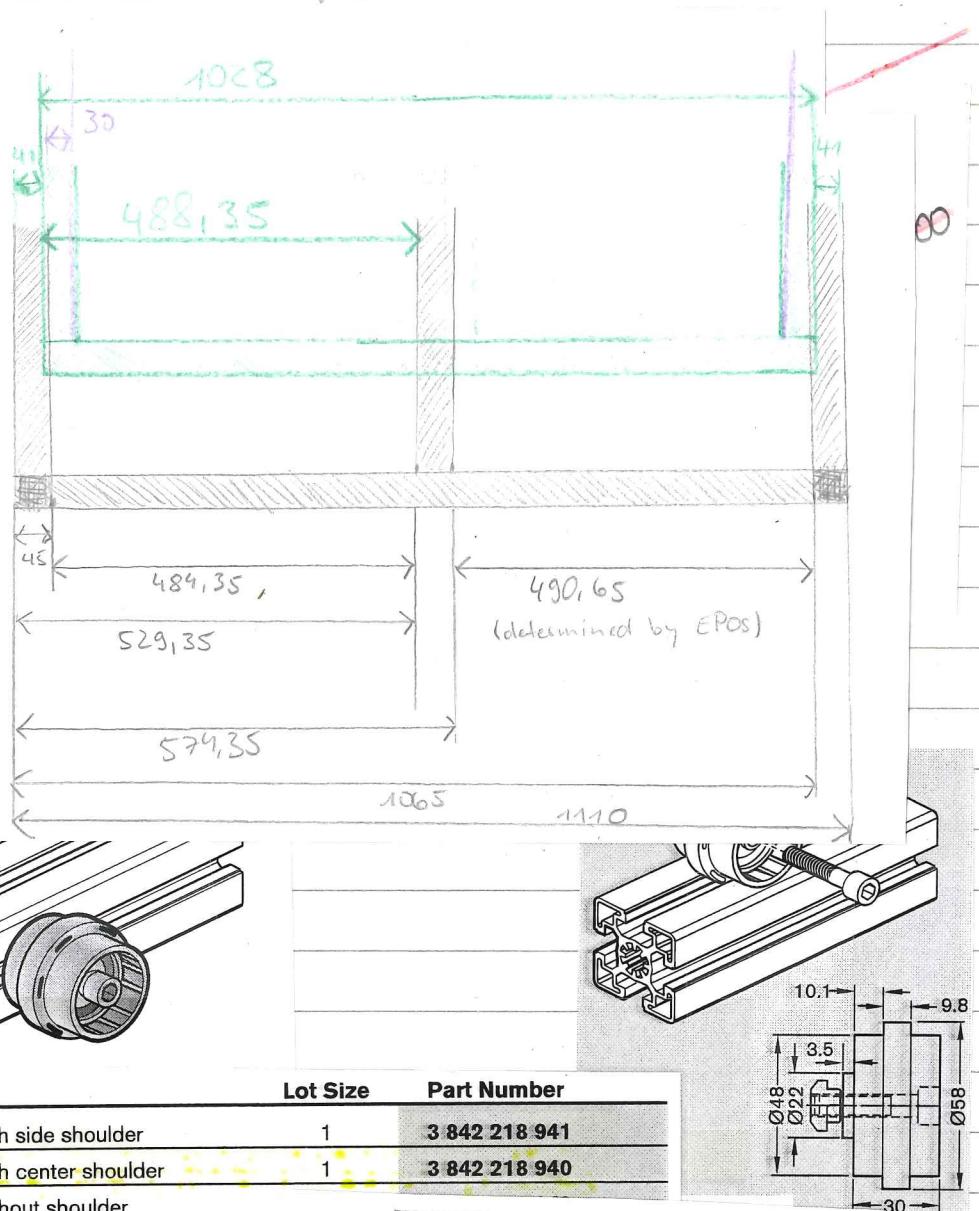
$$600 - 2 \cdot 140 \rightarrow 320 \text{ mm} \quad \text{Roller width} = 58 \text{ mm}$$

$$320 - 2 \cdot \text{roller-radius} \rightarrow 262 \text{ mm} \rightarrow \text{use } 260 \text{ mm}$$

# Lab Info

continue with construction of Support Rail:

Keyboard Drawer Shelf:

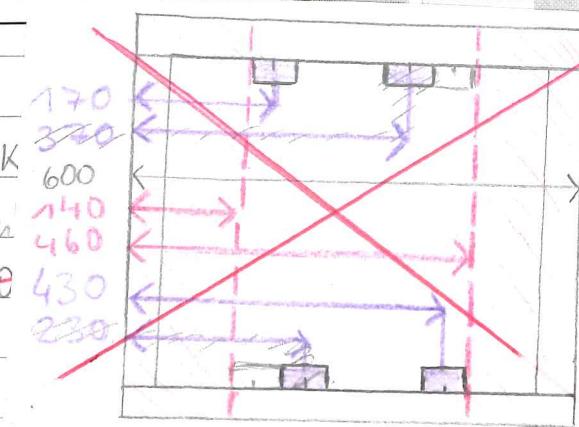


Roller positions: K

Rollers can't be in

$$600 - 2 \cdot 140 \rightarrow 320$$

$$320 - 2 \cdot \text{roller-radius}$$



21.08.2015

## Toolbox:

cut out for corner  
cubes: 5x5

all x-values + 6  
(except side plate)  
→ purple

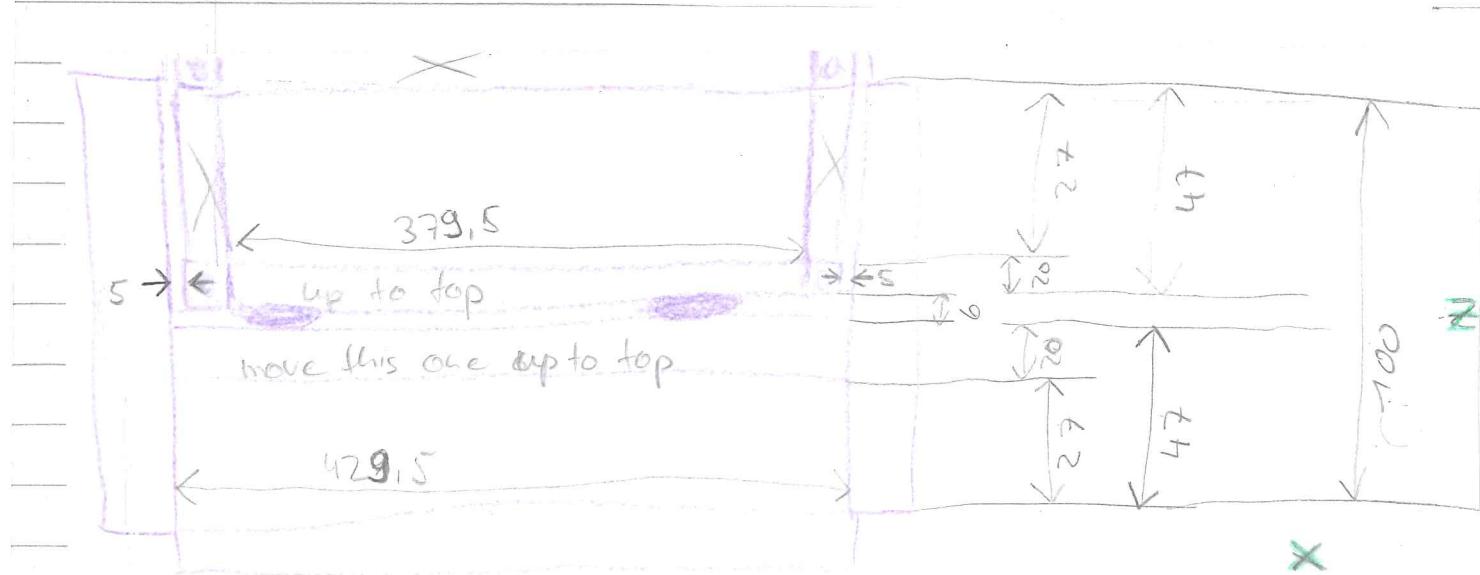
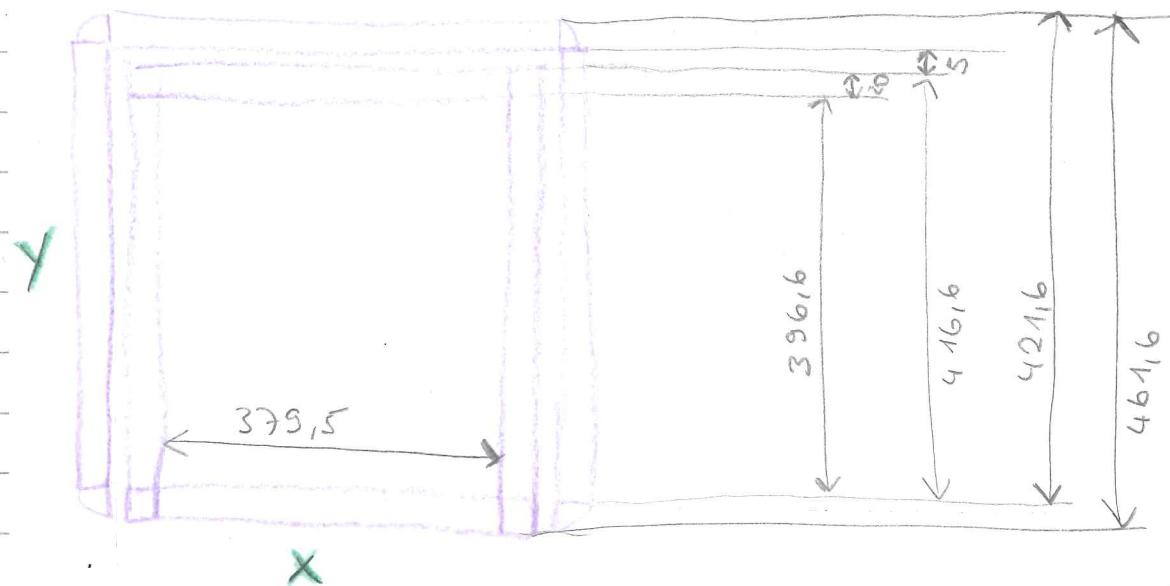
Bottom plate:  $x: 429,5 + 7,7 = 437,2$   
 $y: 421,6 + 7,7 = 429,3$   
 $z: 2$

Top plate:  $x: 379,5 + 7,7 = 387,2$   
 $y: 396,6 + 7,7 = 404,3$   
 $z: 2$

Sideplate:  $x: 2$   
 $y: 421,6 + 7,7 = 429,3$   
 $z: 100 + 7,7 = 107,7$

Front plate:  $x: 429,5 + 7,7 = 437,2$   
 $y: 2$   
 $z: 100 + 7,7 = 107,7$

Backplates:  $x_{bottom}: 429,5 + 7,7 = 437,2$   
 $x_{top}: 379,5 + 7,7 = 387,2$   
 $y: 2$   
 $z: 27 + 7,7 = 34,7$



