

RFQ COLD MODEL TUNER

Figure 1 shows the overview of a prototype tuner for the RFQ cold model. Initially one is to be manufactured to assess the design. If the design is approved another three will be manufactured.

The tuners attach to the RFQ via the KF40 tuner ports at the centre of the RFQ mid-way between the vanes, see figure 2. The tuner is basically a copper plug that can be screwed into and out of the RFQ cavity. The position of the plug will affect the internal surface area of the cavity which will in-turn affect the Q value and resonant frequency of the cavity. Various plug profiles will be designed, manufactured and tested.

The plug is wrapped with 'finger strip' (shown in blue) to prevent RF current leaking out of the cavity via the tuning port.

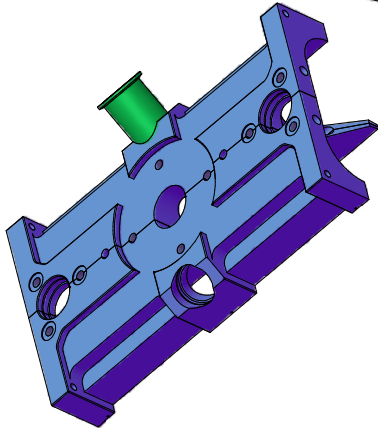


Figure 2 - Tuner in position

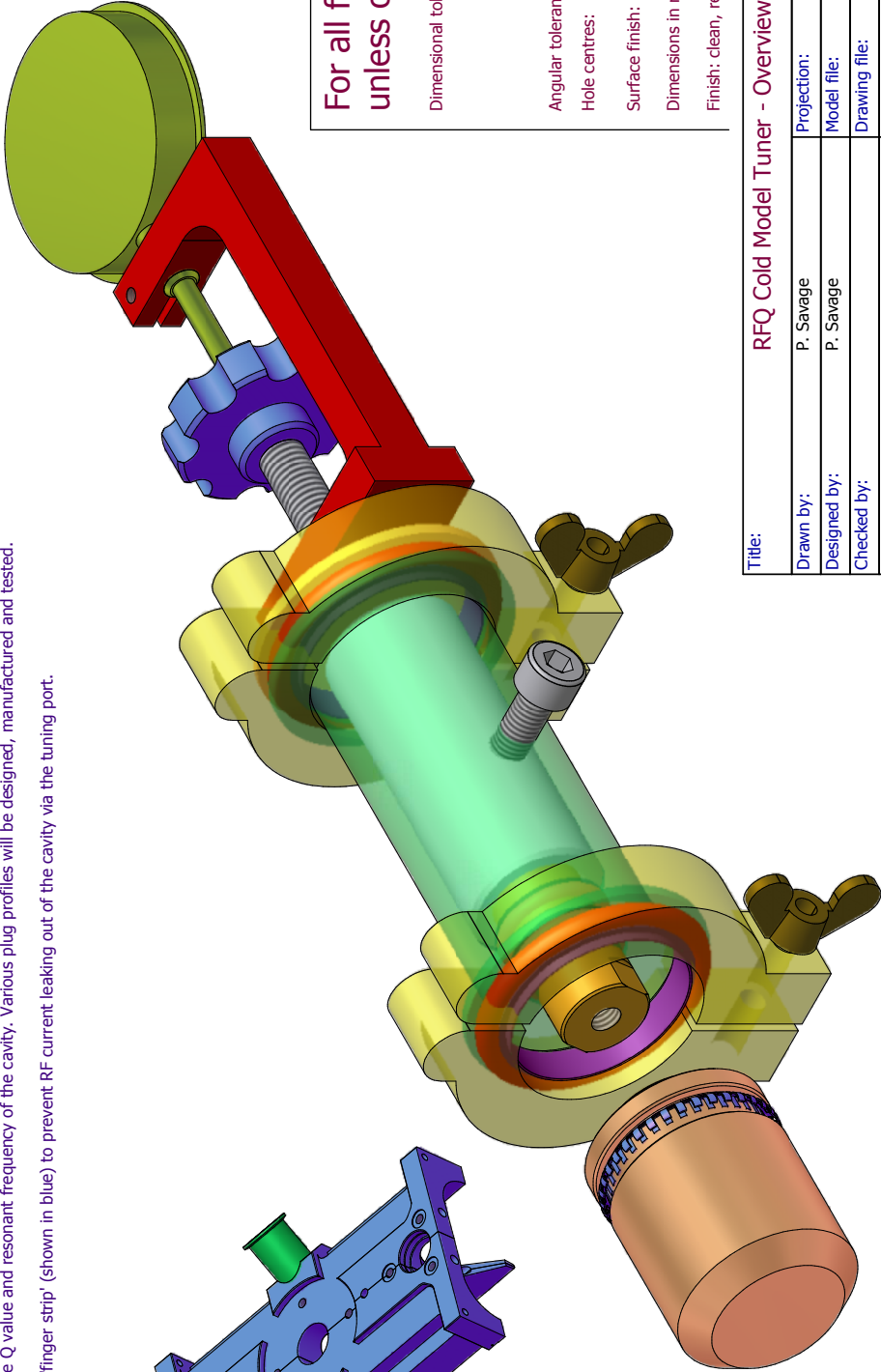


Figure 1 - RFQ Cold Model Prototype Tuner

For all following drawings
unless otherwise stated:

Dimensional tolerance: X	$\pm 0.5\text{mm}$
X.X	$\pm 0.2\text{mm}$
X.XX	$\pm 0.1\text{mm}$
Angular tolerance:	$\pm 0.5^\circ$
Hole centres:	$\pm 0.05\text{mm}$
Surface finish:	1.6 microns
Dimensions in mm	
Finish: clean, remove all burrs	

