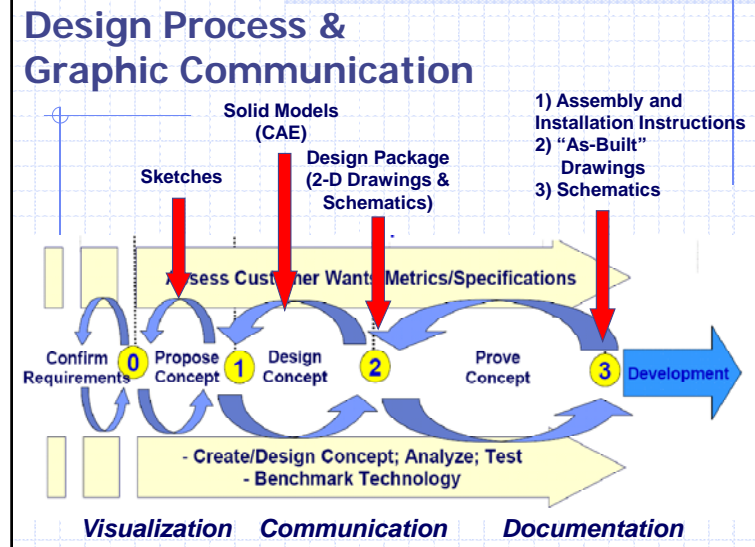


Creating Design Packages

Jim Glancey
MEEG 304 – Machine Design Elements



Drawing Packages

- Contains all the descriptive documentation needed to ensure a part or system can be manufactured and assembled.
- Drawing Package = a group of drawings that communicate the details of a system or sub-system.
- Needs to be finished before any parts can be made.
- The final drawing package will be given to your customer.

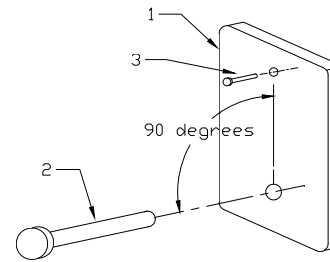
Drawing Package Elements

- Package Content
 - Drawings for each component linked to parent assembly
 - One or more assembly drawings
 - 2D or 3D
 - Assembled or Exploded
 - Label all components
 - Include a *Bill of Materials*
 - Link to component drawings
 - May also include wiring, pneumatic and other diagrams to communicate and illustrate connectivity and installation.

Drawing Package Organization

- Full Assembly & Bill of Materials
 - Sub Assembly #1
 - Sub Assembly #2
 - Sub Assembly #3
 - Parts in Sub Assembly #1
 - Parts in Sub Assembly #2
 - Parts in Sub Assembly #3
- Etc...

Exploded Assembly



Bill of Materials			
Item	Name	Quantity	Amount
1	Base plate	1	1/2x3x4 plate
2	Pin	1	1/2x3 round
3	10-32 Screw	1	1.5 long

Notes:
- Press Pin into Base Plate Until Flush with Back Side

TOLERANCES UNLESS OTHERWISE NOTED:	PROJECT OR CLASS: MEEG 202
DECIMAL .XXX ± .005 .XX ± .010 .X ± .050	DRAWING TITLE: Coat Hook Assembly
FRACTIONAL ± 1/32	DRAWN BY: Griffith/DePompeo DATE: 3/5/05
ANGULAR ± 0.5 DEG	APPROVED BY: DATE:
	MATERIAL: ALUMINUM QUANTITY: 1
	SCALE: 1:1 INCH DRG NO: 3 of 3
	BILLING ACCOUNT:

Notes:
All dimensions in inches
Break all sharp edges

Part 1

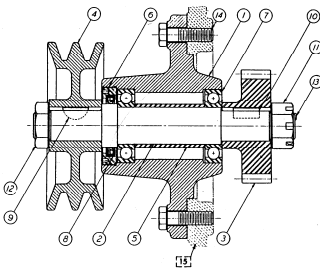
TOLERANCES UNLESS OTHERWISE NOTED:	PROJECT OR CLASS: MEEG 202
DECIMAL .XXX ± .005 .XX ± .010 .X ± .050	DRAWING TITLE: Base Plate
FRACTIONAL ± 1/32	DRAWN BY: Griffith/DePompeo DATE: 3/5/05
ANGULAR ± 0.5 DEG	APPROVED BY: DATE:
	MATERIAL: ALUMINUM QUANTITY: 1
	SCALE: 1:1 INCH DRG NO: 1
	BILLING ACCOUNT:

Part 2

Notes:
All dimensions in inches
Break all sharp edges

TOLERANCES UNLESS OTHERWISE NOTED:	PROJECT OR CLASS: MEEG 202
DECIMAL .XXX ± .005 .XX ± .010 .X ± .050	DRAWING TITLE: Pin
FRACTIONAL ± 1/32	DRAWN BY: Griffith/DePompeo DATE: 3/5/05
ANGULAR ± 0.5 DEG	APPROVED BY: DATE:
	MATERIAL: ALUMINUM QUANTITY: 1
	SCALE: 1:1 INCH DRG NO: 2 of 3
	BILLING ACCOUNT:

Example 2D Sectioned Assembly



BILL OF MATERIAL				
PART NO	NAME	MATL	REDD	NOTES
1	BASE	CI	1	
2	SHAFT	KD30STL	1	
3	GEAR	3003STL	1	
4	DOUBLE V-PULLIFY	7075ALUM	1	
5	SLEEVE	KD30STL	1	
6	BEARING RETAINER	KD30STL	1	
7	BEARINGS		2	NEW DEPARTURE # 3207, LIGHT SERIES
8	GREASE SEAL		1	PERFECT OIL SEAL #23520
9	WOODRUFF KEY		1	*K008
10	FRUIT & WHITNEY KEY		1	*B
11	HEX SLOTTED NUT		1	1-14NF-2B SEM-FIN REG
12	REG HEX JAM NUT		1	1-14NF-2B SEM-FIN
13	COTTER PIN		1	1/2 - SAC
14	HEX HD CAP SCR		4	1/2-13-UNC-2A x 2LG SEM-FIN

Engineering Drawings Typical Content

- Geometry of an object
- Material type and characteristics
- Manufacturing requirements
- Surface finishes and features
- Tolerances (primarily geometric)
- Other (eg. assembly information)

Drawing Title Block

- Typical Title Block Contents:
 - Material
 - Scale
 - Tolerance
 - Description
 - Team name
 - Part number
 - Sheet "number" of "total number of sheets"
 - Part drawn by and date drawn
 - Checked by and date checked
 - File Name
 - Quantity

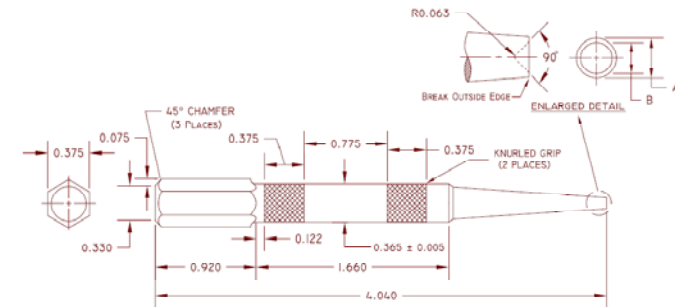
Typical

COMPANY: OMW CORPORATION TITLE: BEARING ALIGNMENT BLOCK LOWER SIDE LEFT PREPARED AND CONSIDERED THE INFORMATION CONTAINED HEREIN TO BE CORRECT AND COMPLETE FOR THE PURPOSES OF THE DRAWING. THE USER SHALL BE RESPONSIBLE FOR THE PROPER INTERPRETATION OF THE DRAWING AND FOR THE PROPER SELECTION OF MATERIALS AND METHODS OF MANUFACTURE AND ASSEMBLY.	PART: 82 HEAD BLAST DRAWN: BOSS GARO DATE: 3/3/05 SCALE: 11 WEIGHTS & MEASUREMENTS SHEET 1 OF 1
---	--

UDME

Notes:
ALL dimensions in inches
Break all sharp edges

TOLERANCES UNLESS OTHERWISE SPECIFIED:	PROJECT OR CLASS:
DECIMAL .XXX ± .006 .XX ± .010 .X ± .050	MEEG 202
FRACTIONAL ± 1/32	DRAWING TITLE:
ANGULAR ± 0.5 DEG	Pin
	DRAWN BY: Griff Fitch/DePompeo
	DATE: 3/5/05
	APPROVED BY: _____
	MATERIAL: ALUMINUM
	QUANTITY: 1
	SCALE: 11 INCH
	IRG NO: 2 of 3
	BILLING ACCOUNT:

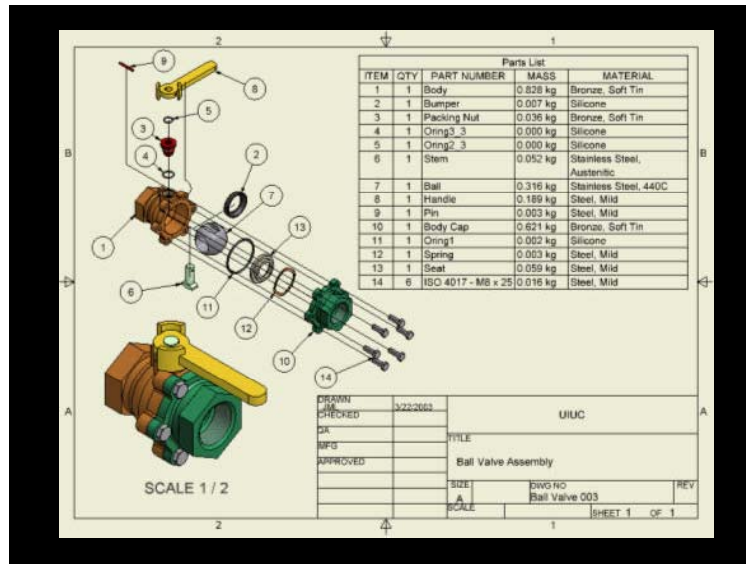


- NOTES: 1) TIP HARDENED TO 52-54 HRC
2) NO TOOL MARKS ON TAPER OR BARREL SECTIONS
3) STAMPED LABEL INCLUDES: NAME, PART NUMBER, SIZE AND WARNING MESSAGE "WARNING: ALWAYS WEAR SAFETY GLASSES"
4) SURFACE FINISH TO BE BLACK OXIDE WITH RUST PREVENTION
5) ALL DIMENSIONS IN INCHES
6) NOT TO SCALE

PART #	A	B
471	0.065	0.032
472	0.100	0.062
473	0.125	0.094
474	0.156	0.125

TOLERANCE ±	+0.010	+0.010
	-0.010	-0.010

TOOL FRANKER'S USE THIS OTHERWISE SPECIFIED:	BALTIMORE TOOL WORKS, INC.
DECIMAL: .X ± 0.1 .XX ± 0.050 .XXX ± 0.010	PART: Import Nail Set DRAWN BY: J. Glancey, P.E. DATE: 5/15/03 LAST REVISION: 5/15/03
ANGULAR: ± 1°	MATERIAL: AISI 6150 (Fine Grain/Special Quality) Steel Hex FILE NAME: Import_Nail_Set-Rev 1.dwg

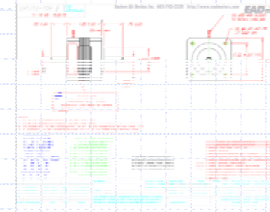


Purchased Parts

- Most manufactures provide electronic drawings.
- Do not need to be fully dimensioned in drawing unless modified after they are purchased
- Add a note for the material giving the part number and contact info of the company the part was purchased from



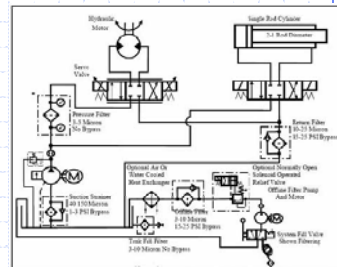
Stepper Motor



Drawing Provided by Manufacturer

Diagrams

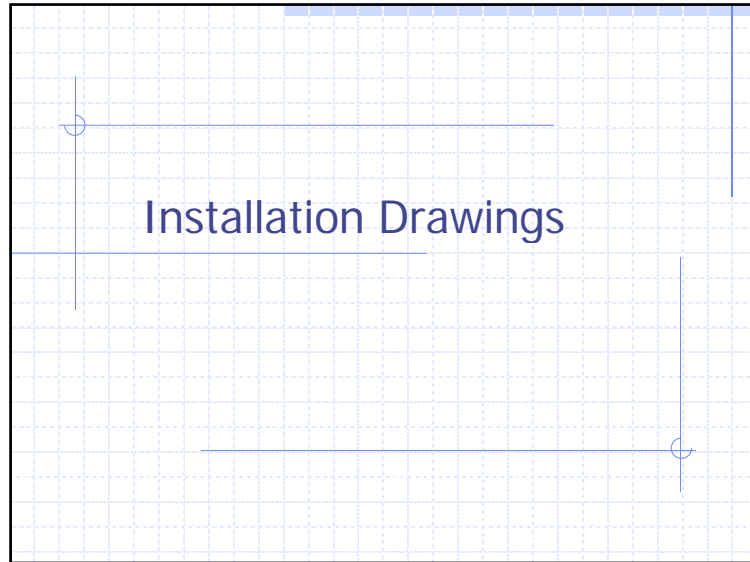
- Same principles apply to assembly diagrams
 - Circuits
 - Pneumatic
 - Hydraulic
 - Logic
- Used to show connectivity and operation.



Don't Forget about Sketching

- Technical sketches (i.e. to scale) are a great way convey ideas.
- Attempting to sketch in SolidWorks often presents more obstacles than just using pencil and paper.
- Jumping into SolidWorks before your design intentions are clear causes problems. i.e. origins, planes, etc...





Installation Drawing Requirements

- Necessary to insure proper installation of a new design.
- Adapting into or onto an existing system.
 - Demolition
 - Modifications (holes, cutouts, etc.)
- Can integrate/illustrate several sub-systems (mechanical, electrical, controls, etc.).

