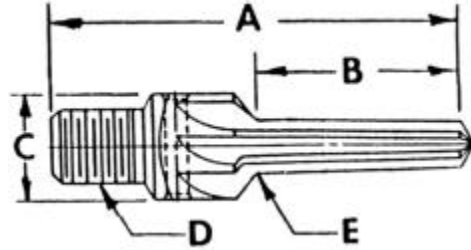


**UTLD-2060AR
Series-Groups 1-2-3**

Six Flute Flush Head Taper Lock Machine Reamer for 16 RMS Finishes

UTLD-2060AR SERIES



6 Flute Flush Head Machine Reamer for Excellent Finishes

For 100° Angle Head Flush Fasteners. - Straight Flutes - Cleans up Holes. Use with correct feeds, speeds and cutting fluids.

GROUP 1 & NOM FAST R	UNITED PART NO. GROUP 1	A OVERALL LENGTH	B FLUTE LENGTH	C BODY DIA	D THD	E FILLET RADIUS
1/8	UTLD-2060AR-1-04	1.562	.625	.365	1/4-28	.025
5/32	UTLD-2060AR-1-05	1.687	.750	.365	1/4-28	.025
3/16	UTLD-2060AR-1-3	1.812	.875	.490	1/4-28	.030
7/32	UTLD-2060AR-1-07	1.937	1.000	.490	1/4-28	.030
1/4	UTLD-2060AR-1-4	2.062	1.125	.553	1/4-28	.030
5/16	UTLD-2060AR-1-5	2.625	1.250	.740	7/16-20	.040
3/8	UTLD-2060AR-1-6	2.750	1.375	.865	7/16-20	.040
7/16	UTLD-2060AR-1-7	3.187	1.625	.990	7/16-20	.050
1/2	UTLD-2060AR-1-8	3.375	1.812	1.115	7/16-20	.050
9/16	UTLD-2060AR-1-9	4.750	2.437	1.290	5/8-18	.070
5/8	UTLD-2060AR-1-10	5.062	2.625	1.420	5/8-18	.070
3/4	UTLD-2060AR-1-12	5.875	2.812	1.600	1"-14	.080
7/8	UTLD-2060AR-1-14	6.500	3.312	1.850	1"-14	.080
1"	UTLD-2060AR-1-16	7.000	3.687	2.100	1"-14	.080

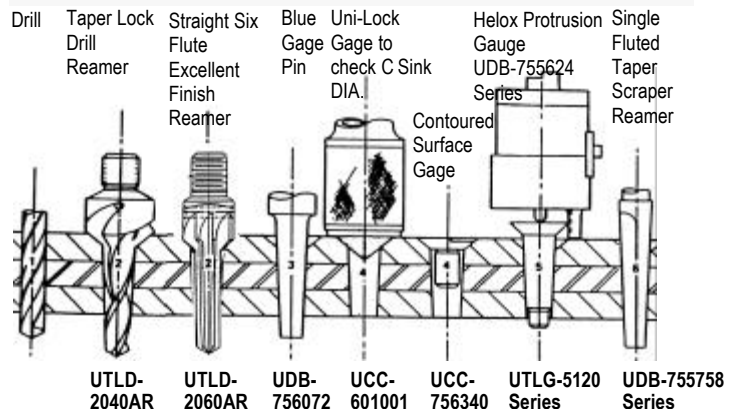
GROUP 2 & NOM FAST R	UNITED PART NO. GROUP 2	A OVERALL LENGTH	B FLUTE LENGTH	C BODY DIA	D THD	E FILLET RADIUS
1/8	UTLD-2060AR-2-04	1.875	.937	.365	1/4-28	.025
5/32	UTLD-2060AR-2-05	2.062	1.125	.365	1/4-28	.025
3/16	UTLD-2060AR-2-3	2.312	1.375	.490	1/4-28	.030
7/32	UTLD-2060AR-2-07	2.500	1.562	.490	1/4-28	.030
1/4	UTLD-2060AR-2-4	3.125	1.750	.615	7/16-20	.030
5/16	UTLD-2060AR-2-5	3.312	1.937	.740	7/16-20	.040
3/8	UTLD-2060AR-2-6	3.500	2.125	.865	7/16-20	.040
7/16	UTLD-2060AR-2-7	4.062	2.500	.990	7/16-20	.050
1/2	UTLD-2060AR-2-8	4.375	2.812	1.115	7/16-20	.050
9/16	UTLD-2060AR-2-9	6.250	3.937	1.290	5/8-18	.070
5/8	UTLD-2060AR-2-10	6.687	4.250	1.420	5/8-18	.070
3/4	UTLD-2060AR-2-12	7.750	4.687	1.600	1"-14	.080
7/8	UTLD-2060AR-2-14	8.750	5.562	1.850	1"-14	.080
1"	UTLD-2060AR-2-16	9.500	6.187	2.100	1"-14	.080

SEQUENCE FOR TWO STEP DRILL/REAM USING POSITIVE FEED EQUIPMENT AND DRILL BAR; FLUSH FASTENER, ALUMINUM STRUCTURE

- STEP 1. **PRE-DRILL:** Select drill size from Pre-Drill section.
- STEP 2. **TAPER REAM:** Use UTLD-2060AR for excellent finish or see Taper Lock Equipment in this section for cutter selection.
- STEP 3. **BEARING PROBE:** See Bearing Check section for applicable probe.
- STEP 4. **COUNTERSINK DIAMETER CHECK:** For normal surfaces, use Uni-Lock Countersink Gage, and for normal or inclined surfaces, use UDB 756340 Series. See Gage Selection chart for proper gage. See Taper Lock Equipment section for countersink diameters.
- STEP 5. **PROTRUSION CHECK:** For TL100 Series, use UDB 755624 Series for inclined surfaces, or scale according to values listed in Protrusion Gage section.
- STEP 6. **TAPER SCRAPE HOLE:** If necessary, use UDB 755758 Series. See section for Re-Work of Straight Holes to Taper Lock for appropriate Taper Scraper. Protrusion and bearing check must be made after this operation.

