



KEYSTONE

KOBRA

**CARE AND MAINTENANCE
INSTRUCTIONS**

**KEYSTONE'S
OVERBURDEN
BIT &
RAPID CASING
ADVANCEMENT**



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SECTION 1 – DESCRIPTION

FEATURES

- **HIGH DRILL EFFICIENCY:**
THE DESIGN OF THE WING BIT ENABLES THE GUIDE DEVICE TO PERFORM MOST OF THE DRILLING DIRECTLY WHILE THE EXPANDED BIT WINGS PERFORM THE REAMING. THIS MINIMIZES LOSS OF HAMMER ENERGY AND MAINTAINS A HIGH DRILLING EFFICIENCY.
- **CONCENTRIC DRILLING:**
SINCE THE WING BITS EXPAND AND RETRACT CONCENTRICALLY, THEY WILL DRILL AND MAINTAIN A ROUND HOLE. UNLIKE ECCENTRIC OVERBURDEN SYSTEMS, WHICH INHERENTLY DRILL MISSHAPEN HOLES, THE KOBRA SYSTEM HAS NO TENDENCY TO WANDER, OR TO PRODUCE AN OFFSET. THIS FEATURE ASSURES A STRAIGHT, ROUND HOLE, EQUIVALENT TO THAT DRILLED WITH A CONVENTIONAL BIT. THIS ALSO MEANS THAT A KOBRA SYSTEM DOES NOT HAVE TO DRILL AS LARGE AN OVERCUT AS A COMPARATIVE ECCENTRIC SYSTEM, SAVING TIME, ENERGY AND MONEY.
- **EASILY RETRACTABLE:**
THE KOBRA SYSTEM WING BITS ARE RETRACTED WHEN THE BIT BODY IS LIFTED. THIS ENSURES THAT THEY CAN BE EASILY RETRACTED EVEN IN SOFT SOIL, WITHOUT HAMMERING, LEVERING, OR EXCESSIVE PULL BACK.
- **NO REVERSE ROTATION REQUIRED:**
REVERSE ROTATION IS NOT REQUIRED FOR RETRACTING THE WING BITS. THIS ELIMINATES CONCERNS ABOUT DISCONNECTING HAMMER PARTS OR TOOL JOINTS IN THE HOLE.
- **SMOOTH DISCHARGE OF CUTTINGS:**
THE KOBRA SYSTEM WING BIT HAS A LOWER HEIGHT AND LARGER CHIP WAYS THAN MANY CONVENTIONAL OVERBURDEN BITS, ENSURING SMOOTH DISCHARGE OF CUTTINGS AND ELIMINATING THE REGRINDING OF CUTTINGS. THE EXHAUST AIR DISCHARGE IS LOCATED BENEATH AND BESIDE THE WINGS, TO CLEAN THE POCKETS AND REDUCE OR ELIMINATE MATERIAL BECOMING TRAPPED IN THE POCKETS.
- **FASTER PENETRATION RATES:**
THE HIGH MECHANICAL STRENGTH OF THE BIT, CONCENTRIC DESIGN, AND THE FULL-FACE CONTACT ENABLES KOBRA SYSTEM WING BITS TO MAINTAIN A HIGHER PENETRATION RATE THAN ANY OTHER OVERBURDEN DRILLING SYSTEM IN THE SAME FORMATION.

SECTION 1 – DESCRIPTION

FUNCTIONAL DESCRIPTION

- **GUIDE DEVICE**

THE GUIDE DEVICE IS THE BASIC BIT BODY. IT INCORPORATES THE INTEGRAL BIT SHANK AND EXHAUST TUBE. THE HEAD OF THE GUIDE DEVICE ACTS AS THE MAIN DRILLING PORTION OF THE WING BIT, DRILLING THE HOLE DIAMETER UP TO THE INTERNAL SIZE OF THE CASING. IT HAS POCKETS WHICH CONTAIN THE WINGS, CONFIGURED TO ALLOW THESE WINGS TO EXTEND DURING DRILLING AND TO RETRACT DURING WITHDRAWAL.