21.08.2015

## Toolbox:

cut out for corner  
cubes: 5x5

all x-values + 6  
(except side plate)  
→ purple

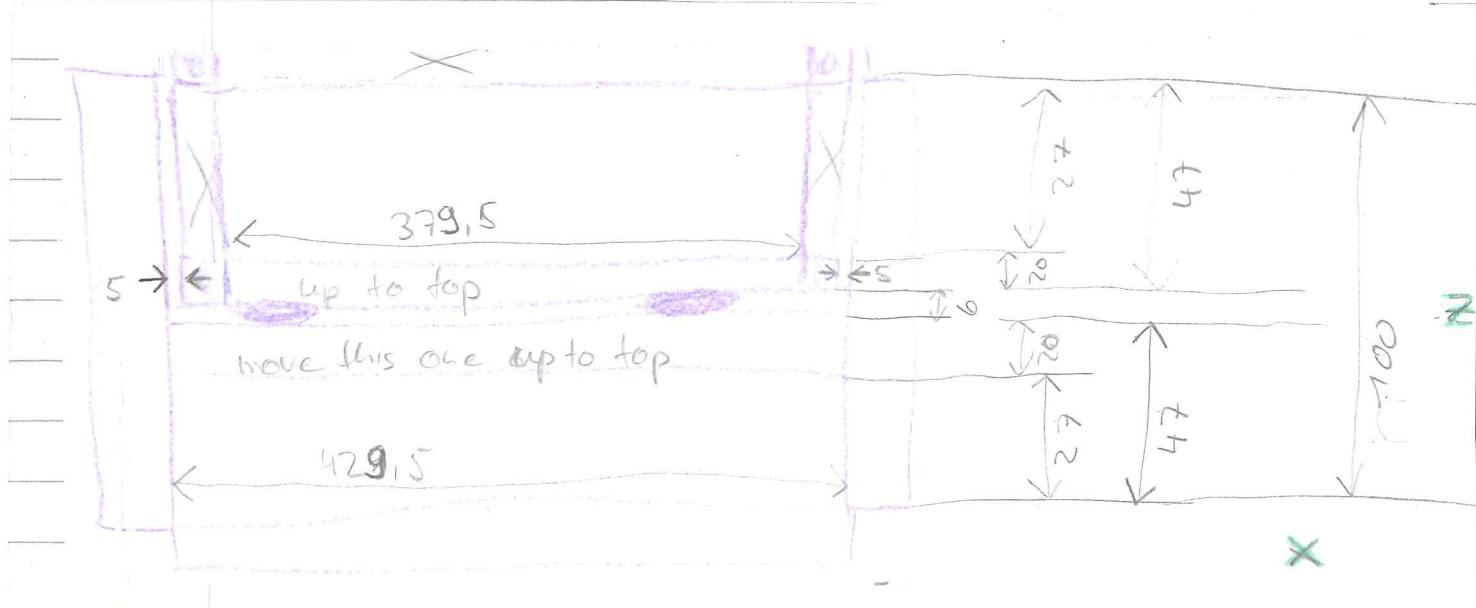
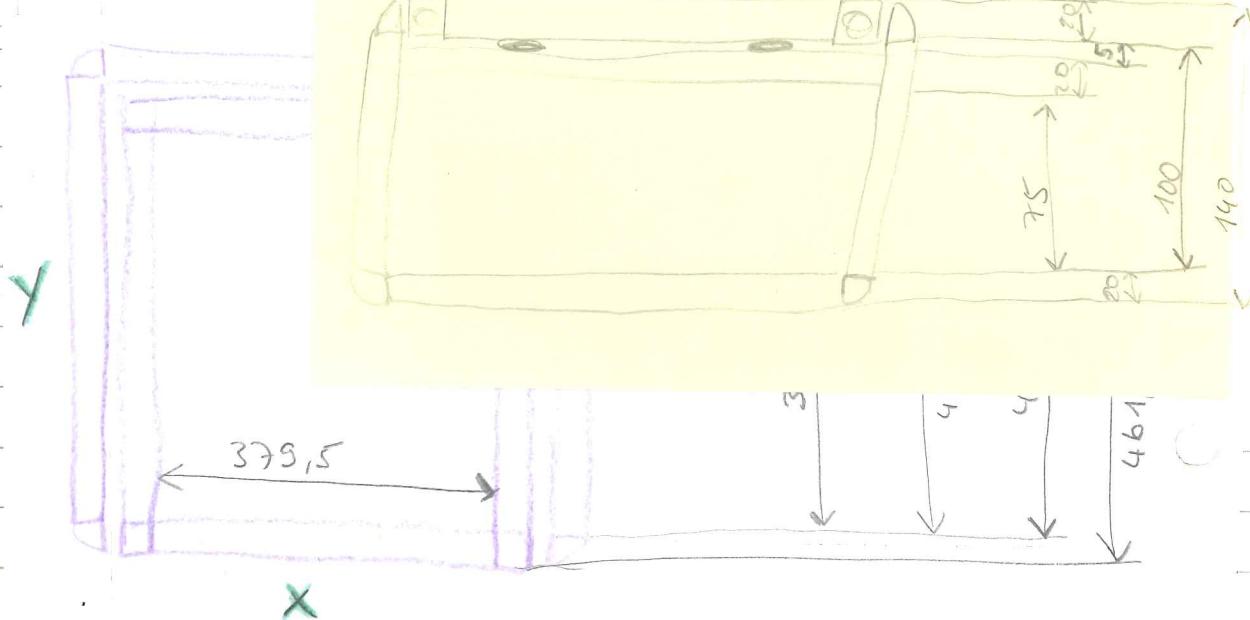
Bottom plate:  $x: 429,5 + 7,7 = 437,2$   
 $y: 421,6 + 7,7 = 429,3$   
 $z: 2$

Top plate:  $x: 379,5 + 7,7 = 387,2$   
 $y: 396,6 + 7,7 = 404,3$   
 $z: 2$

Sideplate:  $x: 2$   
 $y: 421,6 + 7,7 = 429,3$   
 $z: 100 + 7,7 = 107,7$

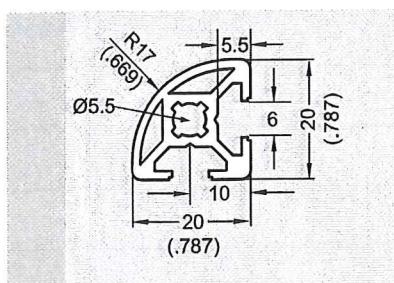
Front plate:  $x: 429,5 + 7,7 = 437,2$   
 $y: 2$   
 $z: 100 + 7,7 = 107,7$

Backplate:  $x: 431,5 + 7,7 = 439,2$   
 $y: 2$   
 $z: 75 + 7,7 = 82,7$



## 20-Series Profiles

**20x20R** 



### Features:

- Ideal for light-duty construction
- Radius corner adds neat, finished appearance
- Has two adjacent 6mm T-slots

### Non-Machined End Finish Options

### Part Number

Profile 20x20R, pkg. of 20, 3000mm long

**3 842 517 183**

Profile 20x20R, single, 3000mm long

**3 842 517 177**

### Machined Options

Profile 20x20R, —/—, specify length  $\geq 30\text{mm} \leq 3000\text{mm}$

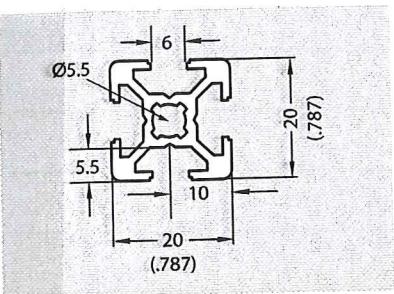
### End Finish

### Part Number

**3 842 992 890/\_mm**

Please contact your distributor for other machining options.

**20x20** 



### Features:

- Ideal for light-duty construction
- Has four 6mm T-slots

### Non-Machined End Finish Options

### Part Number

Profile 20x20, pkg. of 20, 3000mm long

**3 842 517 179 Goto**

Profile 20x20, single, 3000mm long

**3 842 517 173 Goto**

### Machined Options

Profile 20x20, —/—, specify length  $\geq 30\text{mm} \leq 3000\text{mm}$

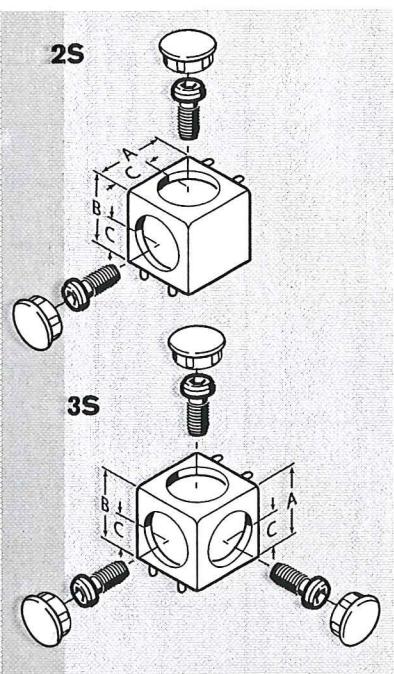
### End Finish

### Part Number

**3 842 992 888/\_mm**

Please contact your distributor for other machining options.

**Corner Cube Kits** 

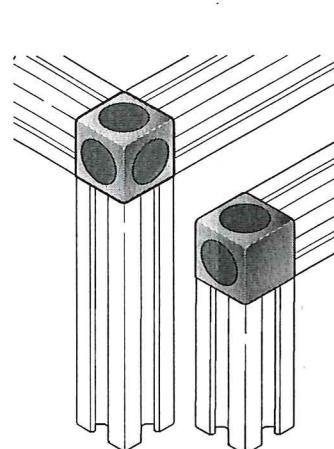


### Features:

- Use 2S version to connect two profiles, or 3S version to connect three profiles
- Includes self-tapping screws and cover caps to provide neat, finished appearance

### Material:

- Corner cube: die-cast aluminum
- Cover caps: black polyamide
- Screws: steel

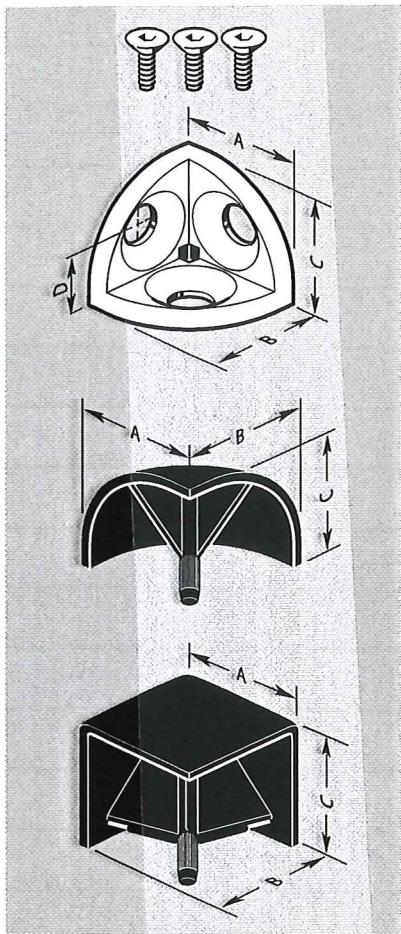


Description	Lot Size	Part Number
20mm corner cube kit 2S	  1	<b>3 842 524 484</b>
20mm corner cube kit 3S	   1	<b>3 842 524 478</b>
30mm corner cube kit 2S	  1	<b>3 842 524 485</b>
30mm corner cube kit 3S	   1	<b>3 842 524 479</b>
40mm corner cube kit 2S	  1	<b>3 842 529 395</b>
40mm corner cube kit 3S	   1	<b>3 842 529 397</b>
45mm corner cube kit 2S	  1	<b>3 842 524 486</b>
45mm corner cube kit 3S	   1	<b>3 842 524 480</b>
50mm corner cube kit 2S	  1	<b>3 842 529 399</b>
50mm corner cube kit 3S	   1	<b>3 842 529 401</b>