GROUP 3 & NOM FAST R	UNITED PART NO. GROUP 3	A OVERALL LENGTH	B FLUTE LENGTH	C BODY DIA	D THD	E FILLET RADIUS
1/8	UTLD-2060AR-3-04	2.187	1.250	.365	1/4-28	.025
5/32	UTLD-2060AR-3-05	2.437	1.500	.365	1/4-28	.025
3/16	UTLD-2060AR-3-3	2.812	1.850	.490	1/4-28	.030
7/32	UTLD-2060AR-3-07	3.000	2.062	.490	1/4-28	.030
1/4	UTLD-2060AR-3-4	3.750	2.375	.615	7/16-20	.030
5/16	UTLD-2060AR-3-5	4.000	2.625	.740	7/16-20	.040
3/8	UTLD-2060AR-3-6	4.250	2.875	.865	7/16-20	.040
7/16	UTLD-2060AR-3-7	4.937	3.375	.990	7/16-20	.050
1/2	UTLD-2060AR-3-8	5.375	3.812	1.115	7/16-20	.050
9/16	UTLD-2060AR-3-9	7.750	5.437	1.290	5/8-18	.070
5/8	UTLD-2060AR-3-10	8.312	5.875	1.420	5/8-18	.070
3/4	UTLD-2060AR-3-12	9.625	6.562	1.600	1"-14	.080
7/8	UTLD-2060AR-3-14	11.000	7.812	1.850	1"-14	.080
1"	UTLD-2060AR-3-16	12.000	8.687	2.100	1"-14	.080

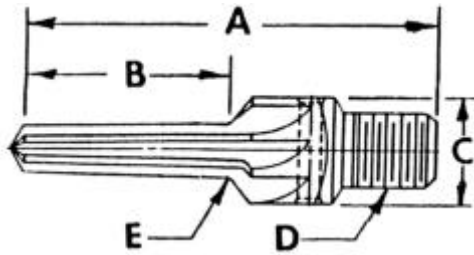
TAPER LOCK HOLE PREPARATION



Six Flute Flush Head Taper Lock Machine Reamer for 16 RMS Finishes

UTLD-2060AR
Series-Groups 4-5-6

UTLD-2060AR SERIES



Available in M-7 HSS, Cobalt and Carbide with oil holes Specify. **6 Flute Flush Head Machine Reamer for Excellent Finishes**

GROUP 4 & NOM FAST R	UNITED PART NO. GROUP 4	A OVERALL LENGTH	B FLUTE LENGTH	C BODY DIA	D THD	E FILLET RADIUS
1/8	UTLD-2060AR-4-04	2.187	1.250	.365	1/4-28	.025
5/32	UTLD-2060AR-4-05	2.437	1.500	.365	1/4-28	.025
3/16	UTLD-2060AR-4-3	2.812	1.875	.490	1/4-28	.030
7/32	UTLD-2060AR-4-07	3.000	2.062	.490	1/4-28	.030
1/4	UTLD-2060AR-4-4	3.750	2.375	.615	7/16-20	.030
5/16	UTLD-2060AR-4-5	4.000	2.625	.740	7/16-20	.040
3/8	UTLD-2060AR-4-6	4.250	2.875	.865	7/16-20	.040
7/16	UTLD-2060AR-4-7	4.937	3.375	.990	7/16-20	.050
1/2	UTLD-2060AR-4-8	5.375	3.812	1.115	7/16-20	.050
9/16	UTLD-2060AR-4-9	7.750	5.437	1.290	5/8-18	.070
5/8	UTLD-2060AR-4-10	8.312	5.875	1.420	5/8-18	.070
3/4	UTLD-2060AR-4-12	9.625	6.562	1.600	1"-14	.080
7/8	UTLD-2060AR-4-14	11.000	7.812	1.850	1"-14	.080
1"	UTLD-2060AR-4-16	12.000	8.867	2.100	1"-14	.080

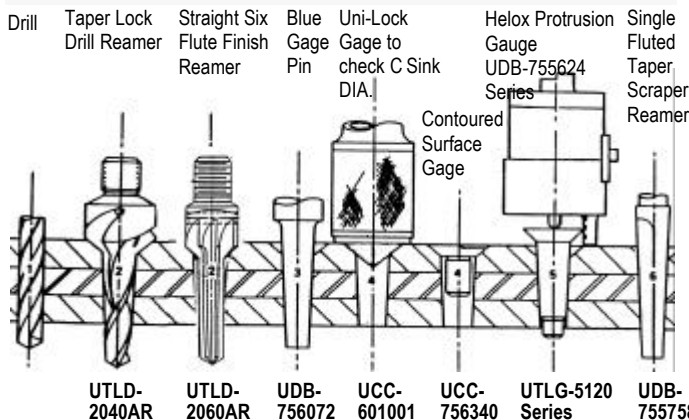
GROUP 5 & NOM FAST R	UNITED PART NO. GROUP 5	A OVERALL LENGTH	B FLUTE LENGTH	C BODY DIA	D THD	E FILLET RADIUS
3/16	UTLD-2060AR-5-3	3.250	1.875	.615	7/16-20	.030
1/4	UTLD-2060AR-5-4	3.750	2.375	.615	7/16-20	.030
5/16	UTLD-2060AR-5-5	4.000	2.625	.740	7/16-20	.040
3/8	UTLD-2060AR-5-6	4.250	2.875	.865	7/16-20	.040
7/16	UTLD-2060AR-5-7	4.937	3.375	1.050	7/16-20	.050
1/2	UTLD-2060AR-5-8	5.375	3.812	1.150	7/16-20	.050
9/16	UTLD-2060AR-5-9	7.750	5.437	1.290	5/8-18	.070
5/8	UTLD-2060AR-5-10	8.312	5.875	1.420	5/8-18	.070
3/4	UTLD-2060AR-5-12	9.625	6.562	1.600	1"-14	.080
7/8	UTLD-2060AR-5-14	11.000	7.812	1.850	1"-14	.080
1"	UTLD-2060AR-5-16	12.000	8.687	2.100	1"-14	.080

GROUP 6 & NOM FAST R	UNITED PART NO. GROUP 6	A OVERALL LENGTH	B FLUTE LENGTH	C BODY DIA	D THD	E FILLET RADIUS
3/16	UTLD-2060AR-6-3	3.250	1.875	.615	7/16-20	.030
1/4	UTLD-2060AR-6-4	3.750	2.375	.615	7/16-20	.030
5/16	UTLD-2060AR-6-5	4.000	2.625	.740	7/16-20	.040
3/8	UTLD-2060AR-6-6	4.250	2.875	.865	7/16-20	.040
7/16	UTLD-2060AR-6-7	4.937	3.375	1.050	7/16-20	.050
1/2	UTLD-2060AR-6-8	5.375	3.812	1.150	7/16-20	.050
9/16	UTLD-2060AR-6-9	7.750	5.437	1.290	5/8-18	.070
5/8	UTLD-2060AR-6-10	8.312	5.875	1.420	5/8-18	.070
3/4	UTLD-2060AR-6-12	9.625	6.562	1.600	1"-14	.080
7/8	UTLD-2060AR-6-14	11.000	7.812	1.850	1"-14	.080
1"	UTLD-2060AR-6-16	12.000	8.687	2.100	1"-14	.080