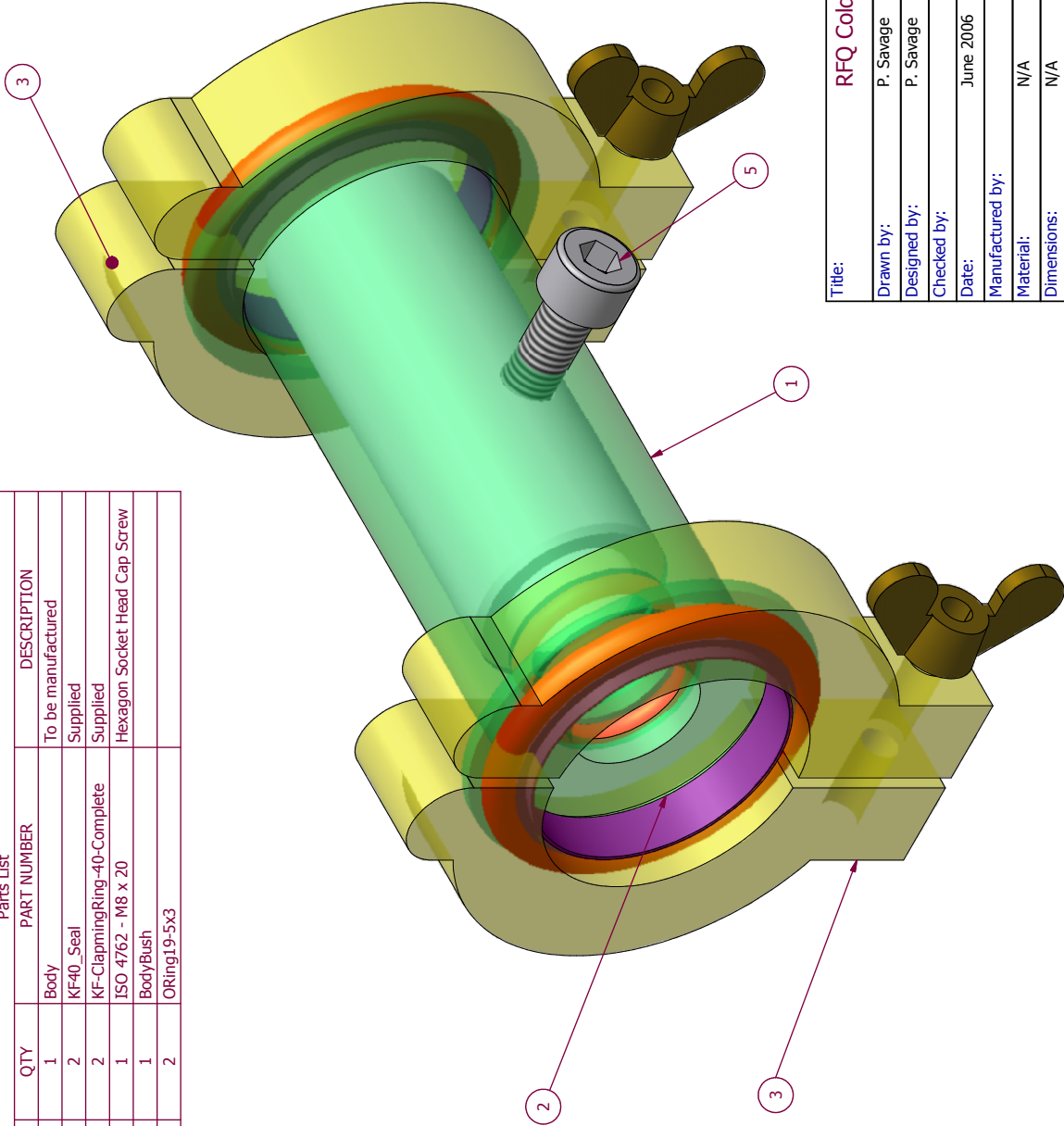
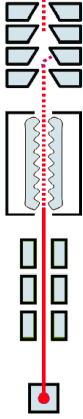
Title: RFQ Cold Model Tuner - Overview

Drawn by:	P. Savage	Projection:	Isometric
Designed by:	P. Savage	Model file:	Complete.iam
Checked by:		Drawing file:	ManualTuner.idw
Date:	June 2006	Version number:	2
Manufactured by:		Project:	F.E.T.S
Material:	N/A	Sheet number:	1 / 16
Dimensions:	N/A	Number off:	1
General Tolerance:	N/A		
Drawing #:	IC_HEP_PJS_FETS_1020		
Notes:			
Contact:	p.savage@imperial.ac.uk 0207 594 7817		

BODY ASSEMBLY

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	Body	To be manufactured
2	2	KF40_Seal	Supplied
3	2	KF-CIapmingRing-40-Complete	Supplied
5	1	ISO 4762 - M8 x 20	Hexagon Socket Head Cap Screw
6	1	BodyBush	
7	2	ORing19-5x3	

Front End Test Stand



Title: RFQ Cold Model Tuner - Body Assembly

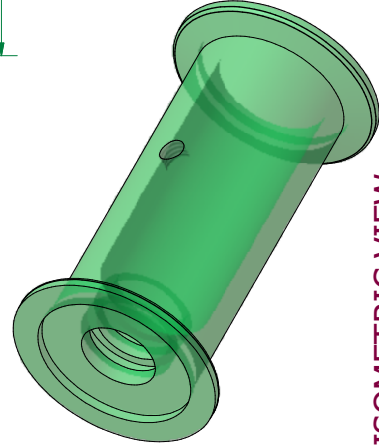
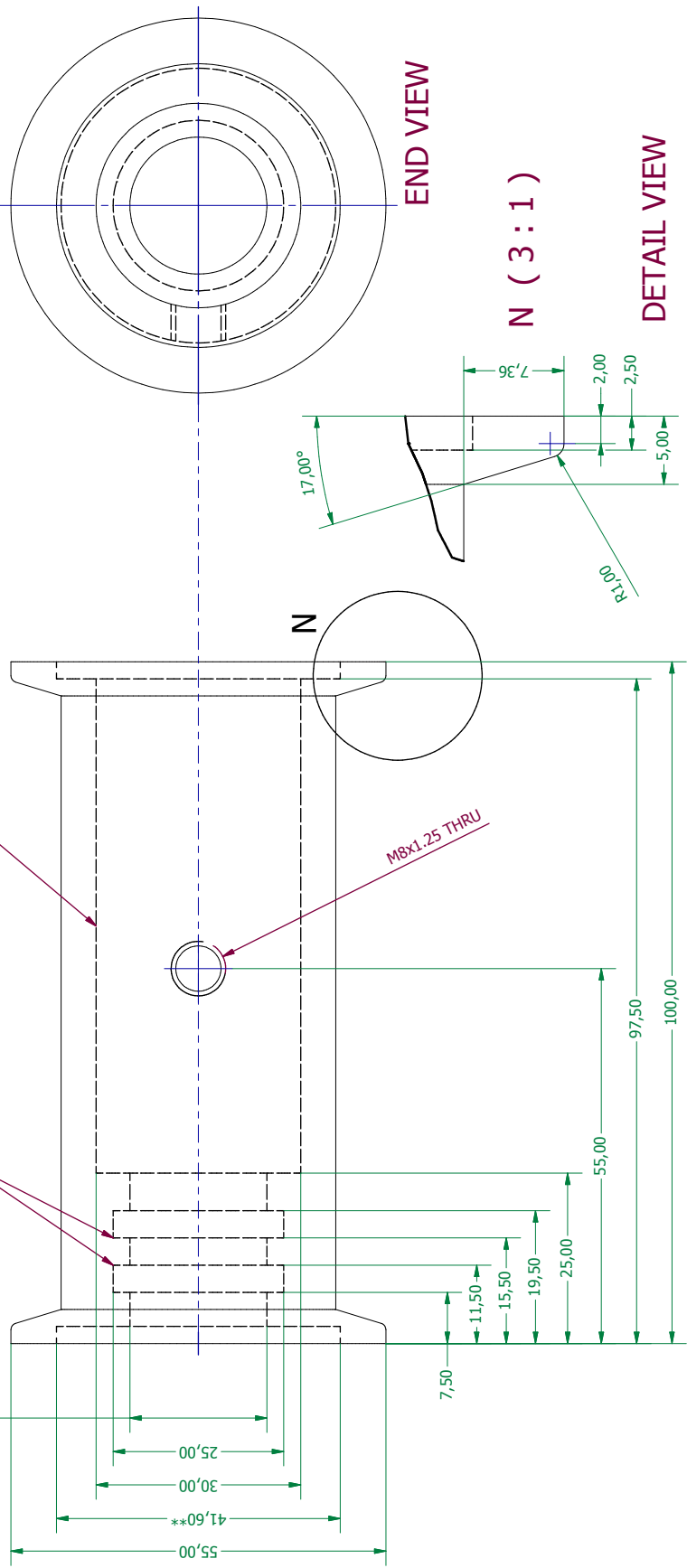
Drawn by:	P. Savage	Projection:	Isometric
Designed by:	P. Savage	Model file:	BodyAssembly.iam
Checked by:		Drawing file:	ManualTuner.idw
Date:	June 2006	Version number:	1
Manufactured by:		Project:	F.E.T.S.
Material:	N/A	Sheet number:	2 / 16
Dimensions:	N/A	Number off:	1
General Tolerance:	N/A		
Drawing #:	IC_HEP_PJS_FETS_1021		
Notes:			
Contact:	p.savage@imperial.ac.uk	0207 594 7817	