Cube Size	Dimension in mm			Screw Size
	A	B	C	
<b>20mm</b>	20	20	10	S6x16
<b>30mm</b>	30	30	15	S8x25
<b>40mm</b>	40	40	20	S12x30
<b>45mm</b>	45	45	22.5	S12x30
<b>50mm</b>	50	50	25	S12x30

# Other 90° Right-Angle Connectors

## Corner Brackets

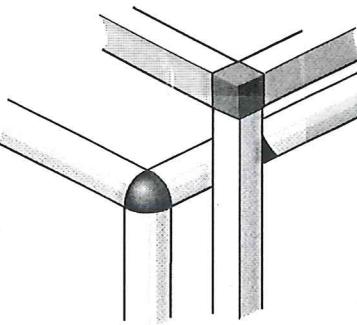


### Features:

- One bracket connects two or three profiles
- Compatible with square or radius profiles
- Provides neat, finished appearance

### Material:

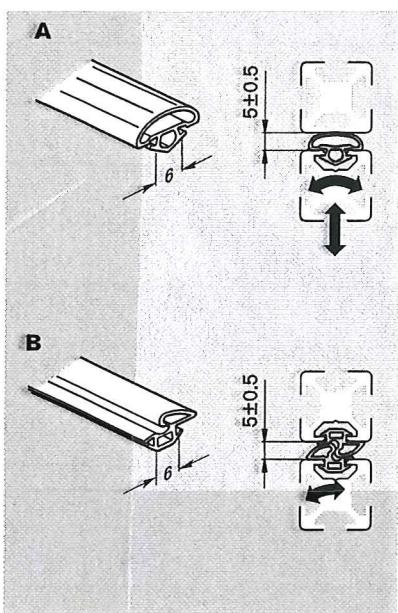
- Bracket: die-cast zinc
- Cover caps: black polyamide 6
- Screws: zinc-plated steel



Description	Lot Size	Part Number
20mm corner bracket with fasteners  1	1	3 842 519 318
20mm radius cover cap	1	3 842 517 146
20mm square cover cap	1	3 842 517 147
30mm corner bracket with fasteners  1	1	3 842 519 319
30mm radius cover cap	1	3 842 517 281
30mm square cover cap	1	3 842 517 282
40mm corner bracket with fasteners  1	1	3 842 529 404
40mm radius cover cap	1	3 842 529 016
40mm square cover cap	1	3 842 529 018
45mm corner bracket with fasteners  1	1	3 842 519 321
45mm radius cover cap	1	3 842 517 290
45mm square cover cap	1	3 842 517 291
Replacement screw for 20mm bracket  DIN 7516 S6x16 flat-head screw	1	3 842 517 132
Replacement screw for 30mm bracket: S8x25 flat-head screw	1	3 842 517 543
Replacement screw for 40mm, 45mm, or 50mm bracket: S12x30 flat-head screw	1	3 842 517 613

Bracket/ Cap Size	Dimension in mm				Screw Size
	A	B	C	D	
20mm	20	20	20	10	S6x16
30mm	30	30	30	15	S8x25
40mm	40	40	40	20	S12x30
45mm	45	45	45	22.5	S12x30
50mm	50	50	50	25	S12x30

## 6mm Door Seals

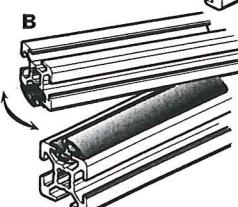
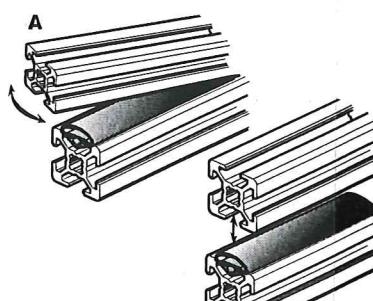


### Features:

- Fit into any profile with a 6mm T-slot
- Prevent unwanted materials and particulate from entering or escaping
- Style A can be used for swinging or sliding doors
- Style B is designed for use on swinging doors to create a positive door stop
- Resistant to acid, caustic solutions, alcohol, mineral oil, and benzene
- Length: 10,000mm

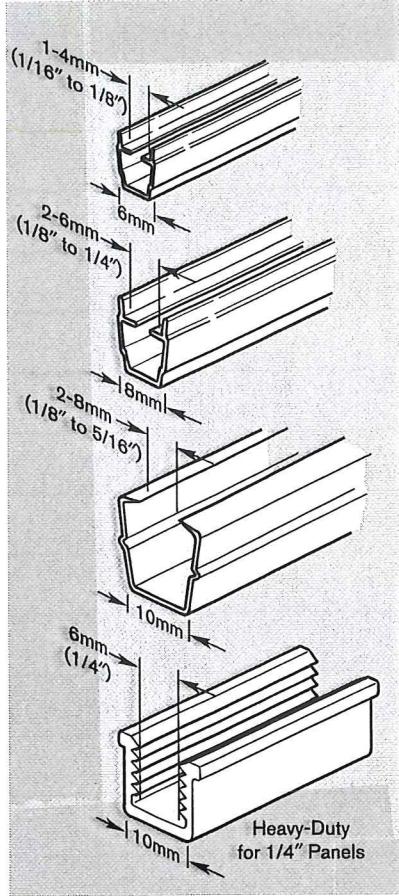
### Material:

- Light gray thermoplastic elastomer



Description	Lot Size	Part Number
A Style A 6mm door seal, 10,000mm long  1	1	3 842 524 623
B Style B 6mm door seal, 10,000mm long  1	1	3 842 524 622

## Panel Support Inserts

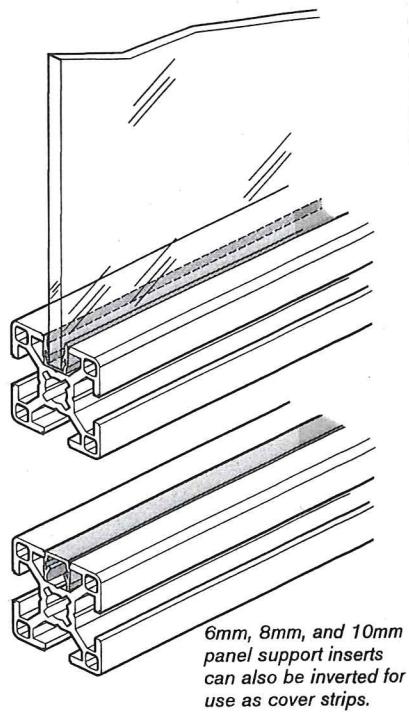


### Features:

- Securely fasten panels from 2mm to 8mm thick in profiles with 6mm, 8mm, or 10mm T-slots
- Sturdy design prevents panels from shifting within the T-slot
- Easy snap-in installation
- Can be inverted for use as a black T-slot cover strip
- When using heavy 1/4" panels in a 10mm T-slot, the heavy-duty panel support is recommended

### Material:

- Black polypropylene



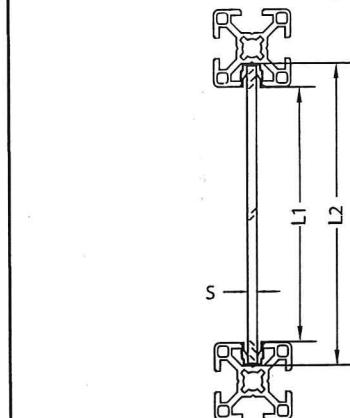
### Description

### Lot Size

### Part Number

6mm panel support insert, 2000mm long	1	3 842 518 343 
8mm panel support insert, 2000mm long	1	3 842 518 347 
10mm panel support insert, 2000mm long	1	3 842 518 351 
Heavy-duty 10mm panel support insert, 2000mm long	1	3 842 146 906

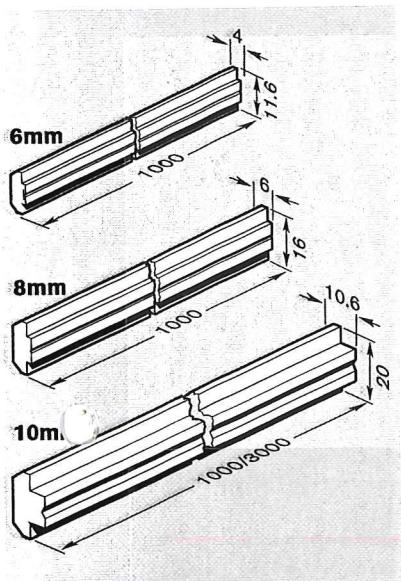
### Panel Sizing Dimensions



L2 (mm)	S (mm)
 6	L1 + 7.7* 1-4
 8	L1 + 14.4* 2-6
 10	L1 + 21.4* 2-8
 10 Heavy Duty	L1 + 16* 6 (1/4≤)
 10 See Note	L1 + 24.4* 2-8

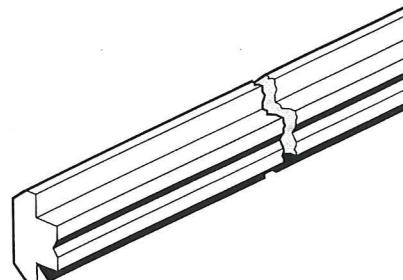
\* Tolerance is +0.0 -0.1  
Note: 45x45 and 45x90 only!

## T-Bars



### Features:

- Slide into ends of T-slot
- Make custom-sized T-slot fasteners and connectors for your application
- Provided as raw steel bar stock which may be cut to length, drilled and tapped up to 8mm (5/16")
- Center groove serves as drilling guide
- Large contact area with profile T-slot provides maximum strength



### Material:

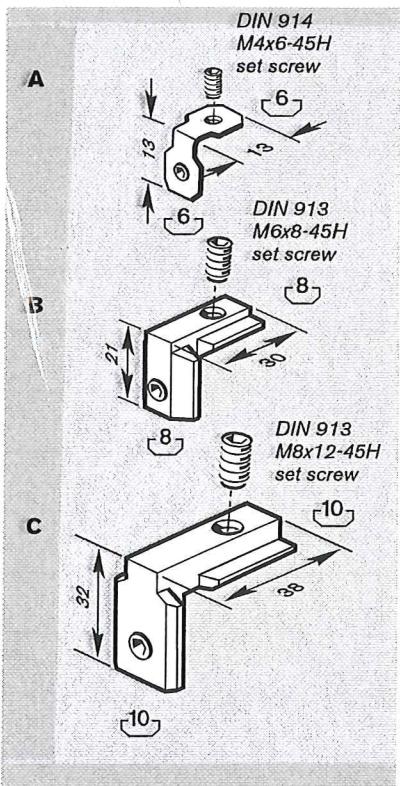
- 12L 14 cold-drawn steel

Description	Lot Size	Part Number
6mm T-bar, 1000mm long	1	3 842 523 438
8mm T-bar, 1000mm long	1	3 842 510 078
10mm T-bar, 1000mm long	1	3 842 528 744

*hot needed*

## **6mm, 8mm, & 10mm Inside-to-Outside Gussets**

A logo consisting of three stylized numbers (6, 8, 10) in a rounded font, followed by an arrow pointing right, and the words "Clean Room" in a bold, sans-serif font.