SEQUENCE FOR TWO STEP DRILL/REAM USING POSITIVE FEED EQUIPMENT AND DRILL BAR; FLUSH FASTENER, ALUMINUM STRUCTURE

- STEP 1. **PRE-DRILL:** Select drill size from Pre-Drill section.
- STEP 2. **TAPER REAM:** Use UTLD-2060AR for excellent finish or see Taper Lock Equipment in this section for cutter selection.
- STEP 3. **BEARING PROBE:** See Bearing Check section for applicable probe.
- STEP 4. **COUNTERSINK DIAMETER CHECK:** For normal surfaces, use Uni-Lock Countersink Gage, and for normal or inclined surfaces, use UDB 756340 Series. See Gage Selection chart for proper gage. See Taper Lock Equipment section for countersink diameters.
- STEP 5. **PROTRUSION CHECK:** For TL100 Series, use UDB 755624 Series for inclined surfaces, or scale according to values listed in Protrusion Gage section.
- STEP 6. **TAPER SCRAPE HOLE:** If necessary, use UDB 755758 Series. See section for Re-Work of Straight Holes to Taper Lock for appropriate Taper Scraper. Protrusion and bearing check must be made after this operation.

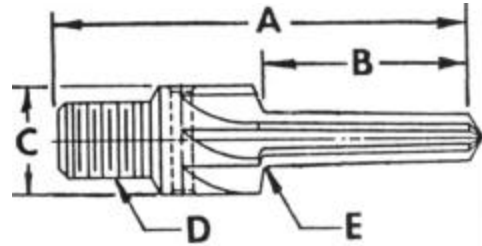
TAPER LOCK HOLE PREPARATION



**UTLD-2060BR
Series-Groups 1-2-3**

Six Straight Flutes for Protruding Head Machine Reamer for 16 RMS Finishes

UTLD-2060BR SERIES



6 Straight Flutes Machine Reamer for Protruding Head for Excellent Finishes

Used for clean up of critical areas.

GROUP 1 & NOM FAST R	UNITED PART NO. GROUP 1	A OVERALL LENGTH	B FLUTE LENGTH	C BODY DIA	D THD	E FILLET RADIUS
1/8	UTLD-2060BR-1-04	1.562	.625	.365	1/4-28	.025
5/32	UTLD-2060BR-1-05	1.687	.750	.365	1/4-28	.025
3/16	UTLD-2060BR-1-3	1.812	.875	.490	1/4-28	.025
7/32	UTLD-2060BR-1-07	1.937	1.000	.490	1/4-28	.025
1/4	UTLD-2060BR-1-4	2.062	1.125	.553	7/16-20	.025
5/16	UTLD-2060BR-1-5	2.625	1.250	.615	7/16-20	.030
3/8	UTLD-2060BR-1-6	2.750	1.375	.615	7/16-20	.030
7/16	UTLD-2060BR-1-7	3.187	1.625	.615	7/16-20	.040
1/2	UTLD-2060BR-1-8	3.375	1.812	.678	7/16-20	.040
9/16	UTLD-2060BR-1-9	4.750	2.437	.980	5/8-18	.073
5/8	UTLD-2060BR-1-10	5.062	2.625	1.100	5/8-18	.073
3/4	UTLD-2060BR-1-12	5.875	2.812	1.420	1"-14	.073
7/8	UTLD-2060BR-1-14	6.500	3.312	1.420	1"-14	.073
1"	UTLD-2060BR-1-16	7.000	3.687	1.600	1"-14	.073

GROUP 2 & NOM FAST R	UNITED PART NO. GROUP 2	A OVERALL LENGTH	B FLUTE LENGTH	C BODY DIA	D THD	E FILLET RADIUS
1/8	UTLD-2060BR-2-04	1.875	.937	.365	1/4-28	.025
5/32	UTLD-2060BR-2-05	2.062	1.125	.365	1/4-28	.025
3/16	UTLD-2060BR-2-3	2.312	1.375	.490	1/4-28	.025
7/32	UTLD-2060BR-2-07	2.500	1.562	.490	1/4-28	.025
1/4	UTLD-2060BR-2-4	3.125	1.750	.615	7/16-20	.025
5/16	UTLD-2060BR-2-5	3.312	1.937	.615	7/16-20	.030
3/8	UTLD-2060BR-2-6	3.500	2.125	.615	7/16-20	.030
7/16	UTLD-2060BR-2-7	4.062	2.500	.615	7/16-20	.040
1/2	UTLD-2060BR-2-8	4.375	2.812	.678	7/16-20	.040
9/16	UTLD-2060BR-2-9	6.250	3.937	.980	5/8-18	.073
5/8	UTLD-2060BR-2-10	6.687	4.250	1.100	5/8-18	.073
3/4	UTLD-2060BR-2-12	7.750	4.687	1.420	1"-14	.073
7/8	UTLD-2060BR-2-14	8.750	5.562	1.420	1"-14	.073
1"	UTLD-2060BR-2-16	9.500	6.187	1.600	1"-14	.073

SEQUENCE FOR ONE SHOT TAPER DRILL USING POSITIVE FEED EQUIPMENT AND DRILL BARS; PROTRUDING FASTENER

STEP 1. **TAPER DRILL:** Select proper equipment from Taper Lock Equipment in this section.

STEP 2. **BEARING PROBE:** Use UDB 756072 Series. See Gage section for applicable probe, based on fastener size and group.

STEP 3. **PROTRUSION CHECK:** For TL200 Series, use UDB 755620 Series for inclined surface. For normal surface, use UDB 755820 Series, or scale using values listed in Protrusion Gage section.

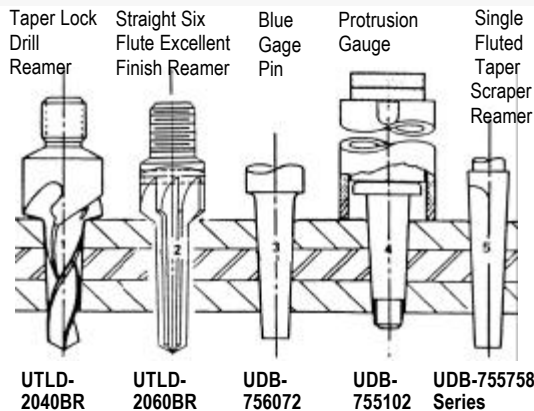
STEP 4. **TAPER SCRAPE HOLE:** If necessary, use UDB 755758 Series single flute scraper. Protrusion and bearing check must be made after this operation.