- **WING**

THE WINGS OF THE KOBRA SYSTEM WING BIT ARE THE EXTENDABLE PORTIONS THAT MOVE OUTWARD TO CUT A HOLE LARGER THAN THE CASING AND RETRACT INWARDS TO ALLOW FOR THE RETRACTING OF THE BIT THROUGH THE INSIDE OF THE CASING. THEY ARE CONTAINED IN POCKETS IN THE GUIDE DEVICE AND RETAINED BY ONE OF SEVERAL RETENTION DEVICES. SMALL BITS HAVE TWO EXTENDABLE WINGS WHILE LARGE BITS HAVE THREE OR MORE.



- **RETENTION DEVICES**

THE KOBRA SYSTEM WINGS ARE RETAINED USING A RETENTION PIN FITTED TO THE BOTTOM POCKET FACE OF THE GUIDE DEVICE.



- **KOBRA SYSTEM**

KEYSTONE KOBRA WING BITS DO NOT HAVE A DRIVE SHOULDER AND THUS CANNOT PULL DOWN THE CASING WITH A DRIVE SHOE ATTACHED TO THE CASING. KOBRA WING BITS MUST BE USED WITH DUAL ROTARY RIGS, OR WITH SYSTEMS DESIGNED TO USE A DUPLEX DIVERter.





SECTION 2 – PARTS IDENTIFICATION

KOBRA SYSTEM SPECIFICATIONS

METRIC MEASUREMENT (mm)

SYSTEM	SHANK	NO. OF WINGS	BIT OUTER DIAMETER		APPLICABLE CASING	
			EXPANDED	RETRACTED	INNER DIA.	OUTER DIA.
5-1/2"	340A	2	152.9	115.3	118.6	139.7
7"	QL50	2	196.9	150.1	152.4	177.8
9-5/8"	380	3	263.0	211.0	217.6	244.5

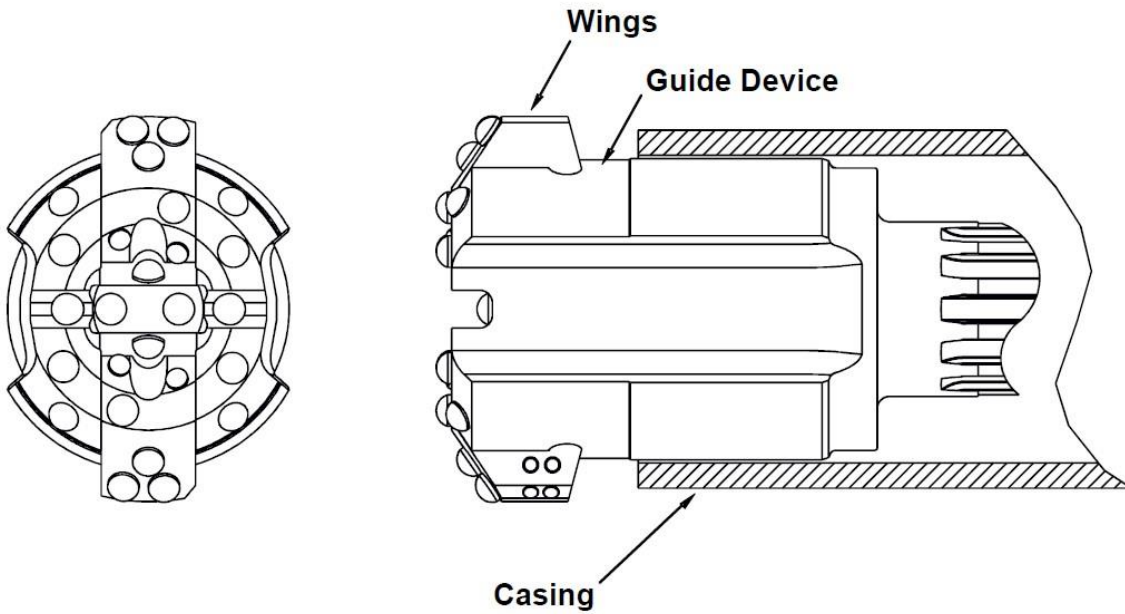
IMPERIAL MEASUREMENT (in)