BODY

SIDE VIEW

PTFE bush groove
O Ring grooves

20,10
+0,10
-0,00

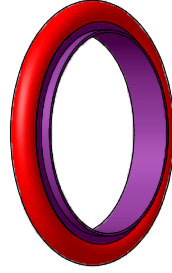
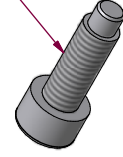


ISOMETRIC VIEW

Title: RFQ Cold Model Tuner - Body

Drawn by:	P. Savage	Projection:	Third angle
Designed by:	P. Savage	Model file:	Body.ipt
Checked by:		Drawing file:	ManualTuner.idw
Date:	June 2006	Version number:	1
Manufactured by:		Project:	F.E.T.S.
Material:	Dural	Sheet number:	3 / 16
Dimensions:	mm	Number off:	1
General Tolerance:	See dwg # 1020		
Drawing #:	IC_HEP_PJS_FETS_1022		
Notes:			
Contact:	p.savage@imperial.ac.uk	0207 594 7817	

Turn M8 screw
Ø6,00 x 4,0 long,
to suit slot in shaft



** To suit KF40 seal. Supplied.

PTFE Bush

Front End Test Stand

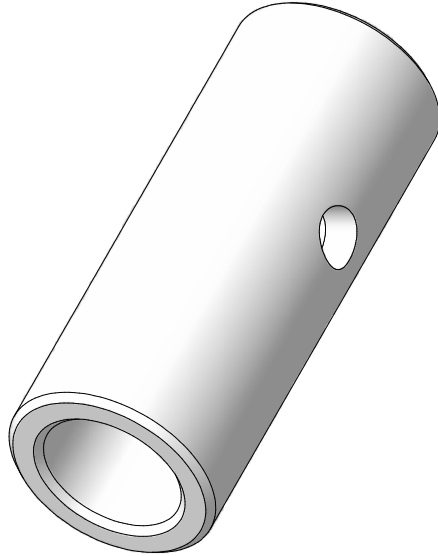
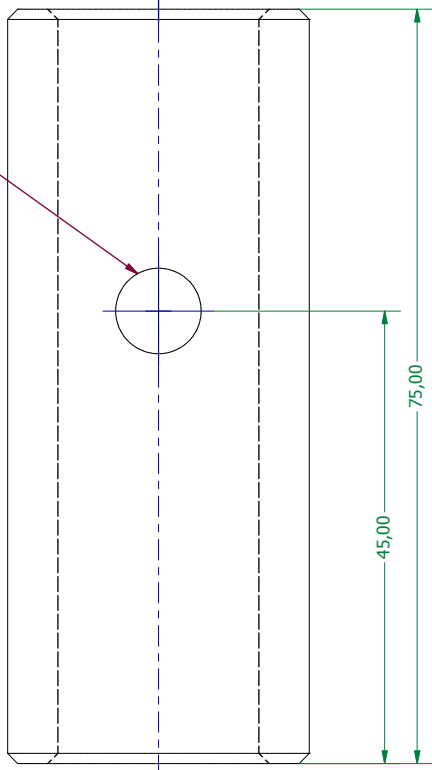
FRONT VIEW

$\varnothing 20,00 + 0,02$
 $+ 0,00 *$

$\varnothing 30,00 **$

SIDE VIEW

HOLE $\varnothing 8,5$ THRU



ISOMETRIC VIEW

* To provide easy sliding fit for brass shaft (dwg #1026)
** To provide light push fit in Tuner body (dwg # 1022)

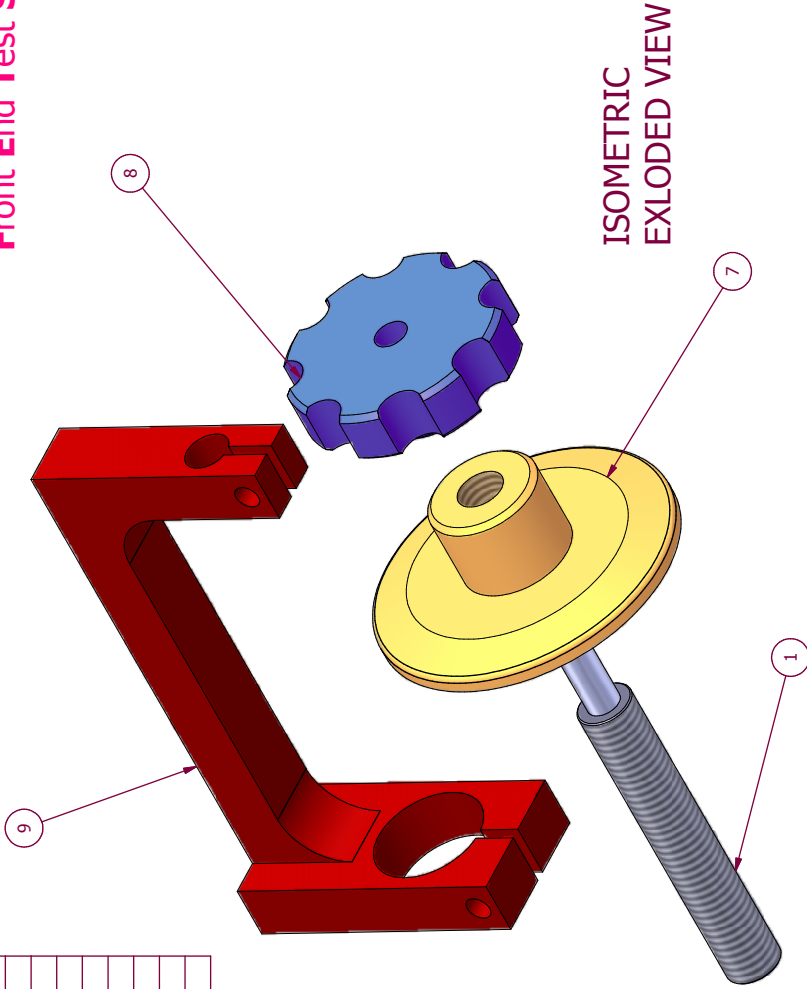
Title: RFQ Cold Model Tuner - Body

Drawn by:	P. Savage	Projection:	Third angle
Designed by:	P. Savage	Model file:	BodyBush.ipt
Checked by:		Drawing file:	ManualTuner.idw
Date:	June 2006	Version number:	1
Manufactured by:		Project:	F.E.T.S.
Material:	PTFE	Sheet number:	4 / 16
Dimensions:	mm	Number off:	2
General Tolerance:	See dwg # 1020		
Drawing #:	IC_HEP_PJS_FETS_1023		
Notes:	Chamfer edges 1.0 x 45deg		
Contact:	p.savage@imperial.ac.uk 0207 594 7817		

Shaft Assembly

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	Screw	To be manufactured
2	1	Widget	Male Coupling
3	1	WidgetII	Female Coupling
6	1	Shaft	To be manufactured
7	1	KF40_FlangeEnd	To be manufactured
8	1	Handle	Supplied
9	1	DTI_Mount	To be manufactured