GROUP 3 & NOM FAST R	UNITED PART NO. GROUP 3	A OVERALL LENGTH	B FLUTE LENGTH	C BODY DIA	D THD	E FILLET RADIUS
1/8	UTLD-2060BR-3-04	2.187	1.250	.365	1/4-28	.025
5/32	UTLD-2060BR-3-05	2.437	1.500	.365	1/4-28	.025
3/16	UTLD-2060BR-3-3	2.812	1.875	.490	1/4-28	.025
7/32	UTLD-2060BR-3-07	3.000	2.062	.490	1/4-28	.025
1/4	UTLD-2060BR-3-4	3.750	2.375	.615	7/16-20	.025
5/16	UTLD-2060BR-3-5	4.000	2.625	.615	7/16-20	.030
3/8	UTLD-2060BR-3-6	4.250	2.875	.615	7/16-20	.030
7/16	UTLD-2060BR-3-7	4.937	3.375	.615	7/16-20	.040
1/2	UTLD-2060BR-3-8	5.375	3.812	.678	7/16-20	.040
9/16	UTLD-2060BR-3-9	7.750	5.437	.980	5/8-18	.073
5/8	UTLD-2060BR-3-10	8.312	5.875	1.100	5/8-18	.073
3/4	UTLD-2060BR-3-12	9.625	6.562	1.420	1"-14	.073
7/8	UTLD-2060BR-3-14	11.000	7.812	1.420	1"-14	.073
1"	UTLD-2060BR-3-16	12.000	8.687	1.600	1"-14	.073

TAPER LOCK HOLE PREPARATION

Use with correct speeds, feeds and cutting fluids for maximum smoothness and excellent finish.

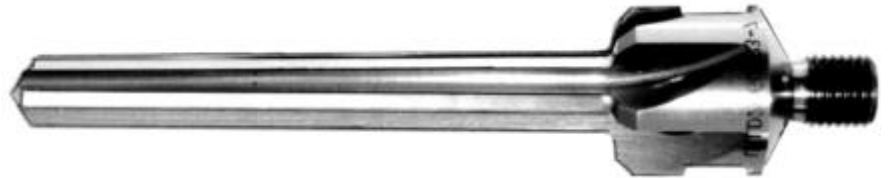
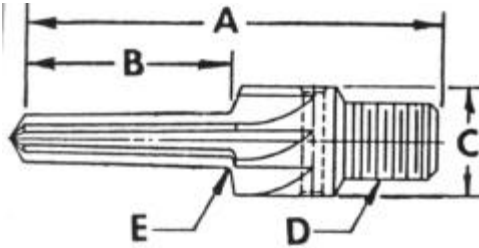
Available with coolant holes if specified.



Six Straight Flutes for Protruding Head Machine Reamer for 16 RMS Finishes

UTLD-2060BR
Series-Groups 4-5-6

UTLD-2060BR SERIES



Available with coolant ports on request.

6 Straight Flutes Machine Reamer for Protruding Head for Excellent Finishes

GROUP 4 & NOM FAST R	UNITED PART NO. GROUP 4	A OVERALL LENGTH	B FLUTE LENGTH	C BODY DIA	D THD	E FILLET RADIUS
1/8	UTLD-2060BR-4-04	2.187	1.250	.490	1/4-28	.025
5/32	UTLD-2060BR-4-05	2.437	1.500	.490	1/4-28	.025
3/16	UTLD-2060BR-4-3	2.812	1.875	.490	1/4-28	.025
7/32	UTLD-2060BR-4-07	3.000	2.062	.490	1/4-28	.025
1/4	UTLD-2060BR-4-4	3.750	2.375	.615	7/16-20	.025
5/16	UTLD-2060BR-4-5	4.000	2.625	.615	7/16-20	.030
3/8	UTLD-2060BR-4-6	4.250	2.875	.615	7/16-20	.030
7/16	UTLD-2060BR-4-7	4.937	3.375	.615	7/16-20	.040
1/2	UTLD-2060BR-4-8	5.375	3.812	.678	7/16-20	.040
9/16	UTLD-2060BR-4-9	7.750	5.437	.980	5/8-18	.073
5/8	UTLD-2060BR-4-10	8.312	5.875	1.100	5/8-18	.073
3/4	UTLD-2060BR-4-12	9.625	6.562	1.420	1"-14	.073
7/8	UTLD-2060BR-4-14	11.000	7.812	1.420	1"-14	.073
1"	UTLD-2060BR-4-16	12.000	8.867	1.600	1"-14	.073

GROUP 5 & NOM FAST R	UNITED PART NO. GROUP 5	A OVERALL LENGTH	B FLUTE LENGTH	C BODY DIA	D THD	E FILLET RADIUS
3/16	UTLD-2060BR-5-3	3.250	1.875	.615	7/16-20	.025
1/4	UTLD-2060BR-5-4	3.750	2.375	.615	7/16-20	.025
5/16	UTLD-2060BR-5-5	4.000	2.625	.615	7/16-20	.030
3/8	UTLD-2060BR-5-6	4.250	2.875	.615	7/16-20	.030
7/16	UTLD-2060BR-5-7	4.937	3.375	.615	7/16-20	.040
1/2	UTLD-2060BR-5-8	5.375	3.812	.678	7/16-20	.040
9/16	UTLD-2060BR-5-9	7.750	5.437	.980	5/8-18	.073
5/8	UTLD-2060BR-5-10	8.312	5.875	1.100	5/8-18	.073
3/4	UTLD-2060BR-5-12	9.625	6.562	1.420	1"-14	.073
7/8	UTLD-2060BR-5-14	11.000	7.812	1.420	1"-14	.073
1"	UTLD-2060BR-5-16	12.000	8.687	1.600	1"-14	.073

GROUP 6 & NOM FAST R	UNITED PART NO. GROUP 6	A OVERALL LENGTH	B FLUTE LENGTH	C BODY DIA	D THD	E FILLET RADIUS
3/16	UTLD-2060BR-6-3	3.250	1.875	.615	7/16-20	.025
1/4	UTLD-2060BR-6-4	3.750	2.375	.615	7/16-20	.025
5/16	UTLD-2060BR-6-5	4.000	2.625	.615	7/16-20	.030
3/8	UTLD-2060BR-6-6	4.250	2.875	.615	7/16-20	.030
7/16	UTLD-2060BR-6-7	4.937	3.375	.615	7/16-20	.040
1/2	UTLD-2060BR-6-8	5.375	3.812	.678	7/16-20	.040
9/16	UTLD-2060BR-6-9	7.750	5.437	.980	5/8-18	.073
5/8	UTLD-2060BR-6-10	8.312	5.875	1.100	5/8-18	.073
3/4	UTLD-2060BR-6-12	9.625	6.562	1.420	1"-14	.073
7/8	UTLD-2060BR-6-14	11.000	7.812	1.420	1"-14	.073
1"	UTLD-2060BR-6-16	12.000	8.687	1.600	1"-14	.073