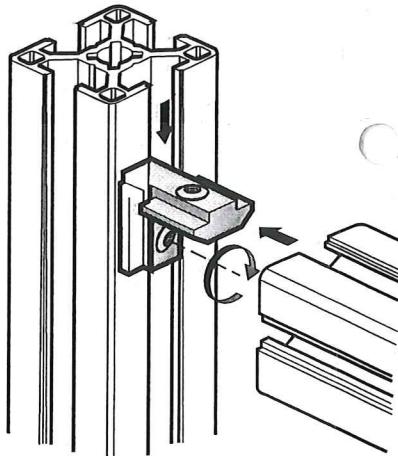
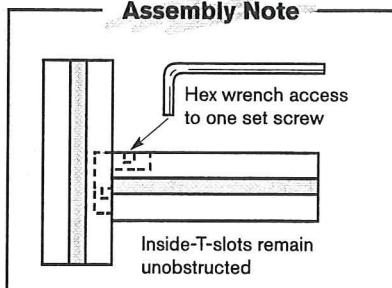
#### **Features:**

- Clean appearance
  - Easy set screw installation
  - Does not obstruct T-slot
  - Includes set screws

### **Material:**

- Die-cast brass

## Assembly Note



Description	Lot Size*	Part Number
A 6mm inside-to-outside gusset and set screws (6→6)	10	3 842 535 574
B 8mm inside-to-outside gusset and set screws (8→8)	10	3 842 535 578
C 10mm inside-to-outside gusset and set screws (10→10)	10	3 842 535 572

*\* For smaller quantities, please contact your local distributor.*

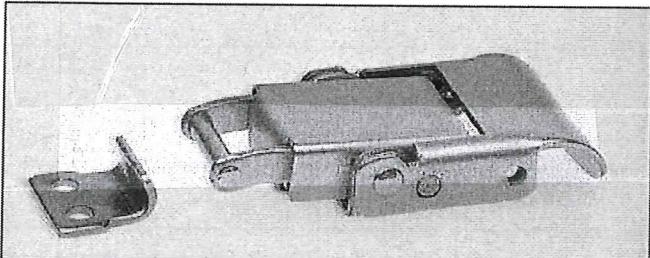
[Home](#) > [Enclosures, Storage & Material Handling](#) > [Cabinet Hardware](#) > [Toggle Latches](#)

**Stainless Steel Toggle Latch,Lockable, Lock not included, Spring Loaded, 30kgf Op. Tension, 57.5 x 28 x 11mm**

£12.755

Price Each (In a Pack of 2)

Qty 2	Qty 10	Qty 20
£12.755	£11.735	£11.225
Qty 80		
£9.695		



## Product Details

### **Locking Pin Toggle Latch**

Two robust latches with fully enclosed spring mechanism which gives wide positioning tolerance.

Assembly rivets and compression springs made from stainless steel 18/8

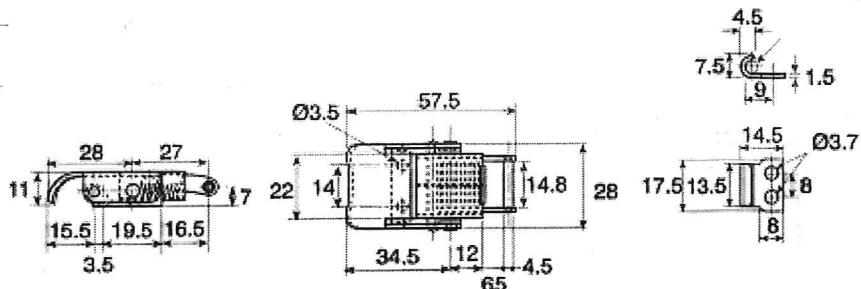
Suitable for screw fixing, using M3.5 screws or welding

Supplied with dimensions template for marking out

Operating tension 30kgf

Latch to catch distance 48mm

Depth	11mm
Dimensions	57.5 x 28 x 11mm
Length	57.5mm
Lockable	Yes, Lock Not Included
Material	Stainless Steel
Operating Tension	30kgf
Spring Loaded	Yes
Width	28mm



## RS Plastic Carrying Handle

RS Stock No. 750-187  
Brand RS



**£7.29**

Price Each (In a Pack of 2)

Qty 2	£7.29	Qty 10	£6.705	Qty 20	£6.415
Qty 80	£5.83				

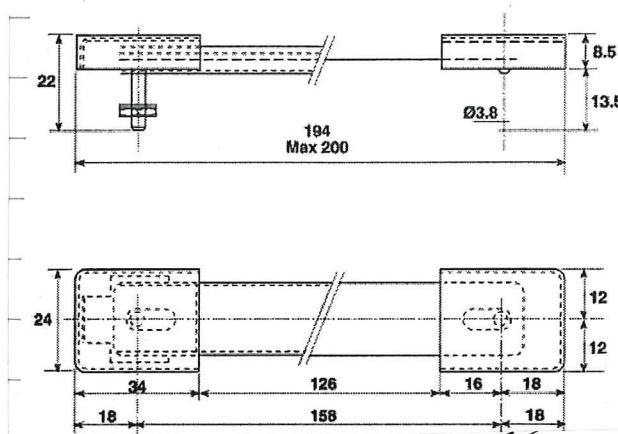


### Product Details

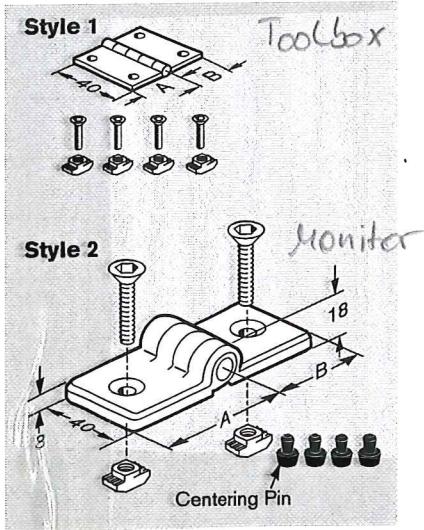
#### Plastic Strap

- Max Load = 25kg
- Captive screws included
- Rear fixing
- Metal, plastic construction

RS, Professionally Approved Products, gives you professional quality parts across all product categories. Our range has been tested by engineers as giving comparable quality to that of the leading brands without paying a premium price.

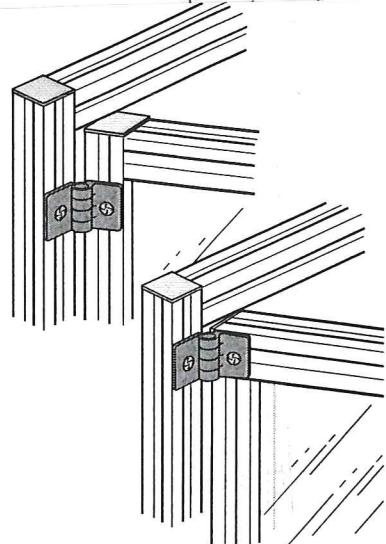


## Heavy-Duty Hinges



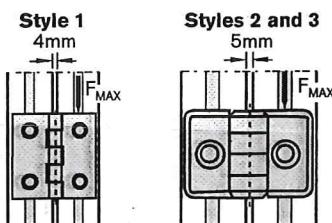
#### Features:

- For swinging and folding doors
- Style 1 20-series hinges are self-centering and are suitable for clean room use.  $F_{MAX} = 300N$
- Style 2 and 3 hinges include centering pins and connect profiles with 8mm and 10mm T-slots, including different sized profiles, such as 30-series to 45-series.  $F_{MAX} = 150 N$
- Style 2 and 3 hinges can be used in both parallel and perpendicular profile connections
- Style 3 hinge uses a slotted hole to allow use in several applications
- Installation hardware included



#### Material:

- Style 1: stainless-steel
- Style 2 and 3: black polyamide 6 with galvanized steel hinge pin



#### Description

#### Lot Size\*

#### Part Number

Profile series 1 to 2	Profile series	Order Hinge	Style	Dimension in mm A   B	Lot Size*	Part Number
20	20	a	1	20   20	2	3 842 535 684
30	30	b	2	30   30	2	3 842 535 687
30	40	c	2	30   39	2	3 842 535 660
30	45	d	2	30   45	2	3 842 535 688
30	60	e	2	30   60	2	3 842 535 689
40	40	f	3	39   39	2	3 842 535 659†
40	50	g	3	39   39	2	3 842 535 659†
45	45	h	2	45   45	2	3 842 535 745
45	60	i	2	45   60	2	3 842 535 746
50	50	j	3	39   39	2	3 842 535 659†
60	60	k	2	60   60	2	3 842 535 747

## Richco Round Fixed Height Feet, FF-001 24mm, 14mm, TPE,

RS Stock No. 220-901  
Brand Richco  
Mfr. Part No. FF-001



**£17.09**

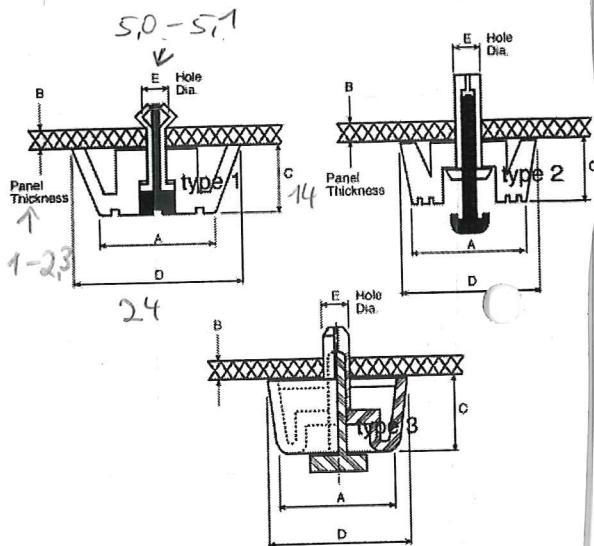
Price 1 Bag of 50

Qty 1  
£17.09

Qty 10  
£16.12

Qty 25  
£15.53

The 3D viewer requires the Java Runtime Environment (JRE) and for Java to be enabled on your system.