Front End Test Stand

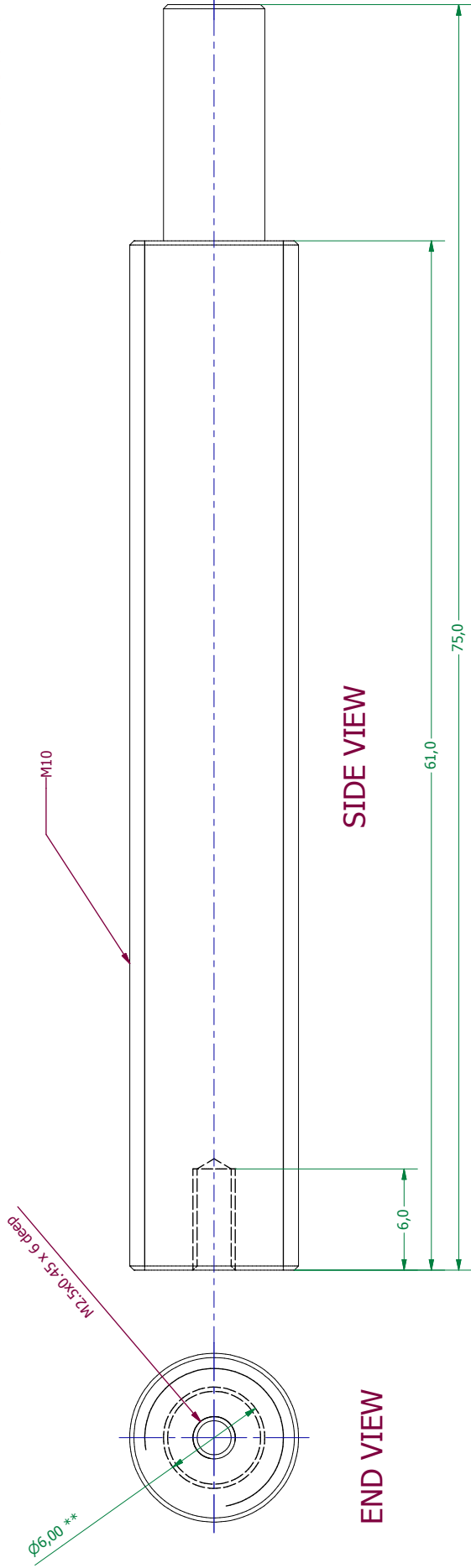


SIDE VIEW

ISOMETRIC
EXPLODED VIEW

Title: RFQ Cold Model Tuner - Shaft Assembly

Drawn by:	P. Savage	Projection:	Isometric
Designed by:	P. Savage	Model file:	ShaftAssembly.iam
Checked by:		Drawing file:	ManualTuner.idw
Date:	June 2006	Version number:	2
Manufactured by:		Project:	F.E.T.S.
Material:	N/A	Sheet number:	5 / 16
Dimensions:	N/A	Number off:	1
General Tolerance:	N/A		
Drawing #:	IC_HEP_PJS_FETS_1024		
Notes:			
Contact:	p.savage@imperial.ac.uk 0207 594 7817		

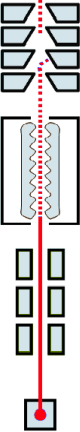


** Light push fit into handle spigot (handle supplied)

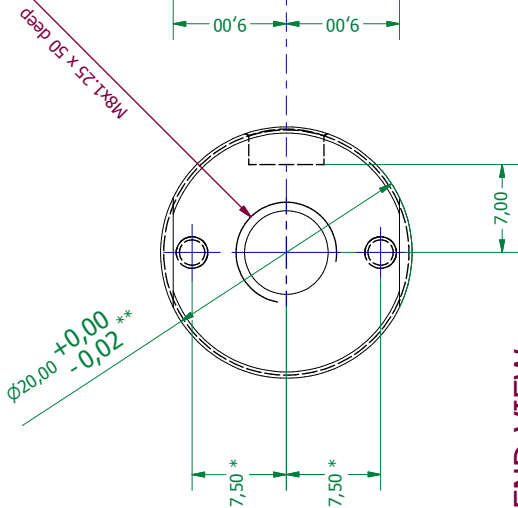


ISOMETRIC VIEW

Title: RFQ Cold Model Tuner - Screw			
Drawn by:	P. Savage	Projection:	Third angle
Designed by:	P. Savage	Model file:	Screw.ipt
Checked by:		Drawing file:	ManualTuner.idw
Date:	June 2006	Version number:	1
Manufactured by:		Project:	F.E.T.S.
Material:	Stainless Steel	Sheet number:	6 / 16
Dimensions:	mm	Number off:	1
General Tolerance:	See dwg # 1020		
Drawing #:	IC_HEP_PJS_FETS_1025		
Notes:	Chamfer edges 0.25 x 45		
Contact:	p.savage@imperial.ac.uk... 0207 594 7817		

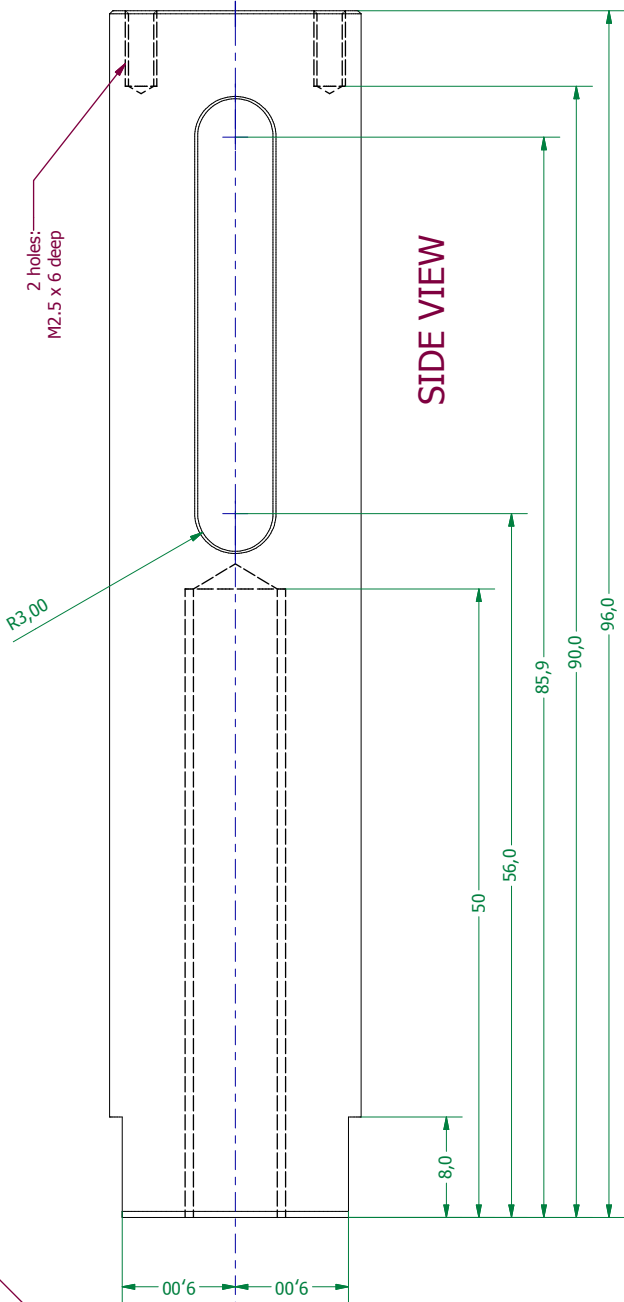


Front End Test Stand



END VIEW

* To suit female coupling (see dwg # 1027)