SEQUENCE FOR ONE SHOT TAPER DRILL USING POSITIVE FEED EQUIPMENT AND DRILL BARS; PROTRUDING FASTENER

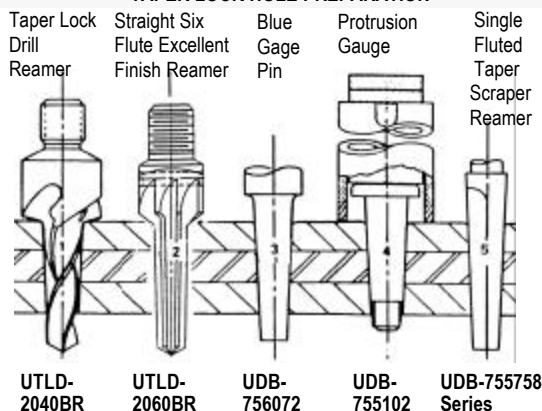
STEP 1. **TAPER DRILL:** Select proper equipment from Taper Lock Equipment in this section.

STEP 2. **BEARING PROBE:** Use UDB 756072 Series. See Gage section for applicable probe, based on fastener size and group.

STEP 3. **PROTRUSION CHECK:** For TL200 Series, use UDB 755620 Series for inclined surface. For normal surface, use UDB 755820 Series, or scale using values listed in Protrusion Gage section.

STEP 4. **TAPER SCRAPE HOLE:** If necessary, use UDB 755758 Series single flute scraper. Protrusion and bearing check must be made after this operation.

TAPER LOCK HOLE PREPARATION

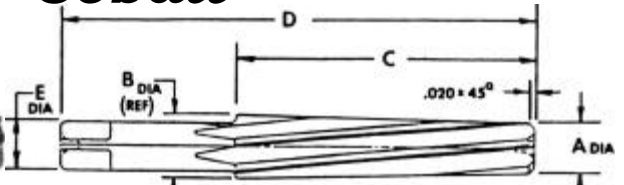


Available in M7 for Aluminum Alloys, M33 for Titanium and Alloy Steels and C2 Carbide for Titanium and Hard Alloy Steels.

**UTLR-254200 Series
Groups 1-2-3-4-5-6**

Reamer Taper Pin 5 L.H. Helical Flutes R.H. Cut Cobalt

UTLR-254200 SERIES



5 Flutes Cobalt Reamer Taper Pin for Flush or Protruding Head Fasteners.

See below for Flush Head or next page for Protruding Head Fasteners and Hole Preparations.

UNITED Taper Pin Reamers ream holes for standard taper pin fits. Left hand Spiral and Straight flutes are primarily for hand reaming. Best results are obtained if hole is pre-drilled a few thousandths smaller than the small diameter of the finished reamed hole. Left hand Helix RH cut pushes chips forward in thru hole reaming and is used in production reaming.

Ream two-thirds the speed of drilling and Feed at 200%-300% higher than drilling to prevent chatter and reamer wear. Allow .010 on 1/4 dia. hole, .015 on 1/2 dia. hole, and .015 up to .025 on a 1-1/2 hole.

Aim for perfect alignment of the Spindle, Reamer, Bushing and hole to be machined. Use **UNITED's** Flex Driver Reamer Handles.

	TOLERANCE:	± .001	REF.	+ .12 .00	+ .12 .00	+ .000 .004
GROUP 1-2 & NOM FAST R	UNITED PART NO. GROUPS 1-2	A DIA	B DIA	C FLUTE LENGTH	D OAL	E DIA
5/32	UTLR-254201	.153	.188	1.73	2.50	.156
3/16	UTLR-254202	.179	.220	1.98	2.70	.187
1/4	UTLR-254204	.238	.284	2.83	3.20	.250
5/16	UTLR-254205	.300	.349	2.35	3.60	.312
3/8	UTLR-254206	.362	.413	2.48	4.00	.375
7/16	UTLR-254207	.424	.481	2.73	4.20	.437
1/2	UTLR-254208	.491	.553	2.98	4.50	.437
9/16	UTLR-254209	.555	.637	3.98	5.50	.437
5/8	UTLR-254210	.618	.705	4.23	5.80	.437

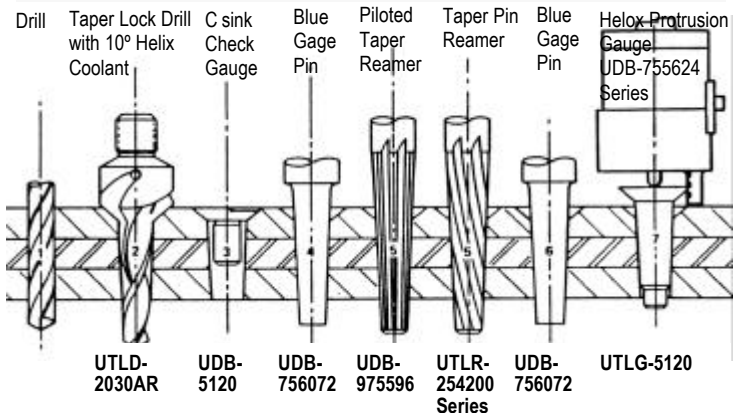
	TOLERANCE:	± .001	REF.	+ .12 .00	+ .12 .00	+ .000 .004
GROUP 3-4 & NOM FAST R	UNITED PART NO. GROUPS 3-4	A DIA	B DIA	C FLUTE LENGTH	D OAL	E DIA
5/32	UTLR-254401	.153	.204	2.48	3.20	.156
3/16	UTLR-254402	.179	.240	2.98	3.70	.187
1/4	UTLR-254404	.238	.310	3.48	4.50	.250
5/16	UTLR-254405	.300	.377	3.73	5.00	.312
3/8	UTLR-254406	.362	.445	3.98	5.50	.375
7/16	UTLR-254407	.424	.517	4.48	6.00	.437
1/2	UTLR-254408	.491	.595	4.98	6.50	.437
9/16	UTLR-254409	.555	.699	6.98	8.50	.437
5/8	UTLR-254410	.618	.773	7.48	9.00	.437

SEQUENCE FOR TWO STEP DRILL/REAM USING POSITIVE FEED EQUIPMENT AND DRILL BAR IN TITANIUM FOR FLUSH FASTENERS.