SYSTEM	SHANK	NO. OF WINGS	BIT OUTER DIAMETER		APPLICABLE CASING	
			EXPANDED	RETRACTED	INNER DIA.	OUTER DIA.
5-1/2"	340A	2	6.020	4.538	4.670	5.500
7"	QL50	2	7.750	5.910	6.000	7.000
9-5/8"	380	3	10.354	8.307	8.565	9.625

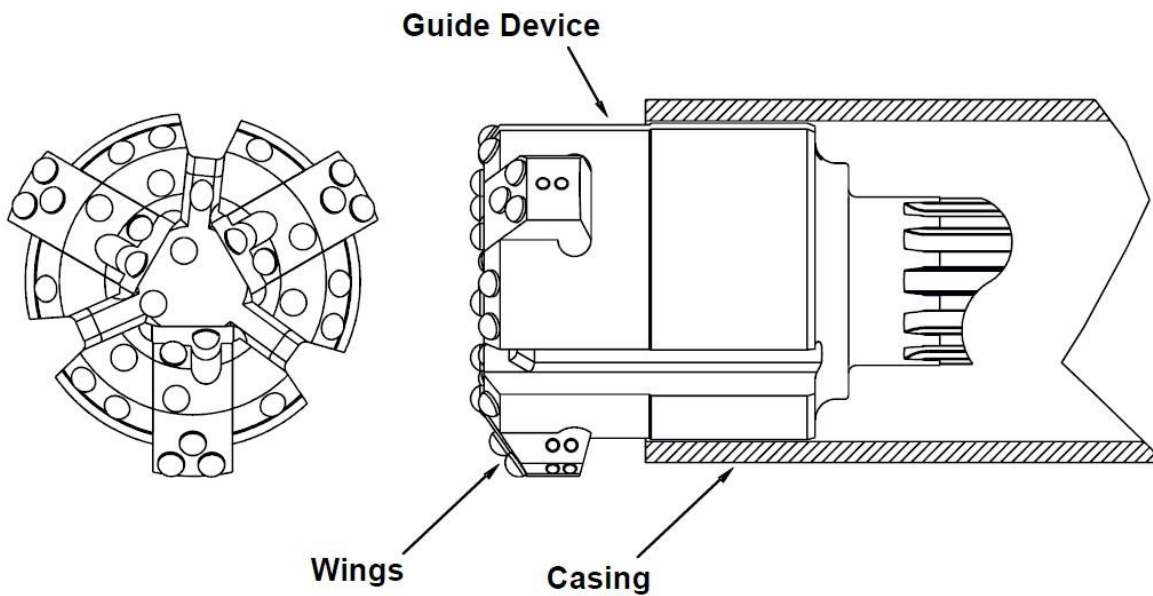
ALL CASING SIZES ARE NOMINAL.
OTHER SIZES AND SHANKS MAY BE AVAILABLE UPON REQUEST.