SIDE VIEW

RFQ Cold Model Tuner - Sliding Shaft

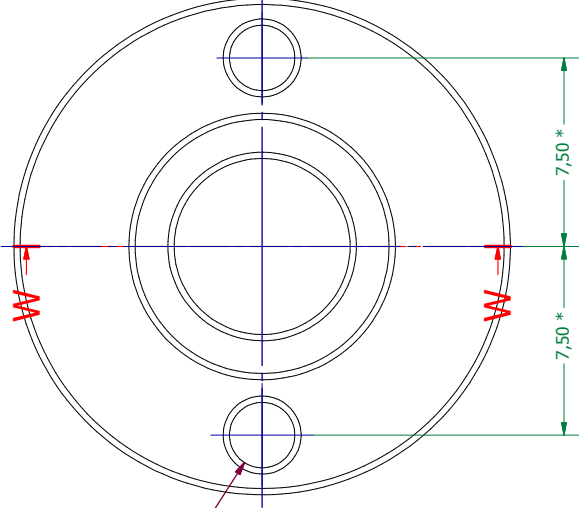
Title:	P. Savage	Projection:	Third angle
Drawn by:	P. Savage	Model file:	Shaft.ipt
Designed by:	P. Savage	Drawing file:	ManualTuner.idw
Checked by:		Version number:	1
Date:	June 2006	Project:	F.E.T.S.
Manufactured by:		Sheet number:	7 / 16
Material:	Brass	Number off:	1
Dimensions:	mm		
General Tolerance:	See dwg # 1020		
Drawing #:	IC_HEP_PJS_FETS_1026		
Notes:	** Easy sliding fit in Tuner body bushes		
Contact:	p.savage@imperial.ac.uk... 0207 594 7817		

ISOMETRIC VIEW

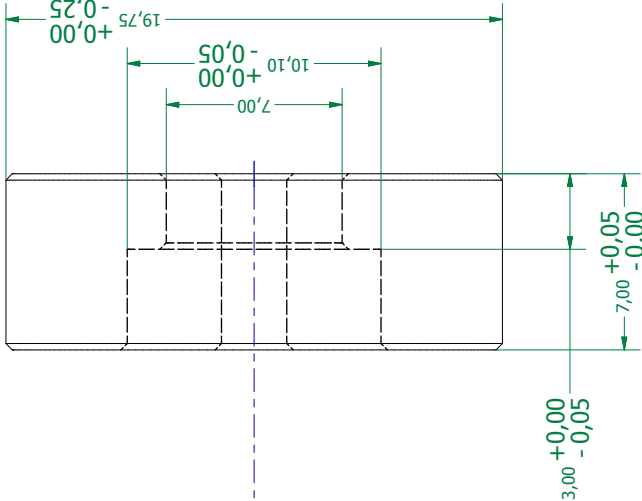
Coupling - Female

Front End Test Stand

SECTION VIEW



END VIEW



SIDE VIEW

* To match with shaft (see dwg# 1026)

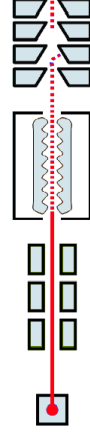
The aim for the male and female coupling is to join the shaft to the screw allowing for minimal axial play but still allowing for rotation between the two parts.

RFQ Cold Model Tuner - Female Coupling

Title:	P. Savage	Projection:	Third angle
Drawn by:	P. Savage	Model file:	CouplingFemale.ipt
Designed by:	P. Savage	Drawing file:	ManualTuner.idw
Checked by:	June 2006	Version number:	1
Date:	Brass	Project:	F.E.T.S.
Manufactured by:	mm	Sheet number:	8 / 16
Material:	See dwg # 1020	Number off:	1
Dimensions:	IC_HEP_PJS_FETS_1027		
General Tolerance:	Chamfer edges 0.25 x 45		
Drawing #:	p.savage@imperial.ac.uk... 0207 594 7817		
Notes:			
Contact:			

ISOMETRIC VIEW

Front End Test Stand



EDGE VIEW



EDGE VIEW

Sliding fit on
KF40 flange boss.

Ø8 thru,
Sliding fit on
DTI plunger
housing.