### Product Details

#### Fast Fitting Feet FF

Three types of feet with drive-screw or push-rivet fastening:

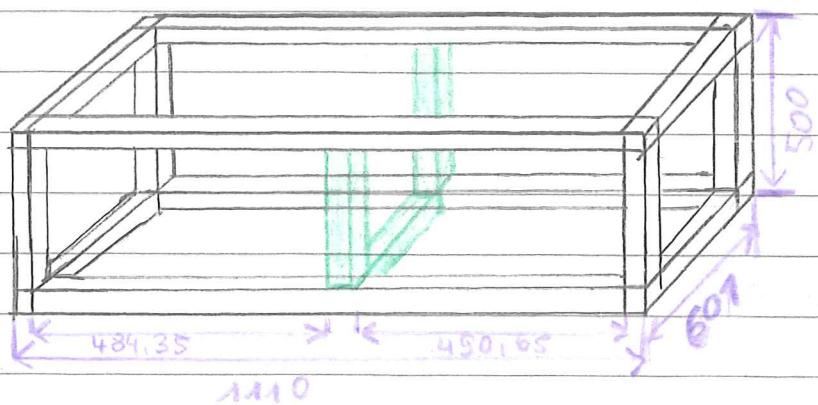
Type 1: Vinyl foot with an acetal drive-screw which is pressed to install and can be released with a screwdriver

Type 2: Vinyl foot with a nylon push-rivet installed by hand and rear releasable (inside case)

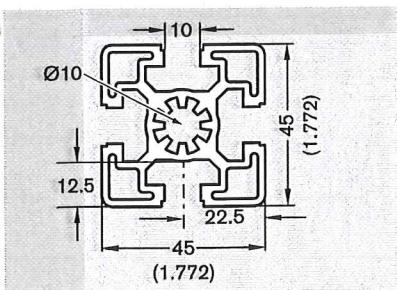
Type 3: Santoprene® skid and vibration resistant foot with a polypropylene push-rivet installed by hand and rear releasable

Santoprene® is a registered trademark of AES

### Main Frame:



## 45x45H 10 Goto



### Features:

- General purpose, thicker-walled profile for strong, rugged performance
- Has four 10mm T-slots

### Non-Machined End Finish Options

Profile 45x45H, pkg. of 20, 6000mm long

### Part Number

3 842 315 100 Goto

Profile 45x45H, single, 6000mm long

3 842 507 125 Goto

### Machined Options

### End Finish

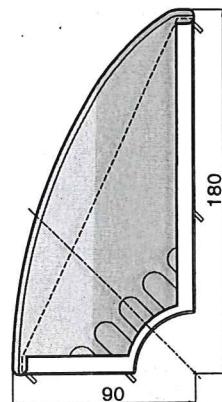
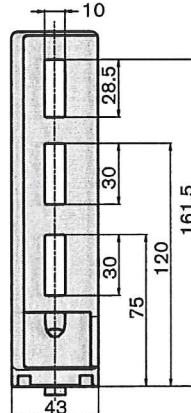
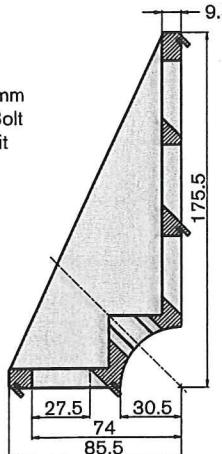
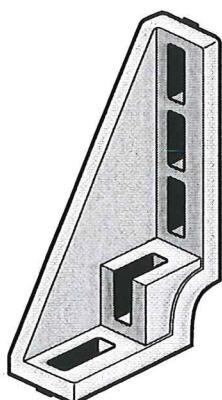
### Part Number

Profile 45x45H, -/-, specify length $\geq 30\text{mm} \leq 6000\text{mm}$	<input type="checkbox"/>	3 842 990 520/_ mm
Profile 45x45H, M12/-, specify length $\geq 55\text{mm} \leq 6000\text{mm}$	<input type="checkbox"/>	3 842 990 517/_ mm
Profile 45x45H, M16/-, specify length $\geq 115\text{mm} \leq 6000\text{mm}$	<input type="checkbox"/>	3 842 990 521/_ mm
Profile 45x45H, D17/-, specify length $\geq 40\text{mm} \leq 6000\text{mm}$	<input type="checkbox"/>	3 842 990 648/_ mm
Profile 45x45H, M12/M12, specify length $\geq 110\text{mm} \leq 6000\text{mm}$	<input type="checkbox"/>	3 842 990 518/_ mm
Profile 45x45H, M16/M12, specify length $\geq 175\text{mm} \leq 6000\text{mm}$	<input type="checkbox"/>	3 842 990 519/_ mm
Profile 45x45H, M16/M16, specify length $\geq 240\text{mm} \leq 6000\text{mm}$	<input type="checkbox"/>	3 842 990 522/_ mm
Profile 45x45H, M12/D17 specify length $\geq 90\text{mm} \leq 6000\text{mm}$	<input type="checkbox"/>	3 842 990 640/_ mm
Profile 45x45H, M16/D17, specify length $\geq 165\text{mm} \leq 6000\text{mm}$	<input type="checkbox"/>	3 842 990 642/_ mm
Profile 45x45H, M12-D9.8-D9.8VS/M12-D9.8-D9.8VS, specify length $\geq 110\text{mm} \leq 6000\text{mm}$	<input checked="" type="checkbox"/>	3 842 992 372/_ mm
Profile 45x45H, D9.8/D9.8, specify length $\geq 80\text{mm} \leq 6000\text{mm}$	<input type="checkbox"/>	3 842 992 969/_ mm
Profile 45x45H, D17/D17, specify length $\geq 80\text{mm} \leq 6000\text{mm}$	<input type="checkbox"/>	3 842 990 644/_ mm
Profile 45x45H, D17/D17VS, specify length $\geq 80\text{mm} \leq 6000\text{mm}$	<input type="checkbox"/>	3 842 990 646/_ mm

Please contact your distributor for other machining options.

## 45x180 Foundation Bracket

10

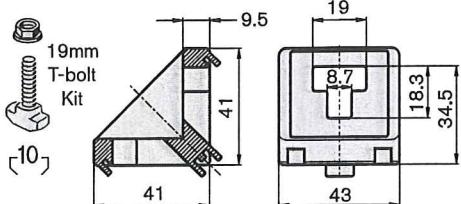
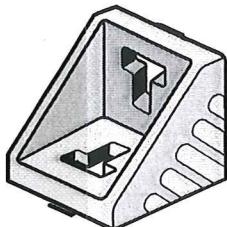


Description	Lot Size	Part Number
45x180 foundation bracket only	1	3 842 523 583
10 45x180 foundation bracket with fasteners	1	3 842 527 535
10 45x180 gusset kit with fasteners (includes cover cap) designLINE	1	3 842 538 750
45x180 round cover cap	1	3 842 523 585

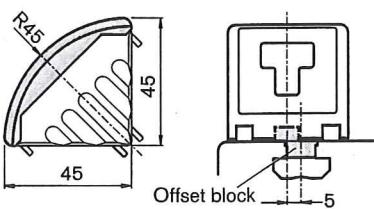
## Gussets

### 45x45 Gusset **GoTo**

10



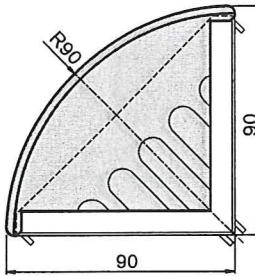
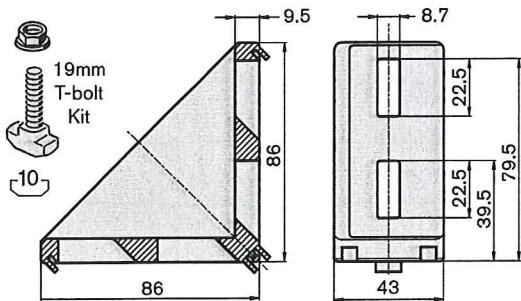
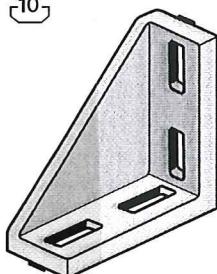
When connecting two profiles with 60mm side dimensions, order offset blocks to help align gusset with outer edge of profiles.



Description	Lot Size	Part Number
45x45 gusset only	1	3 842 523 558 <b>GoTo</b>
10 45x45 gusset with fasteners	1	3 842 523 561 <b>GoTo</b>
45x45 gusset kit with fasteners (includes cover cap) <b>designLINE</b>	1	3 842 538 719
45x45 round cover cap	1	3 842 523 563 <b>GoTo</b>
Offset block 10mm T-slot-5mm offset	1	3 842 523 593

### 45x90 Gusset

10

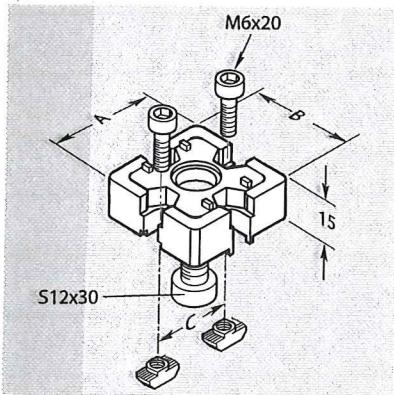


Description	Lot Size	Part Number
45x90 gusset only	1	3 842 523 567 <b>GoTo</b>
10 45x90 gusset with fasteners	1	3 842 523 570 <b>GoTo</b>
45x90 gusset kit with fasteners (includes cover cap) <b>designLINE</b>	1	3 842 538 720
45x90 round cover cap	1	3 842 523 572

GoTo boschrexroth-us.com/framing to get these in stock items **FAST** from your local distributor

## T-Connector Kits

### t40, 45x45, & 50x50 T-Connector Kits



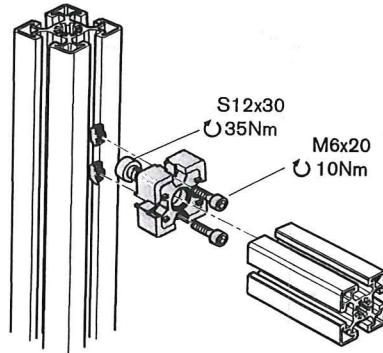
T-Connector Size	Dimension in mm		
	A	B	C
40mm	40	40	29.6
45mm	45	45	34
50mm	50	50	39

#### Features:

- Includes all fastening hardware
- Includes self-tapping screw; no machining required

#### Material:

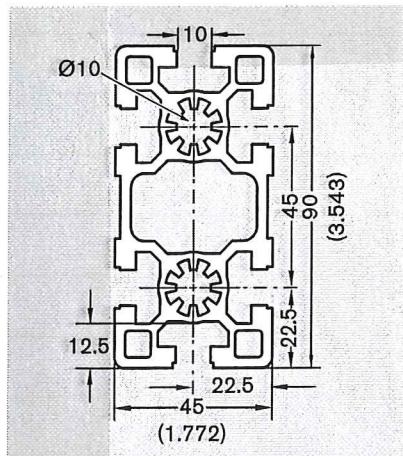
- Die-cast zinc



Description	Lot Size	Part Number
40x40 T-connector kit <b>designLINE</b>	1	3 842 538 697
45x45 T-connector kit <b>designLINE</b>	1	3 842 538 698
50x50 T-connector kit <b>designLINE</b>	1	3 842 538 699
40x40 T-connector kit	1	3 842 532 195
<b>45x45 T-connector kit</b>	1	<b>3 842 520 802</b>
50x50 T-connector kit	1	3 842 532 198