SECTION 2 – SAMPLE LAYOUTS

7" WING BIT



9-5/8" WING BIT



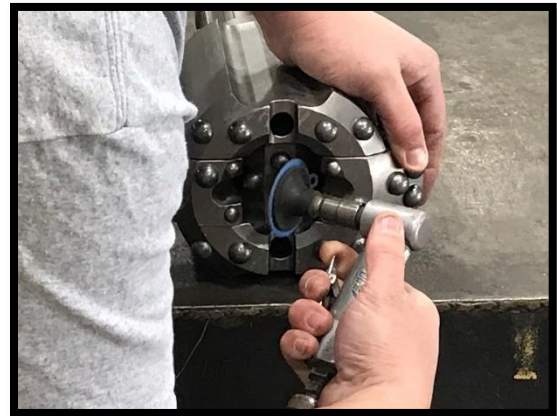
SECTION 3 – MAINTENANCE

DISASSEMBLY

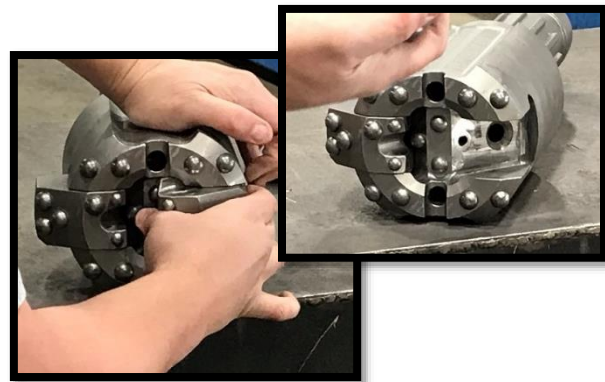
THE WINGS IN KEYSTONE KOBRA SYSTEMS MAY BE DISASSEMBLED FROM THE GUIDE DEVICE, EITHER FOR REPAIR OR REPLACEMENT.

WING DISASSEMBLY

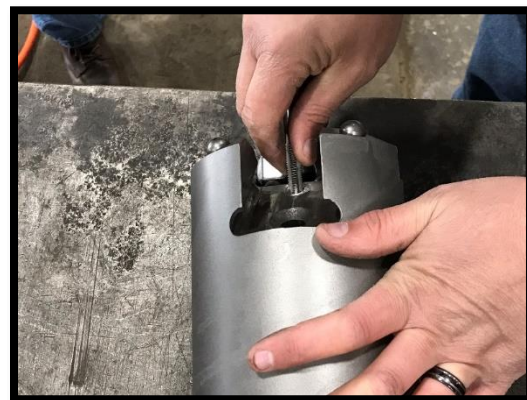
1. FIND THE STEEL PINS LOCATED TOWARD THE CENTER OF THE BIT ON THE INCLINED BOTTOM FACE OF THE MILLED POCKET IN THE GUIDE DEVICE. THESE PINS KEEP THE WINGS FROM FALLING OUT WHEN THEY ARE IN THE RETRACTED POSITION. USING A HAND GRINDER WITH A GRINDING STONE OR CUT-OFF WHEEL, GRIND THE DOME DOWN FLAT.



2. SLIDE THE WINGS OUT OF THE GUIDE DEVICE BY SLIDING THEM INWARD TOWARDS THE CENTER OF THE BIT. THIS PROVIDES EASIER ACCESS TO THE RETENTION PIN FOR THEIR SUBSEQUENT REMOVAL.



3. USING A M10-1.5 TAP, THREAD INTO THE RETENTION PIN TO CLEAN THE THREADS FOR REMOVAL.



SECTION 3 – MAINTENANCE

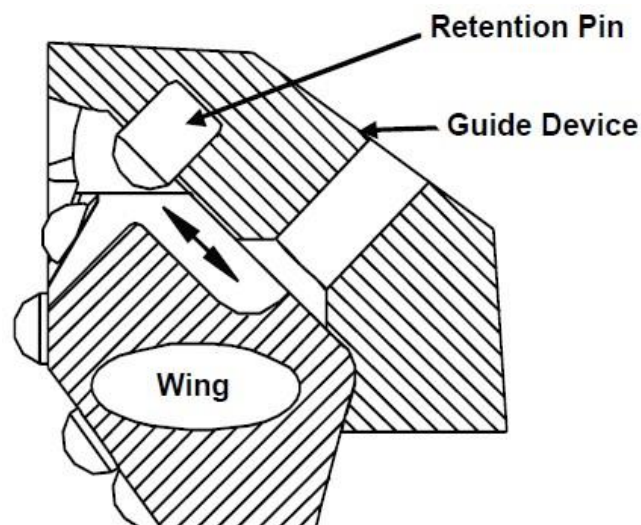
WING DISASSEMBLY (cont.)