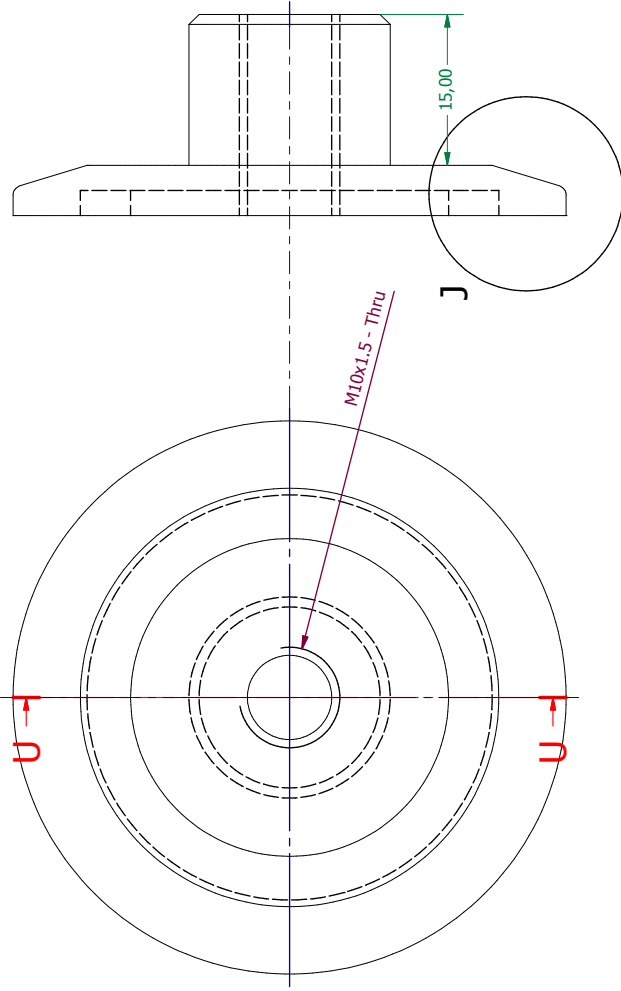


BASE VIEW

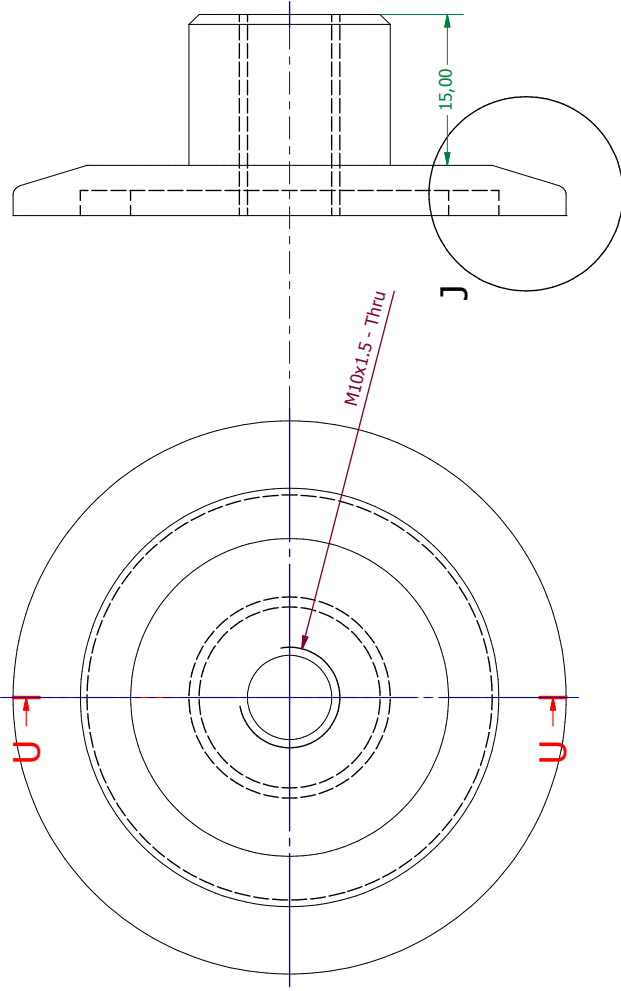
ISOMETRIC VIEW

Title: RFQ Cold Model Tuner - DTI Mount				
Drawn by:	P. Savage	Projection:	Third angle	
Designed by:	P. Savage	Model file:	DTI_Mount.ipt	
Checked by:		Drawing file:	ManualTuner.idw	
Date:	June 2006	Version number:	1	
Manufactured by:		Project:	F.E.T.S.	
Material:	Dural	Sheet number:	10 / 16	
Dimensions:	mm	Number off:	1	
General Tolerance:	See dwg# 1020			
Drawing #:	IC_HEP_PJS_FETS_1029			
Notes:				
Contact:	p.savage@imperial.ac.uk... 0207 594 7817			