## Monitor Frame:

### 45x90H



#### Features:

- Heavy-duty profile for strong, rugged performance
- Center channel can be used as an air manifold
- Has six 10mm T-slots

#### Non-Machined End Finish Options

#### Part Number

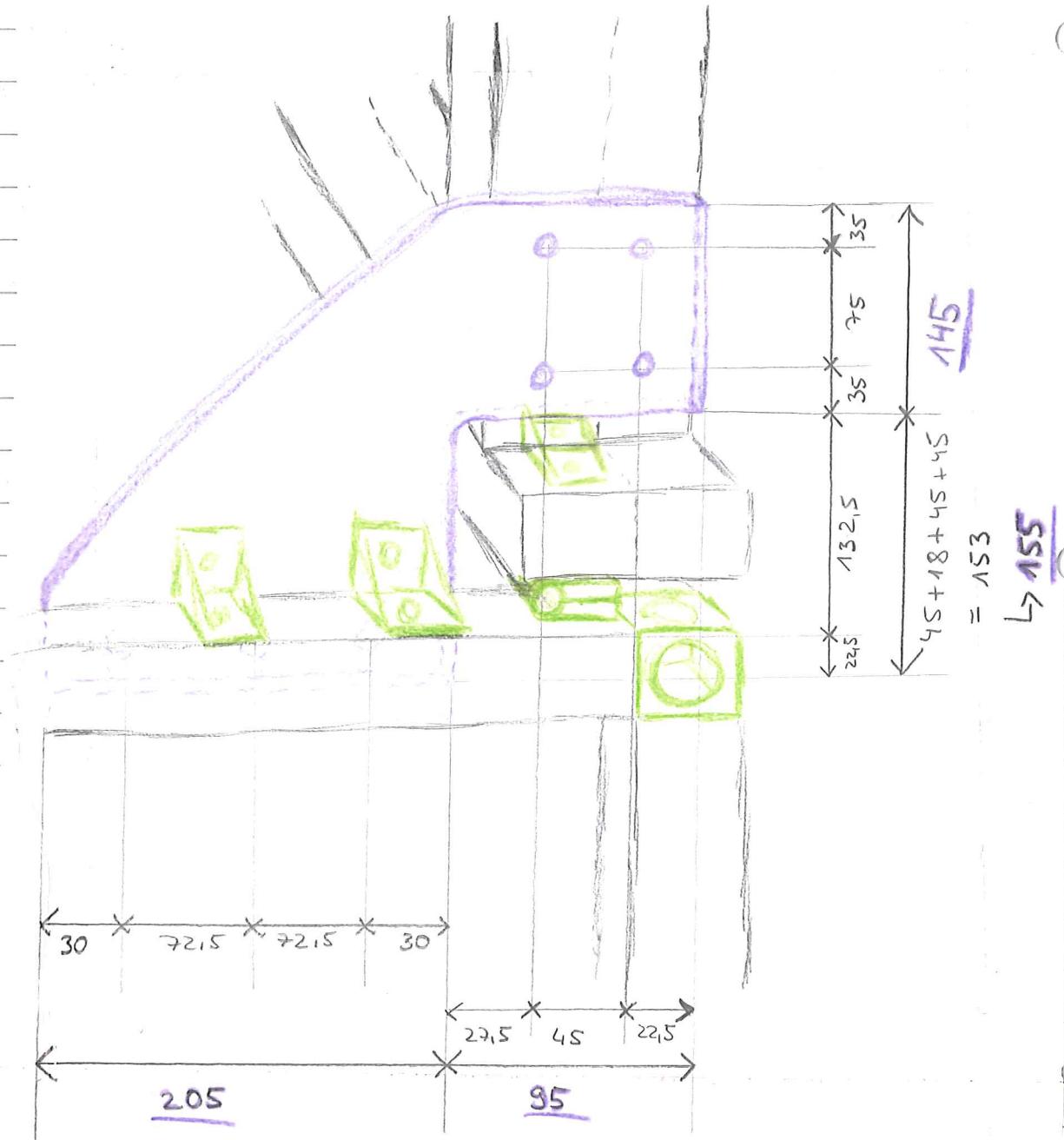
Profile 45x90H, pkg. of 12, 6000mm long	3 842 315 123
Profile 45x90H, single, 6000mm long	3 842 507 123

#### Machined Options

#### End Finish

#### Part Number

Profile 45x90H, $-/-$ , specify length $\geq 50\text{mm} \leq 6000\text{mm}$		3 842 990 300/_mm
Profile 45x90H, $M12/-$ , specify length $\geq 55\text{mm} \leq 6000\text{mm}$		3 842 990 301/_mm
Profile 45x90H, $M16/-$ , specify length $\geq 120\text{mm} \leq 6000\text{mm}$		3 842 990 303/_mm
Profile 45x90H, $M16/M16$ , specify length $\geq 240\text{mm} \leq 6000\text{mm}$		3 842 990 304/_mm
Profile 45x90H, $-/D17$ , specify length $\geq 40\text{mm} \leq 6000\text{mm}$		3 842 990 329/_mm
Profile 45x90H, $-/D17VS$ , specify length $\geq 40\text{mm} \leq 6000\text{mm}$		3 842 990 331/_mm
Profile 45x90H, $M12/M12$ , specify length $\geq 110\text{mm} \leq 6000\text{mm}$		3 842 990 302/_mm
Profile 45x90H, $M12/D17$ , specify length $\geq 90\text{mm} \leq 6000\text{mm}$		3 842 990 323/_mm
Profile 45x90H, $M12/D17VS$ , specify length $\geq 90\text{mm} \leq 6000\text{mm}$		3 842 990 305/_mm
Profile 45x90H, $M16/D17$ , specify length $\geq 165\text{mm} \leq 6000\text{mm}$		3 842 990 325/_mm
Profile 45x90H, $M16/D17VS$ , specify length $\geq 165\text{mm} \leq 6000\text{mm}$		3 842 990 307/_mm
Profile 45x90H, $D17/D17$ , specify length $\geq 80\text{mm} \leq 6000\text{mm}$		3 842 990 313/_mm
Profile 45x90H, $D17VS/D17$ , specify length $\geq 80\text{mm} \leq 6000\text{mm}$		3 842 990 311/_mm
Profile 45x90H, $D17VS/D17VS$ , specify length $\geq 80\text{mm} \leq 6000\text{mm}$		3 842 990 309/_mm

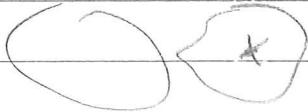
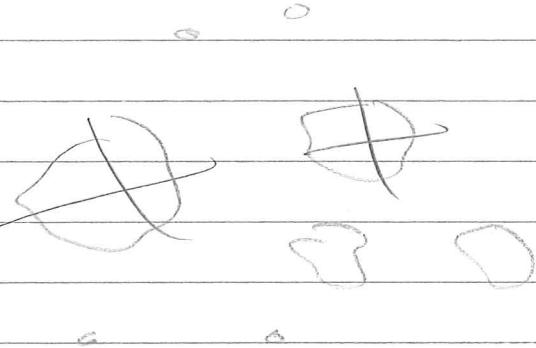


## PDR A Meeting

first draft of collisions paper : 25<sup>th</sup> Nov after ISB

✓ Meet Jürgen and discuss rough outline with him  
at DPS

- ✓ Plot collision data with single encounters on one and multiple encounters on other y axis
- ↳ 5.11.15 I decided to use  $\xi = \sqrt{1 - \frac{\Delta E}{E_{\text{before}}}}$  instead  
"total COR" in Excel



- ✓ bubble plots → bubble size scale

color code for (potential) sticking

- ✓ pattern for multiple encounters what happens in which order (bouncing etc.)

18. 11. 2015

Topics:

- ✓ - usb 1 to us adapter
- ISIS risk assessment
- yes form for 60s adventures
- ✓ → paper (collisions) draft after ISIS
- ✓ - Tom Headen's mail (put our research on ISIS webpage) ↗ Yes
- ✓ - Meetings / Conferences / Trainings:

✓ 32. 01. UK planetary Early Career (Leicester) 08.01.16 registered

✓ 7.-9. 03. Planet formation (Duisburg)

STFC bursary ↗ ✓ 14.-15. 06. Cometary Science after Rosetta (London)

✓ 14.-15. 03. Media & Communications training (Buckinghamshire)

✓ 1.-2. 02. water in the inner Solar System (Newport Pagnell) 08.01.16 registered + abstract submitted

decide in spring 16. -21. 10. DPS (Pasadena) with EPSC

- practise talk for ELPs meeting
- ✓ - bullet points for cell biology episode → Peter Taylor UCL
- look at modified plots for COR

Nate (Nathaniel)  
Nottingham  
Trent

Wedest: Robert Marchbanks  
Ian McDonald  
Thermal engineering, Marco  
Mangano (Brighton)

→ Nathaniel Szevczak

11. 12. 2015

my todo list:

Priorities:

- cold dust analysis + paper
- ISIS June analysis + paper
- ISIS Dec analysis + paper
- warm dust analysis
- 60s adventures
- teaching
- PF experiment preparation

after ISIS dec (maybe split in two papers if it takes too long)  
together with second paper  
KPS run on deposited ice  
paper out before Easter

Is there a difference cold dust to warm dust that is in the literature  
if not → ignore it.