- STEP 1. **PRE-DRILL:** Select drill size from Pre-Drill section.
- STEP 2. **TAPER REAM AND COUNTERSINK:** See Taper Lock Equipment in this section for cutter selection.
- STEP 3. **COUNTERSINK DIAMETER CHECK:** For normal surfaces, use Uni-Lock Countersink Gage, and for normal or inclined surfaces, use UDB 756340 Series. See Gage Selection chart for gage. See appropriate Taper Lock Equipment section for countersink diameters.
- STEP 4. **BEARING PROBE:** Use UDB 756072 Series. See Bearing Check section for applicable values, based on fastener size and group.
- STEP 5. **HAND REAMING:** Finish ream tapered holes by hand reaming with multi-fluted tapered reamer. When hand reaming, alternate straight and spiral fluted reamers to prevent rifling.
- STEP 6. **BEARING PROBE:** See Step 4.
- STEP 7. **PROTRUSION CHECK:** For TL100 Series, use UDB 755624 Series for inclined surfaces, or scale according to values listed in Protrusion Gage section.

	TOLERANCE:	± .001	REF.	+ .12 .00	+ .12 .00	+ .000 .004
GROUP 5-6 & NOM FAST R SIZE	UNITED PART NO. GROUPS 5-6	A DIA	B DIA	C FLUTE LENGTH	D OAL	E DIA
3/16	UTLR-254602	.200	.261	2.98	3.70	.250
1/4	UTLR-254604	.264	.336	3.48	4.50	.312
5/16	UTLR-254605	.329	.406	3.74	5.00	.312
3/8	UTLR-254606	.393	.476	3.98	5.50	.437
7/16	UTLR-254607	.461	.553	4.48	6.00	.437
1/2	UTLR-254608	.533	.636	4.98	6.50	.437
9/16	UTLR-254609	.617	.762	6.98	8.50	.437

TAPER LOCK FLUSH HEAD HOLE PREPARATION

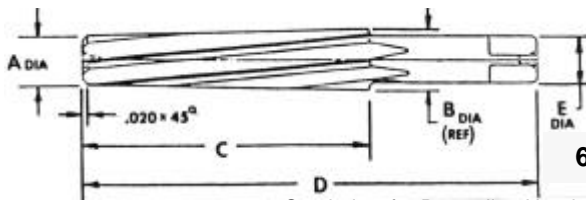


Reamer Taper Pin 6 L.H. Helical Flutes R.H. Cut Cobalt

**UTLR-255200 Series
Groups 1-2-3-4-5-6**

Aim for perfect alignment of the Spindle, Reamer, Bushing and hole to be machined.

UTLR-255200 SERIES



6 Flutes Reamer Taper Pin for Flush or Protruding Head Fasteners

See below for Protruding Head or previous page for Flush Head Fasteners and Hole Preparations.

Best results are obtained if hole is pre-drilled a few thousandths smaller than the small diameter of the finished reamed hole. Left hand Helix RH cut pushes chips forward in thru hole reaming and is used in production reaming.

Ream two-thirds the speed of drilling and Feed at 200%-300% higher than drilling to prevent chatter and reamer wear. Allow .010 on 1/4 dia. hole, .015 on 1/2 dia. hole, and up to .025 on a 1-1/2 hole. Keep reamer chamfers ground accurately.

TOLERANCE:		± .001	REF.	+ .12 .00	+ .12 .00	+ .000 .004
GROUP 1-2 & NOM FAST R	UNITED PART NO. GROUPS 1-2	A DIA	B DIA	C FLUTE LENGTH	D OAL	E DIA
5/32	UTLR-255201	.153	.188	1.73	2.50	.156
3/16	UTLR-255202	.179	.220	1.98	2.70	.187
1/4	UTLR-255204	.238	.284	2.83	3.20	.250
5/16	UTLR-255205	.300	.349	2.35	3.60	.312
3/8	UTLR-255206	.362	.413	2.48	4.00	.375
7/16	UTLR-255207	.424	.481	2.73	4.20	.437
1/2	UTLR-255208	.491	.553	2.98	4.50	.437
9/16	UTLR-255209	.555	.637	3.98	5.50	.437
5/8	UTLR-255210	.618	.705	4.23	5.80	.437

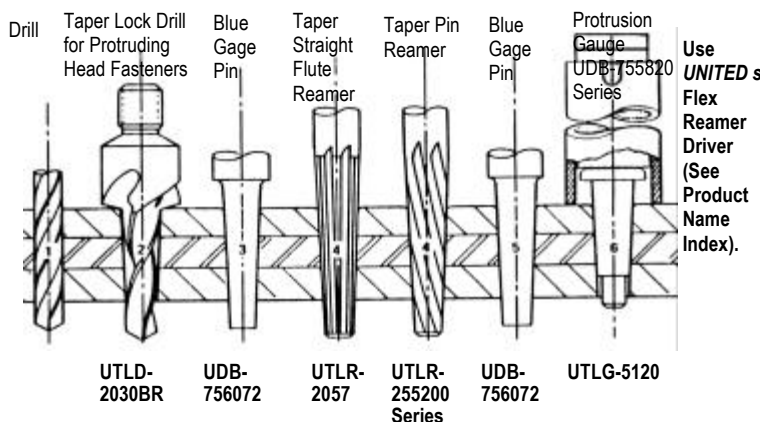
TOLERANCE:		± .001	REF.	+ .12 .00	+ .12 .00	+ .000 .004
GROUP 3-4 & NOM FAST R	UNITED PART NO. GROUPS 3-4	A DIA	B DIA	C FLUTE LENGTH	D OAL	E DIA
5/32	UTLR-255401	.153	.204	2.48	3.20	.156
3/16	UTLR-255402	.179	.240	2.98	3.70	.187
1/4	UTLR-255404	.238	.310	3.48	4.50	.250
5/16	UTLR-255405	.300	.377	3.73	5.00	.312
3/8	UTLR-255406	.362	.445	3.98	5.50	.375
7/16	UTLR-255407	.424	.517	4.48	6.00	.437
1/2	UTLR-255408	.491	.595	4.98	6.50	.437
9/16	UTLR-255409	.555	.699	6.98	8.50	.437
5/8	UTLR-255410	.618	.773	7.48	9.00	.437

TOLERANCE:		± .001	REF.	+ .12 .00	+ .12 .00	+ .000 .004
GROUP 5-6 & NOM FAST R SIZE	UNITED PART NO. GROUPS 5-6	A DIA	B DIA	C FLUTE LENGTH	D OAL	E DIA
3/16	UTLR-255602	.200	.261	2.98	3.70	.250
1/4	UTLR-255604	.264	.336	3.48	4.50	.312
5/16	UTLR-255605	.329	.406	3.74	5.00	.312
3/8	UTLR-255606	.393	.476	3.98	5.50	.437
7/16	UTLR-255607	.461	.553	4.48	6.00	.437
1/2	UTLR-255608	.533	.636	4.98	6.50	.437
9/16	UTLR-255609	.617	.762	6.98	8.50	.437