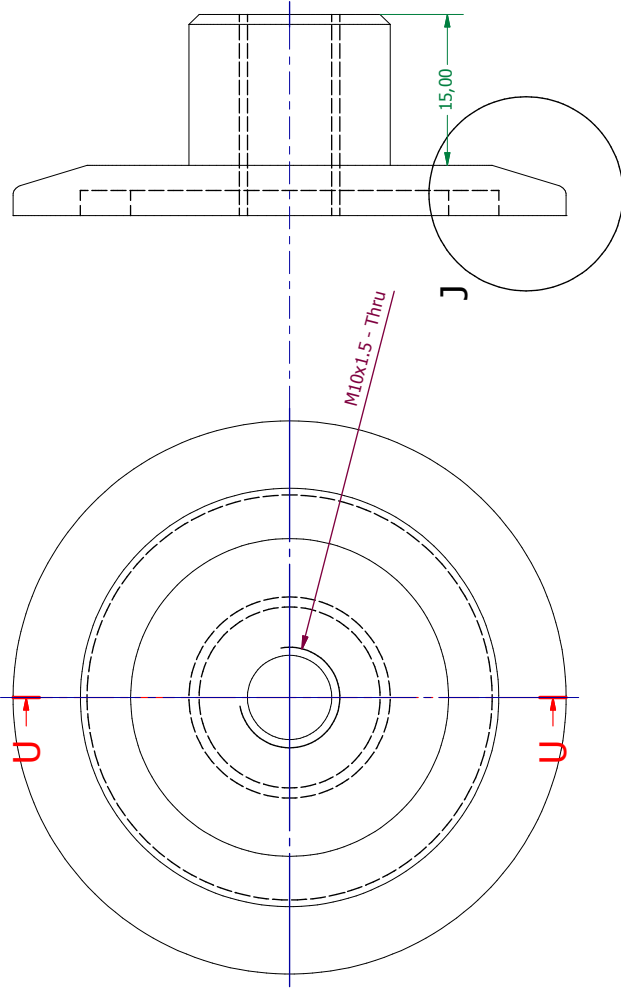
SIDE VIEW



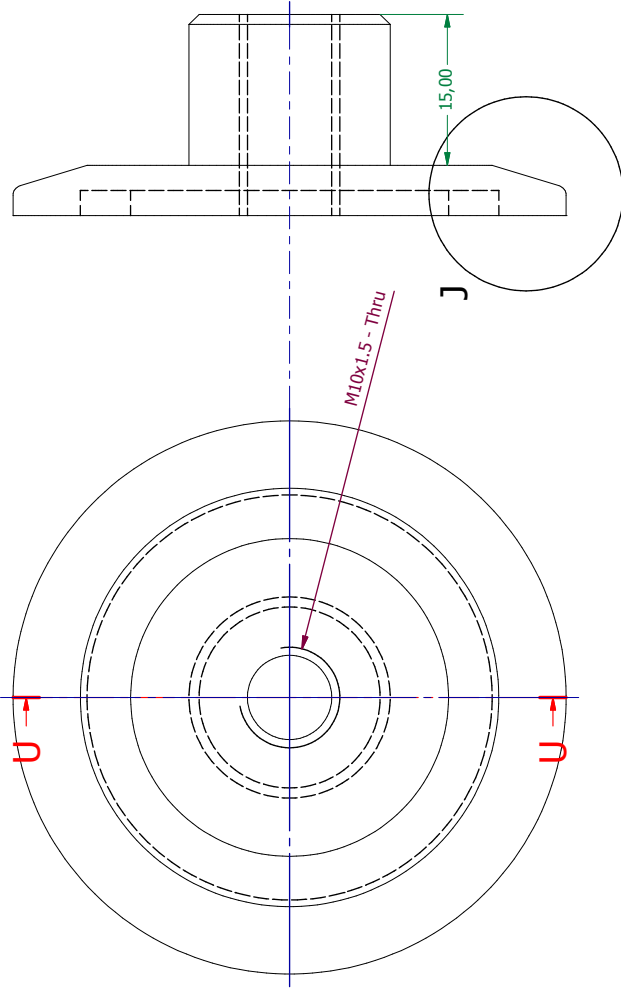
SECTION VIEW



END VIEW



DETAIL VIEW



ISOMETRIC VIEW

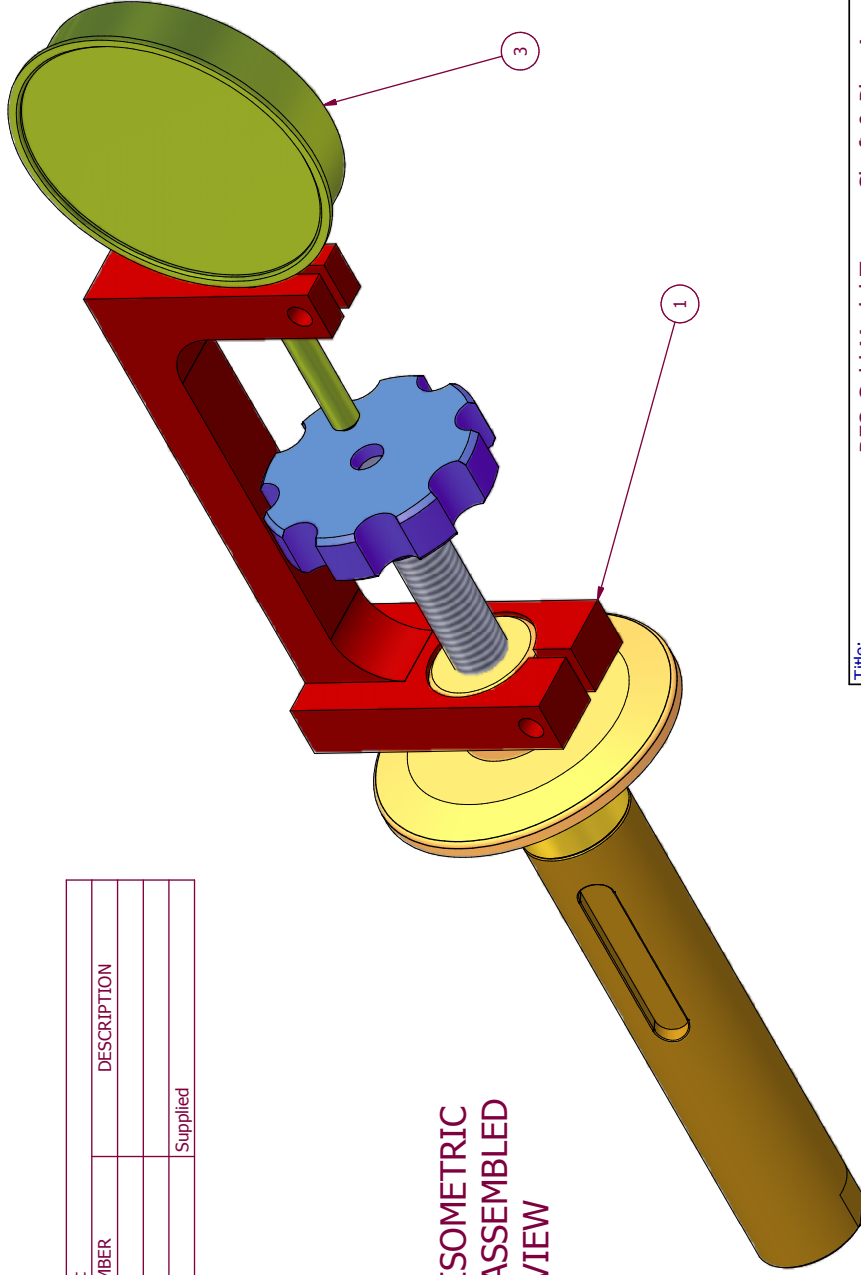
RFQ Cold Model Tuner - KF40 Flange

Title:	P. Savage	Projection:	Third angle
Drawn by:	P. Savage	Model file:	KF40_FlangeEnd.ipt
Designed by:	P. Savage	Drawing file:	ManualTuner.idw
Checked by:	June 2006	Version number:	1
Date:	June 2006	Project:	F.E.T.S.
Manufactured by:	Brass or S. Steel	Sheet number:	11 / 16
Material:	mm	Number off:	1
Dimensions:	See dwg # 1020		
General Tolerance:	IC_HEP_PJS_FETS_1030		
Drawing #:			
Notes:			
Contact:	p.savage@imperial.ac.uk...		

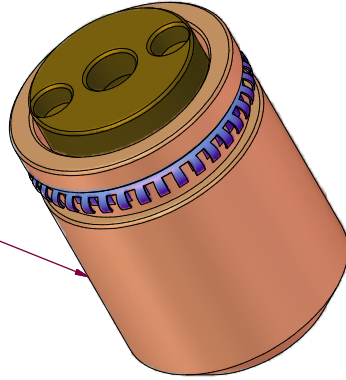
Shaft & Plug Assembly

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	ShaftAssembly	
2	1	PluAssembly	
3	1	DTI	Supplied

Front End Test Stand



ISOMETRIC
ASSEMBLED
VIEW



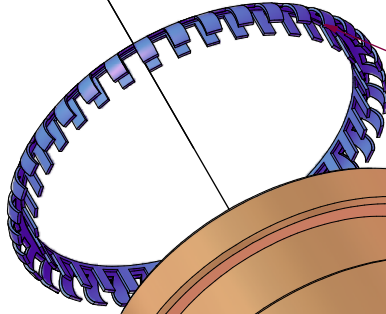
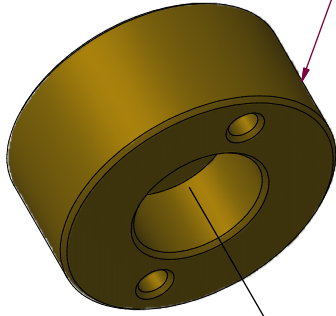
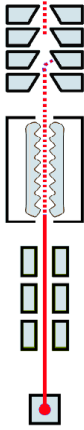
Title: RFQ Cold Model Tuner - Shaft & Plug Assembly

Drawn by:	P. Savage	Projection:	Isometric
Designed by:	P. Savage	Model file:	Shaft+PlugAssembly.iam
Checked by:		Drawing file:	ManualTuner.idw
Date:	June 2006	Version number:	1
Manufactured by:		Project:	F.E.T.S.
Material:	N/A	Sheet number:	12 / 16
Dimensions:	N/A	Number off:	1
General Tolerance:	N/A		
Drawing #:	IC_HEP_PJS_FETS_1031		
Notes:			
Contact:	p.savage@imperial.ac.uk	0207 594 7817	

Plug Assembly

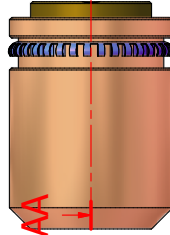
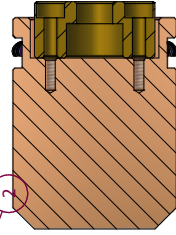
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	Plug	
2	1	PlugRetainer	
3	1	FingerStrip	

Front End Test Stand



ISOMETRIC
EXPLODED VIEW

SECTION VIEW
AA-AA (0.80 : 1)