more important than all paper

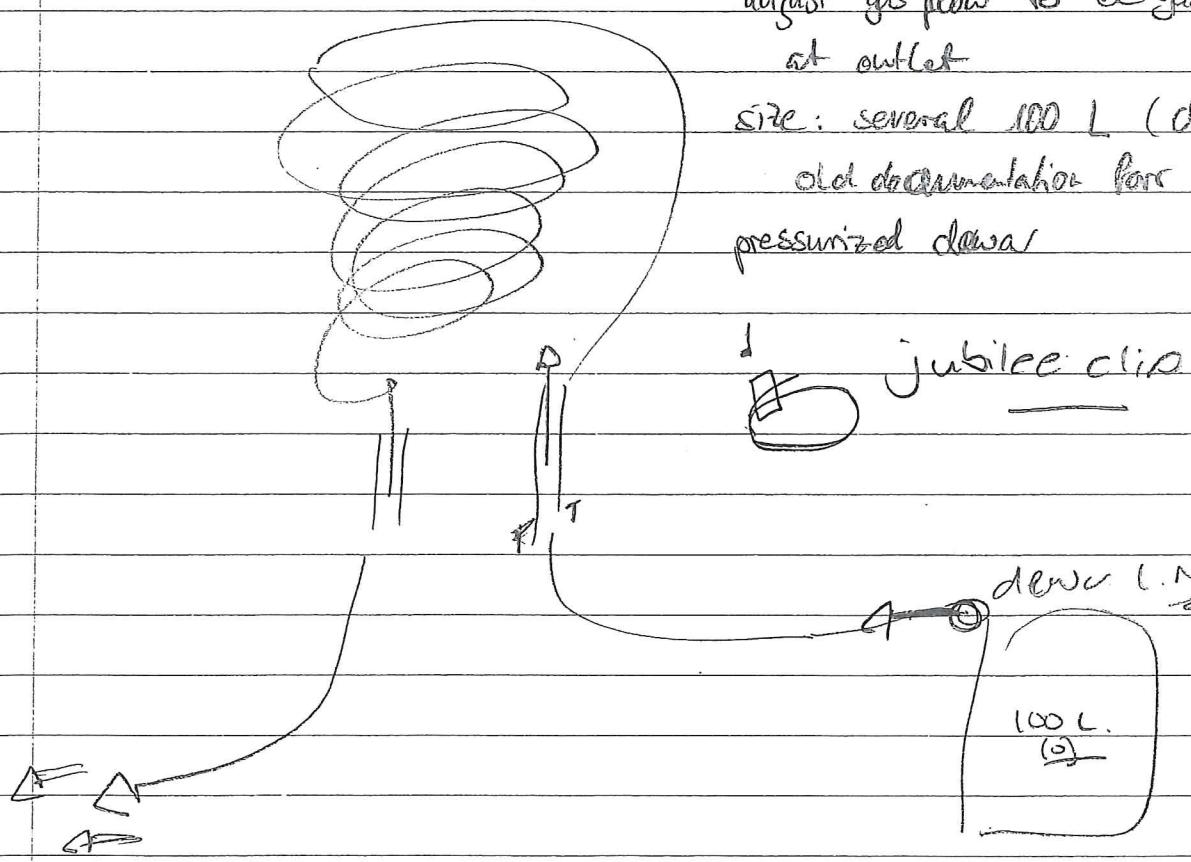
# PDRA Meeting

topics for next meeting:

- ISIS <sup>dcc</sup> data: - new bump in latest sample 4 plots
  - ↳ Tristansays: bad statistics, use molcs files
  - crystalline peak intensities → don't match theory
  
- PF experiment:
  - how to use cooling line?
  - which freezer can I use?
  - EPOS specifications
    - ↳ Jill found one
  - What size and type of dewar do we need (pressurized)?

adjust gas flow to be gaseous at outlet

size: several 100 L (check old documentation for order pressurized dewar)



ask Jürgen for old PF - computer  $\rightarrow$  should have EPOS programs on it

(need to be able to change them during flight)

## Variables

### Switches

(*FALSE = open circuit = piston not at this position, TRUE = closed circuit = piston at this position*)

master\_switch\_front  
master\_switch\_back  
slave\_switch\_front  
slave\_switch\_back

might come from the box not from EPOS

### Status

(*FALSE = not firing, TRUE = firing*)

master\_firing  
slave\_firing

### PC Signals

command (*send from PC to EPOS, = "go" to start firing program*)

### Parameters

forward\_speed = **to be determined**  
retract\_speed = maximum possible speed

constant acceleration

$\hookrightarrow$  calculate from distance between switches

gears from maxon  $\rightarrow$  check order forms

## Master EPOS

while command not == "go":

    send values of master\_switch\_front, master\_switch\_back, slave\_switch\_front,  
    slave\_switch\_back, master\_firing, slave\_firing to PC

when command changes to "go" and master\_switch\_back == TRUE and slave\_switch\_back == TRUE:

    do one cycle of fire program

    simultaneously tell slave EPOS to do one cycle of fire program

when firing program has been completed, go back to while command not == "go" mode

### Firing Program Master

master\_firing = TRUE

send master\_firing, slave\_firing to PC

while master\_switch\_front == FALSE:

    move motor forward with forward\_speed

when master\_switch\_front == TRUE:

    stop

while master\_switch\_back == FALSE:

    move motor backward with retract\_speed

when master\_switch\_back == TRUE:

    stop

master\_firing = FALSE

send master\_firing, slave\_firing to PC

"go" signal might have  
to be 0/5V from

DAC

end firing program

## Slave EPOS

wait for signal from master epos, then start firing program  
then wait for master signal again

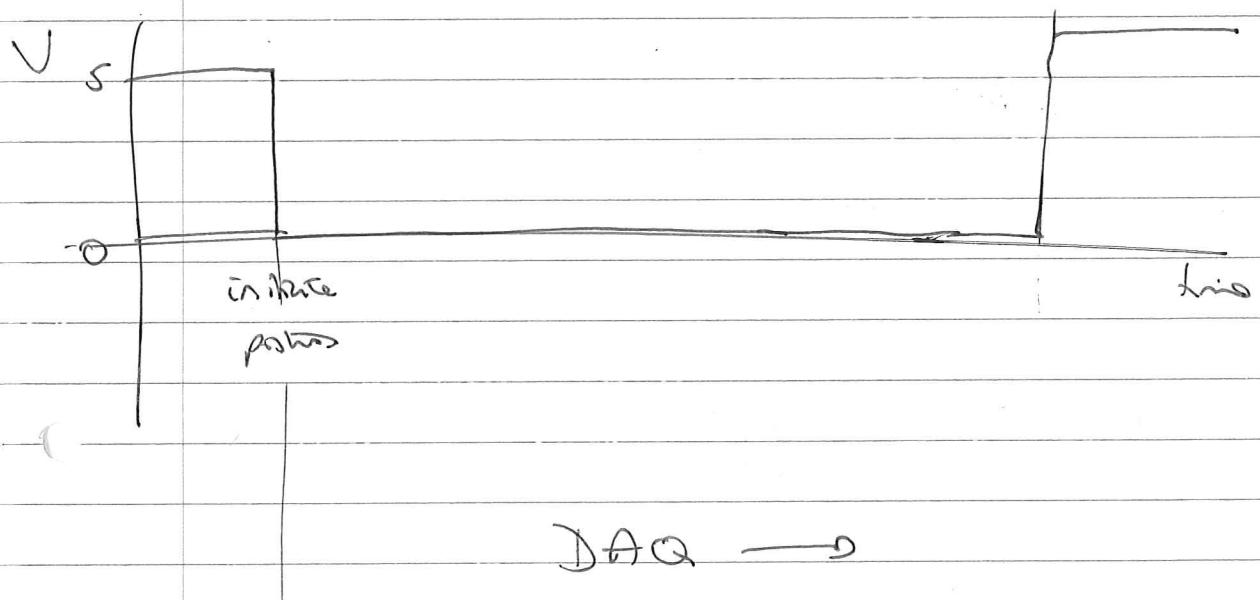
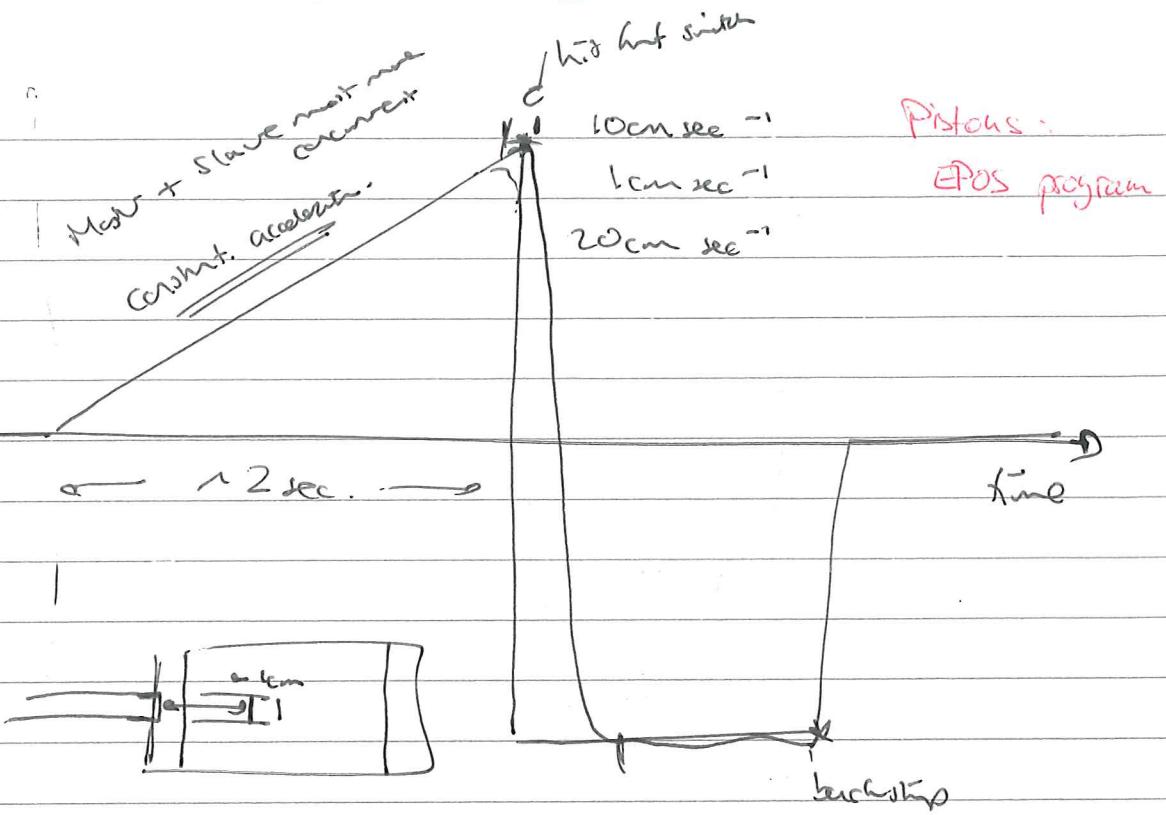
### Firing Program Slave

```
slave_firing = TRUE
send slave_firing to master
while slave_switch_front == FALSE:
    move motor forward with forward_speed
when slave_switch_front == TRUE:
    stop
while slave_switch_back == FALSE:
    move motor backward with retract_speed
when slave_switch_front == TRUE:
    stop
slave_firing = FALSE
send slave_firing to master
end firing program
```