SEQUENCE FOR TWO STEP DRILL/REAM USING POSITIVE FEED EQUIPMENT AND DRILL BAR; PROTRUDING FASTENER

- STEP 1. **PRE-DRILL:** Select drill size from Pre-Drill section.
- STEP 2. **TAPER REAM AND COUNTERSINK:** See Taper Lock Equipment in this section for cutter selection.
- STEP 3. **BEARING PROBE:** Use UDB 756072 Series. See Bearing Check section for applicable values, based on fastener size and group.
- STEP 4. **HAND REAMING:** Finish ream tapered holes by hand reaming with multi-fluted tapered reamer. When hand reaming, alternate straight and spiral fluted reamers to prevent rifling.
- STEP 5. **BEARING PROBE:** See Step 3.
- STEP 6. **PROTRUSION CHECK:** For TL200 Series, use UDB 755620 Series for inclined surface. For normal surface, use UDB 755820 Series, or scale using values listed in Protrusion Gage section.

TAPER LOCK PROTRUDING HEAD HOLE PREPARATION

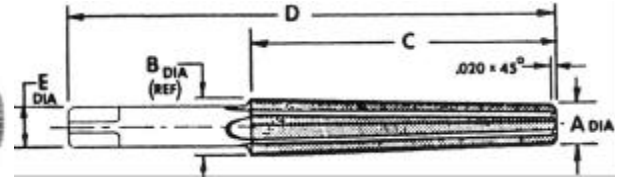


Use **UNITED'S** Flex Reamer Driver (See Product Name Index).

**UTLR-257200 Series
Groups 1-2-3-4-5-6**

Carbide Reamer Taper Pin Straight Multiple Flutes

UTLR-257200 SERIES



Carbide Reamer Taper Pin for Flush or Protruding Head Fasteners.

See below for Flush Head and next page for Protruding Head Fasteners Hole Preparations.

For hand reaming or production reaming. Square handle grip provided. Ideal for excellent finish and thru hole applications. Best results are obtained if hole is pre-drilled a few thousandths smaller than the small diameter of finished reamed hole. Carbide Reamers have great abrasive resistance, provide consistent cuts and smoother finishes than other tools.

Ream two-thirds the speed of drilling and Feed at 200%-300% higher than drilling to prevent chatter and reamer wear. Allow .010 on 1/4 dia. hole, .015 on 1/2 dia. hole, and .015 up to .025 on a 1-1/2 hole. Aim for perfect alignment of the Spindle, Reamer, Bushing and hole to be machined. Use our Flex Reamer Driver (See Index).

	TOLERANCE:	± .001	REF.	+ .12 .00	+ .12 .00	+ .000 .004
GROUP 1-2 & NOM FAST R	UNITED PART NO. GROUPS 1-2	A DIA	B DIA	C FLUTE LENGTH	D OAL	E DIA
5/32	UTLR-257201	.156	.186	1.50	2.25	.156
3/16	UTLR-257202	.182	.218	1.75	2.75	.187
1/4	UTLR-257204	.238	.284	2.23	3.25	.250
5/16	UTLR-257205	.300	.349	2.35	3.50	.312
3/8	UTLR-257206	.362	.413	2.48	3.50	.375
7/16	UTLR-257207	.424	.481	2.73	3.75	.437
1/2	UTLR-257208	.491	.553	2.98	4.00	.437
9/16	UTLR-257209	.555	.637	3.98	5.00	.437
5/8	UTLR-257210	.618	.705	4.23	5.50	.437

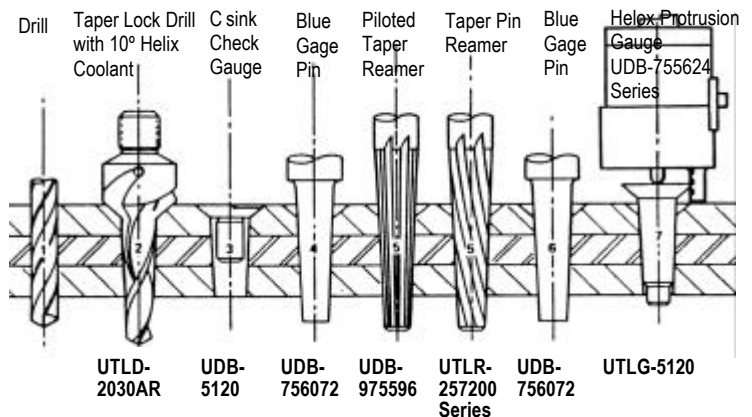
	TOLERANCE:	± .001	REF.	+ .12 .00	+ .12 .00	+ .000 .004
GROUP 3-4 & NOM FAST R	UNITED PART NO. GROUPS 3-4	A DIA	B DIA	C FLUTE LENGTH	D OAL	E DIA
5/32	UTLR-257401	.157	.198	1.97	2.00	.156
3/16	UTLR-257402	.183	.235	2.50	3.50	.187
1/4	UTLR-257404	.243	.305	2.98	4.00	.250
5/16	UTLR-257405	.304	.372	3.86	4.25	.312
3/8	UTLR-257406	.362	.445	3.98	5.00	.375
7/16	UTLR-257407	.429	.511	3.94	5.00	.437
1/2	UTLR-257408	.491	.595	4.98	6.00	.437
9/16	UTLR-257409	.555	.699	6.98	8.00	.437
5/8	UTLR-257410	.618	.773	7.48	8.50	.437

SEQUENCE FOR TWO STEP DRILL/REAM USING POSITIVE FEED EQUIPMENT AND DRILL BAR FOR FLUSH FASTENERS.

- STEP 1. **PRE-DRILL:** Select drill size from Pre-Drill section.
- STEP 2. **TAPER REAM AND COUNTERSINK:** See Taper Lock Equipment in this section for cutter selection.
- STEP 3. **COUNTERSINK DIAMETER CHECK:** For normal surfaces, use Uni-Lock Countersink Gage, and for normal or inclined surfaces, use UDB 756340 Series. See Gage Selection chart for gage. See appropriate Taper Ream Equipment section for countersink diameters.
- STEP 4. **BEARING PROBE:** Use UDB 756072 Series. See Bearing Check section for applicable values, based on fastener size and group.
- STEP 5. **HAND REAMING:** Finish ream tapered holes by hand reaming with multi-fluted tapered reamer. When hand reaming, alternate straight and spiral fluted reamers to prevent rifling.
- STEP 6. **BEARING PROBE:** See Step 4.
- STEP 7. **PROTRUSION CHECK:** For TL100 Series, use UDB 755624 Series for inclined surfaces, or scale according to values listed in Protrusion Gage section.