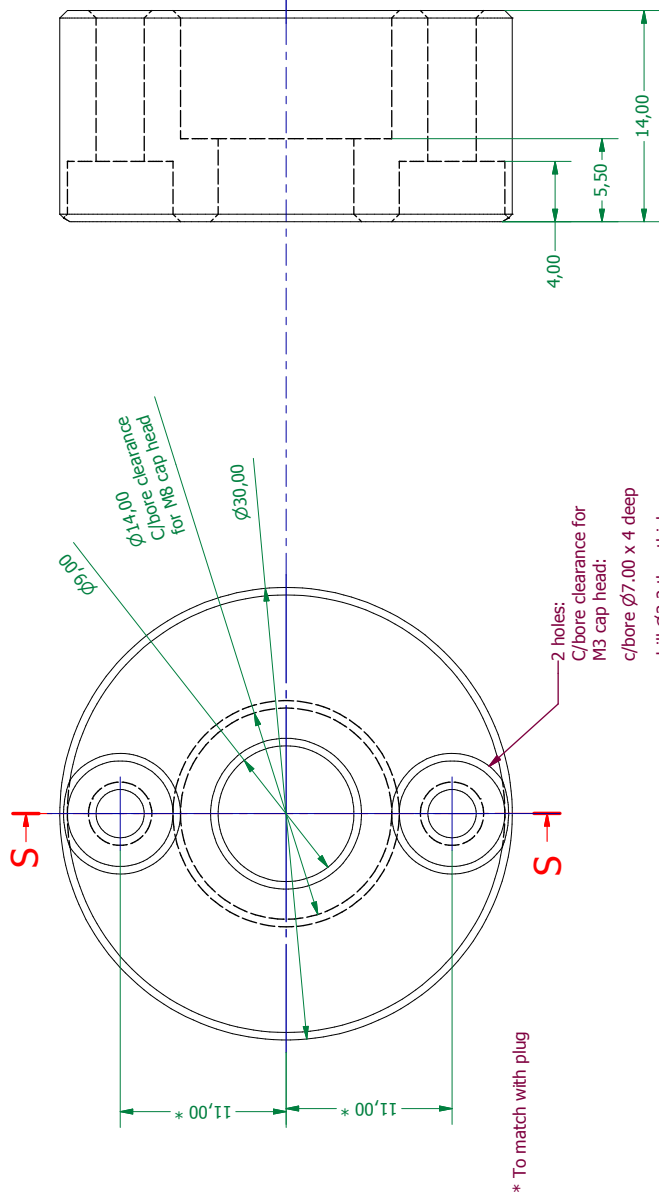
SIDE VIEW

RFQ Cold Model Tuner - Plug Assembly			
Drawn by:	P. Savage	Projection:	Isometric
Designed by:	P. Savage	Model file:	PlugAssembly.iam
Checked by:		Drawing file:	ManualTuner.idw
Date:	June 2006	Version number:	1
Manufactured by:		Project:	F.E.T.S.
Material:	N/A	Sheet number:	13 / 16
Dimensions:	N/A	Number off:	1
General Tolerance:	N/A		
Drawing #:	IC_HEP_PJS_FETS_1032		
Notes:			
Contact:	p.savage@imperial.ac.uk., 0207 594 7817		

Finger strip can be joined using adhesive tape, small rivets or screws or by clipping to a suitable protrusion. dheseve is not recommended for large transverse loads. See http://www.p-p-t.co.uk/contact_finger_strip.html

Plug Retainer

Front End Test Stand



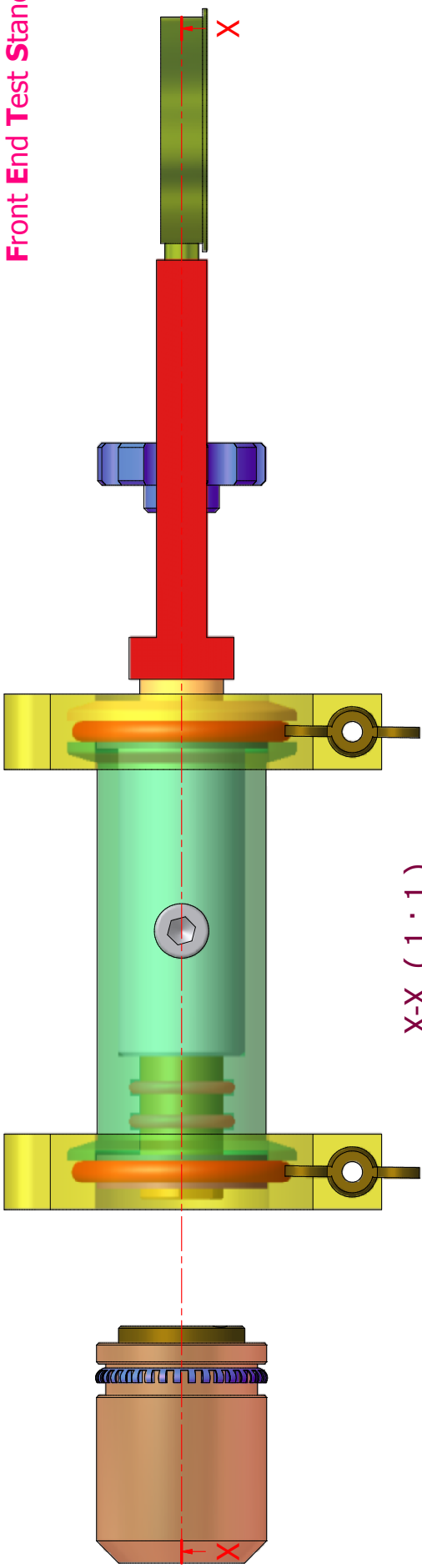
END VIEW

SIDE VIEW

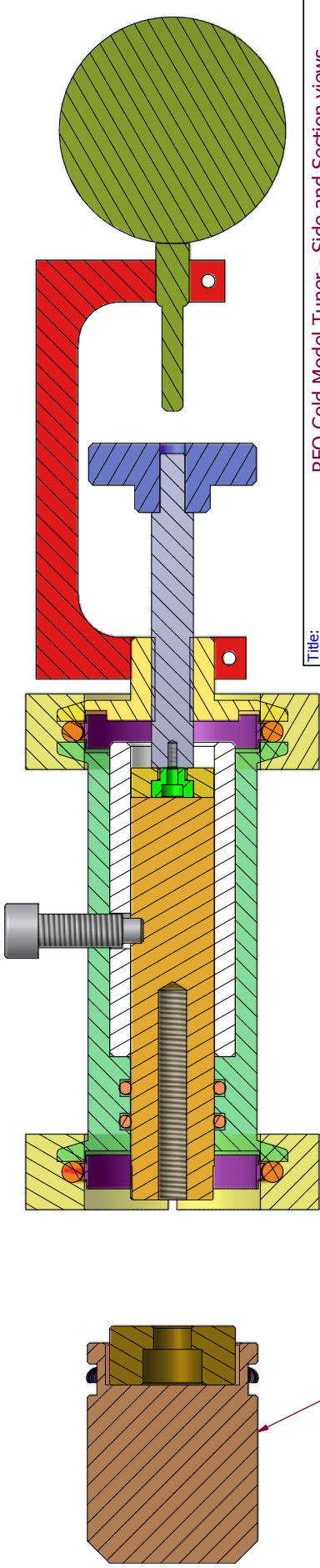
Title: RFQ Cold Model Tuner - Plug Retainer			
Drawn by:	P. Savage	Projection:	Third angle
Designed by:	P. Savage	Model file:	PlugRetainer.ipt
Checked by:		Drawing file:	ManualTuner.idw
Date:	June 2006	Version number:	1
Manufactured by:		Project:	F.E.T.S.
Material:	Dural	Sheet number:	15 / 16
Dimensions:	mm	Number off:	1
General Tolerance:	See dwg# 1020		
Drawing #:	IC_HEP_PJS_FETS_1034		
Notes:			
Contact:	p.savage@imperial.ac.uk 0207 594 7817		

ISOMETRIC VIEW

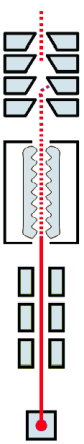
Complete Assembly



X-X (1 : 1)



There should be play between the plug and the shaft when fully assembled. This allows for misalignment between the KF40 flanges and prevents binding when tightening the KF40 clamps.



Front End Test Stand

RFQ Cold Model Tuner - Side and Section views

Title:	Drawn by:	P. Savage	Projection:	Third angle
	Designed by:	P. Savage	Model file:	Complete.iam
	Checked by:		Drawing file:	ManualTuner.idw
	Date:	Feb 07	Version number:	2
	Manufactured by:		Project:	F.E.T.S.
	Material:	N/A	Sheet number:	16 / 16
	Dimensions:	N/A	Number off:	1
	General Tolerance:	N/A		
	Drawing #:	IC_HEP_PJS_FETS_1035		
	Notes:			
	Contact:	p.savage@imperial.ac.uk 0207 594 7817		