# PDRA Meeting

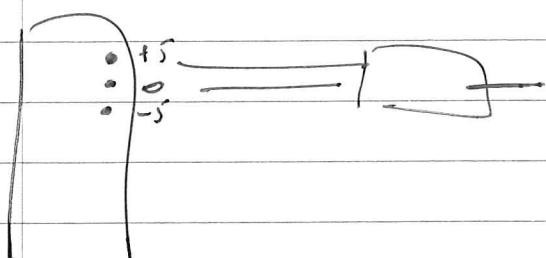
22.02.2016

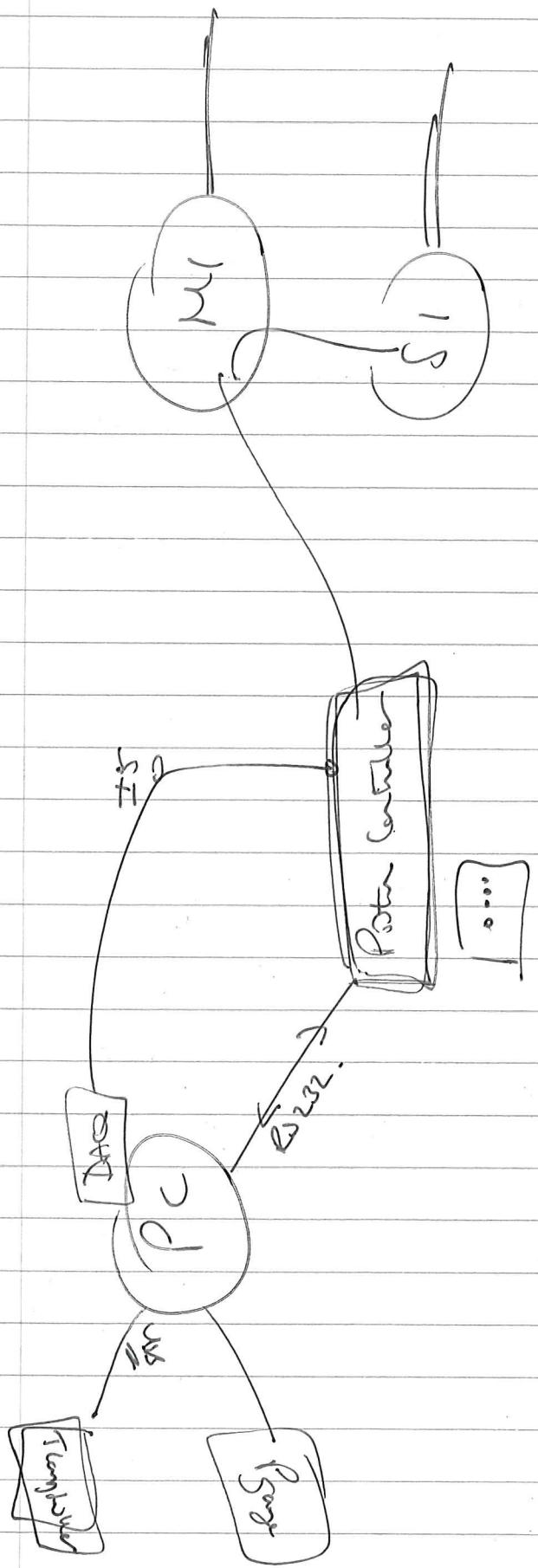
jetvis



DAQ →

[RS 232. →]





# PDR A Meeting

## Agenda:

✓ Paper (lay particles - PRL):

- work through comments / pics etc.
- schedule : June 25<sup>th</sup> send paper to co-authors
- 21<sup>st</sup> get comments from Helen
- 17<sup>th</sup> send paper to Helen

✓ 60s :- research fish after paper

- budget Helen deals with it

✓ Ogden : - prep for this year's workshop

- feed back on collaboration so far

word doc with instructions by 24<sup>th</sup> give to Helen

PF proposal : 17.06.15

✓ Lab clean-up: When do we meet with M.S.  
after June holiday

✓ October : 30.09. to 10.10. 4 days working from Germany  
3 days holiday

✓ CDSA : draft by 20<sup>th</sup> evening  
make summary of 3+2 form

12.07.2016

## Agenda:

Work planning → next meeting

Lab Move ✓

60s final report → return to Helen by Wednesday 13.07.

PRL Paper

16.08.2016

Ice Particles

Diffuse interface fit: compare intensity / slope changes in lawQ data (Feb vs Dec)

thickness: average

SSA expected value: ~~—\*~~ line with star at low T

1 bilayer  $\approx 4 \text{ \AA}$  (Thürmer + Nie phas 110 (MFS), 2013)

17.08.2016

table summarising collision experiments in Catherine's thesis  
also starting point for atmospheric literature research

thickness errorbars: deviation of the mean

# Lab - Info : Support Rack Design

Centre of gravity and linear load

Support Rack (#2)

Distance between consecutive attaching points in x-direction:

$$D_2 = 33$$

Number of fixing points: 6 (2 in x-, 3 in y-direction)

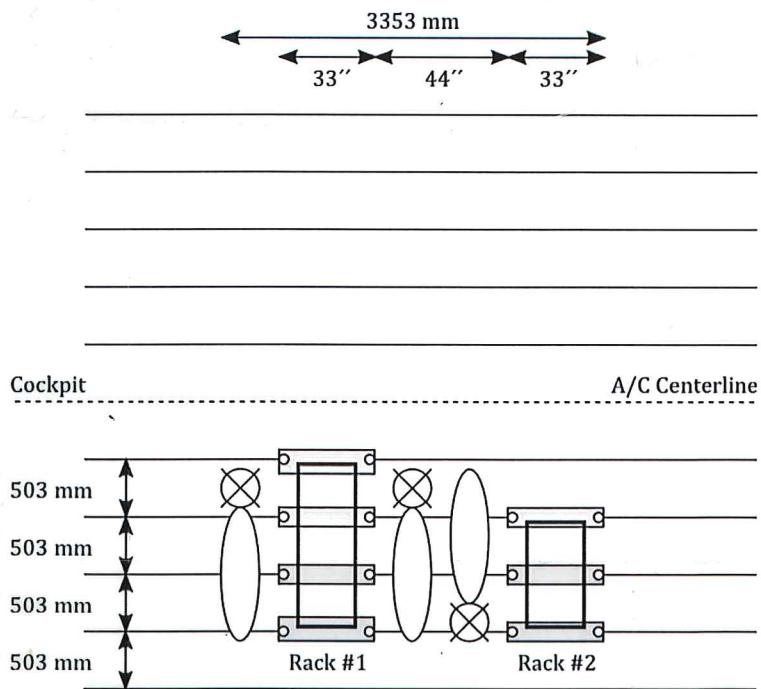
Mass of rack:  $M_2 = 131 \text{ kg}$

$$\Rightarrow M_{\text{attach},2} = \frac{M_2}{6} = 21.8 \text{ kg}$$

Center of gravity height:  $H_2 = 257 \text{ mm}$

$\Rightarrow$  The linear load per 1m track section must be

$$RL \leq 100 \frac{\text{kg}}{\text{m}}$$



Distance between attaching points for racks 1 & 2:  $44'' = 1.1176 \text{ m}$

$\Rightarrow$  no need to take double setup into account when calculating RL

$$\underline{RL_2 (\max)} = 2 \cdot M_{\text{attach},2} = 43.7 \frac{\text{kg}}{\text{m}} \leq 100 \frac{\text{kg}}{\text{m}} \Rightarrow \text{should be fine}$$

## Parabolic Flight

How is the proposal doing?

### Vacuum Cleaner

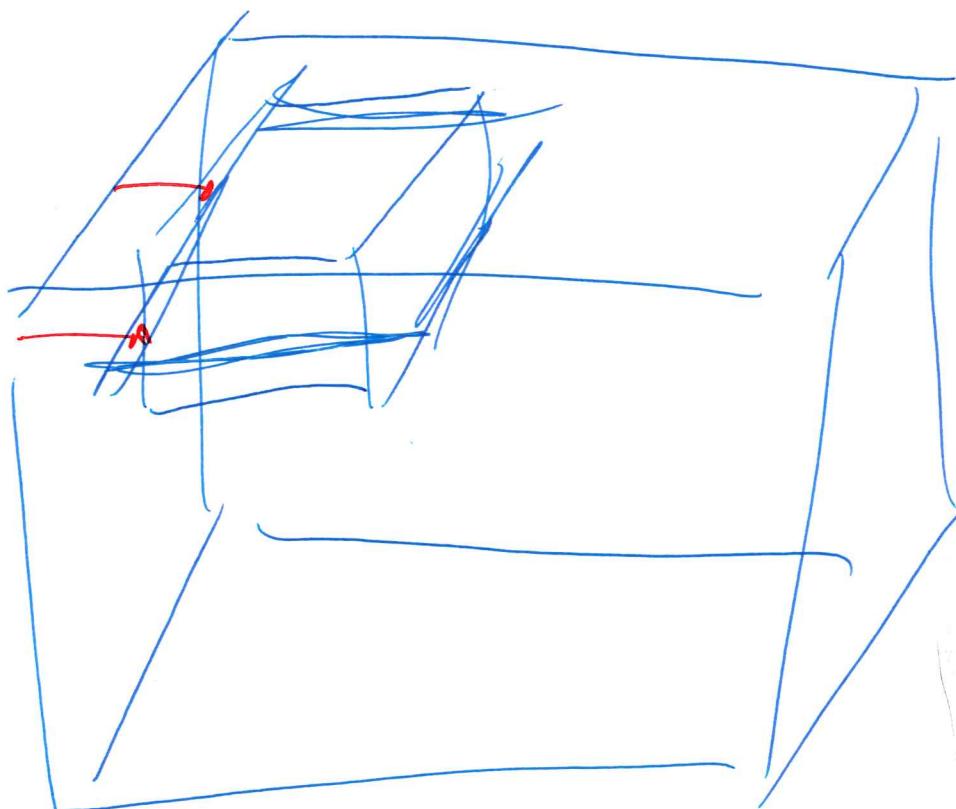
According to the NOVESPACE guidelines, we can use Li-ion batteries on flight (but not charge them on flight). So, we could order any of the Dyson handheld vacuum cleaners. Price range £150 to £250. Operation time: 15 to 20 minutes. I'll look into the details and order one that I consider suitable after my holidays. On the parabolic flight budget or on the general lab budget?

### Toolbox

Brian from NOVESPACE doesn't like to have the toolbox in the rack (centre of gravity height). He suggested to mount it directly on the floor next to the rack.

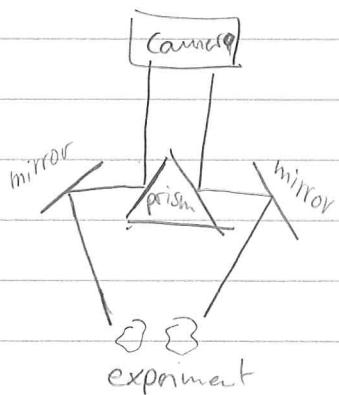
I don't really like that idea. I spoke to Chris Hall and he suggested to save lots of weight by using a Kevlar tool-roll instead of a toolbox. I like this idea, but haven't discussed it with Brian yet. What do you think about it?

Ask Braunschweig for photos



# Parabolic Flight experiment design

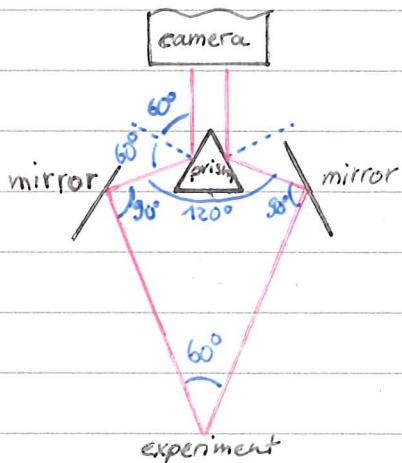
## Beam Splitter Optics:



- prism needs to cover full camera range

~ width  $\approx$

- mirrors same width and angle as prism, height adjustable



There seem to be only 90° prisms on the market  
 $\Rightarrow$  re-design

17.08.2016