	TOLERANCE:	± .001	REF.	+ .12 .00	+ .12 .00	+ .000 .004
GROUP 5-6 & NOM FAST R	UNITED PART NO. GROUPS 5-6	A DIA	B DIA	C FLUTE LENGTH	D OAL	E DIA
3/16	UTLR-257602	.200	.261	2.98	4.00	.250
1/4	UTLR-257604	.264	.336	3.48	4.50	.312
5/16	UTLR-257605	.329	.406	3.74	4.75	.312
3/8	UTLR-257606	.393	.476	3.98	5.00	.437
7/16	UTLR-257607	.462	.551	4.27	5.25	.437
1/2	UTLR-257608	.533	.636	4.98	6.00	.437
9/16	UTLR-257609	.617	.762	6.98	8.00	.437

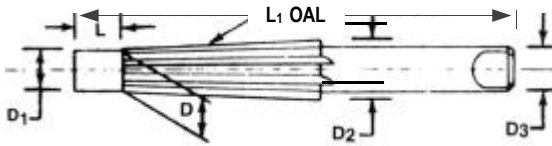
TAPER LOCK FLUSH HEAD HOLE PREPARATION



Piloted Taper Pin Reamer for Aluminum, Titanium and Hard Alloys

**UDB-975596 Series
Groups 4-5-6-7-8-9**

UDB-975596 SERIES



Piloted Tapered Reamers for Hard Materials

.250 Taper per foot H.S.S. STRAIGHT FLUTE R.H. CUT

Best results are obtained if hole is pre-drilled a few thousandths smaller than the small diameter of the finished reamed hole.

Ream two-thirds the speed of drilling and Feed at 200%-300% higher than drilling to prevent chatter and reamer wear.

Straight Flute RH cut pushes chips forward in thru hole reaming and is used in production reaming.

Allow .010 on 1/4 dia. hole, .015 on 1/2 dia. hole, .015 and up to .025 on a 1-1/2 hole.

UNITED PART NO. & DASH	D +.001 -.001	D1 +.000 -.001	D2 REF.	D3	L STD. BUSH	L1 OAL	TR# REAMER	BOLT SIZE & TYPE	EXISTING HOLE DIAMETER
UDB-975596-4-.234	.232	.234	.260	.31	.37	3.24	#4	1/4 T.L.	.2344
UDB-975596-4-.244	.244	.246	.299	.31	.37	4.31	#5	1/4 H.L. LB.	.247 / .245
UDB-975596-4-.252	.250	.252	.299	.31	.37	4.25	#5	1/4 GC.	.253 / .256
UDB-975596-4-.260	.258	.260	.299	.31	.37	3.86	#5	1/4 HL LB 1st Oversize	.261 / .263
UDB-975596-4-.277	.275	.277	.299	.31	.37	4.50	Ref. ALT	1/4 Group 3	.277 / .279
UDB-975596-4-.277A	.275	.277	.330	.35	.37	4.50	Ref. ALT	1/4 Group 4 & 5	.277 / .279
UDB-975596-5-.296	.294	.296	.330	.35	.50	5.14	#6	5/16 T.L.	.2969
UDB-975596-5-.306	.304	.306	.330	.35	.50	5.66	#6	5/16 H.L. L.B.	.307 / .309
UDB-975596-5-.313	.311	.313	.330	.35	.50	4.32	#6	5/16 GC.	.315 / .318
UDB-975596-5-.322	.320	.322	.330	.35	.50	3.89	#6	5/16 HL LB 1st Oversize	.323 / .325
UDB-975596-5-.339	.339	.339	.422	.40	.50	6.31	#7	5/16 Group 3, 4, 5, 2nd OS	.340 / .342
UDB-975596-6-.358	.356	.358	.422	.40	.50	5.55	#7	3/8 T.L.	.3594
UDB-975596-6-.369	.367	.369	.422	.40	.50	5.02	#7	3/8 H.L. L.B.	.370 / .372
UDB-975596-6-.377	.375	.377	.422	.40	.50	4.64	#7	3/8 GC.	.381 / .378
UDB-975596-6-.385	.383	.385	.422	.40	.50	4.25	#7	3/8 HL LB 1st Oversize	.386 / .388
UDB-975596-6-.401	.402	.401	.505	.43	.50	7.19	#8	3/8 Group 3, 4, 5, 2nd OS	.402 / .404
UDB-975596-7-.421	.419	.421	.505	.43	.50	6.64	#8	7/16 T.L.	.4219
UDB-975596-8-.483	.481	.483	.606	.50	.50	8.31	#9	1/2 T.L.	.4844
UDB-975596-9-.545	.543	.545	.606	.50	.50	5.81	#9	9/16 T.L.	.5456
UDB-975596-9-.561	.599	.561	.606	.50	.50	3.12	#9	9/16 Fastener	.562 / .567

To order, specify Part Number plus Dash Number.

Example: **UDB-975596-6-.369**

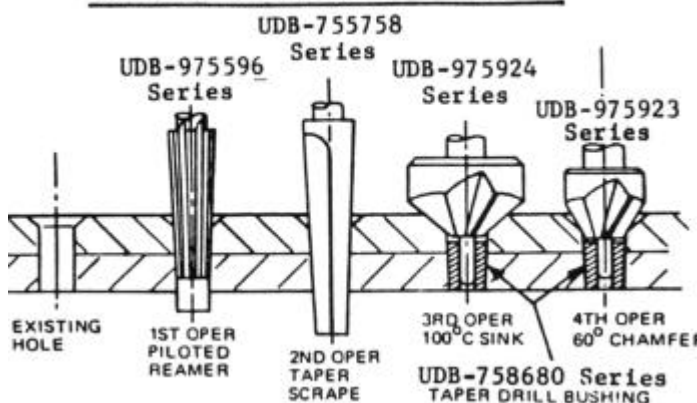
For Aluminum, Hard Alloys and Titanium

Use for Taper Lock Bolts, Hi-Lok, Hi-Tigue, Lock Bolts and Rivets.

1. 160 RPM Motor may be used with Piloted Reamer, Taper Scraper and 100° Countersink Cutter. Use Flex Drive UDB-74910 Series.

2. See Gage Section for proper Probe, Countersink Check Tool and Protrusion Check Tool.

CUTTER SEQUENCE FOR FLUSH FASTENERS



CUTTER SEQUENCE FOR PROTRUDING FASTENERS