4. OBTAIN A M10-1.5 BOLT, APPROXIMATELY TWICE THE LENGTH OF THE RETENTION PIN. SCREW THE BOLT INTO THE THREADED HOLE WITHIN THE RETENTION PIN. WHEN THE BOLT CONTACTS THE BOTTOM OF THE HOLE, CONTINUE TO THREAD IT INWARD, JACKING OUT THE RETENTION PIN.



5. **ALTERNATIVELY** – USING A HOLLOW SLIDE ARM (SLIDE HAMMER), SCREW A THREADED ROD INTO THE RETENTION PIN. SCREW A NUT ON TO THE TOP END OF THE THREADED ROD AND PULL OUT THE RETENTION PIN USING THE HOLLOW SLIDE AS A REVERSE IMPACT DEVICE.

NOTE: CARE MUST BE TAKEN WHILE REMOVING THE RETENTION PINS TO PREVENT DAMAGE TO THE HOLE ITSELF. DAMAGE TO THIS HOLE COULD CAUSE THE REPLACEMENT PINS TO FIT LOOSELY (OR NOT AT ALL) WHEN THE BIT IS REASSEMBLED.



SECTION 3 – MAINTENANCE

INSPECTION

WINGS

EXAMINATION OF THE KOBRA BIT WINGS WILL INDICATE IF THEY CAN BE REFURBISHED. IF THE BODY WASH IS NOT EXCESSIVE, BUT THERE IS CONSIDERABLE PLAY WHEN INSTALLED IN THE WING POCKET, IT MAY BE POSSIBLE TO BUILD UP THE SLIDING SURFACES ON THE WINGS AND RE-USE THEM. IN SOME CASES, MINOR BODY WASH ON THE LEADING EDGE OF THE WINGS CAN BE REPAIRED.

IF THE BIT HAS ENCOUNTERED RUBBLE IN THE HOLE CONTAINING FOREIGN MATERIAL OR OBJECTS, AND THE ONLY DAMAGE TO THE WINGS IS BROKEN BUTTONS, CONSULT KEYSTONE DRILL FOR THE COST OF FACTORY REPLACEMENT BROKEN BUTTONS.

INSPECT WINGS FOR CRACKS AROUND THE PIN OR BUTTON HOLES. IF CRACKS EXIST, REPLACE THE WING.

BIT BODY

INSPECT THE SHANK INTERFACE WITH THE BIT SHOULDER. IF DRILLING WITH LARGE QUANTITIES OF WATER, CAVITATION CAN OCCUR AT THE INTERFACE. IF THIS EXISTS, REMOVE ALL SHARP EDGES WITH A DEBURRING TOOL OR GRINDING STONE.

INSPECT THE STRIKING FACE FOR INDENTATIONS. IF DEEP INDENTATIONS APPEAR, THE STRIKING FACE MAY NEED TO BE FACED OFF TO REMOVE THEM. A LIKE AMOUNT FROM THE ROP OF THE BIT DRIVE SPLINES AND THE BIT SHOULDER MAY ALSO HAVE TO BE REMOVED TO RESTORE THE ORIGINAL DIMENSIONAL RELATIONSHIP.

BIT FACE – IF SOME BUTTONS ARE BROKEN BUT THE BIT IS OTHERWISE IN GOOD CONDITION, KEYSTONE DRILL PROVIDES A FACTORY BUTTON REPLACEMENT SERVICE.

SECTION 3 – MAINTENANCE

INSPECTION

WING BODY WEAR

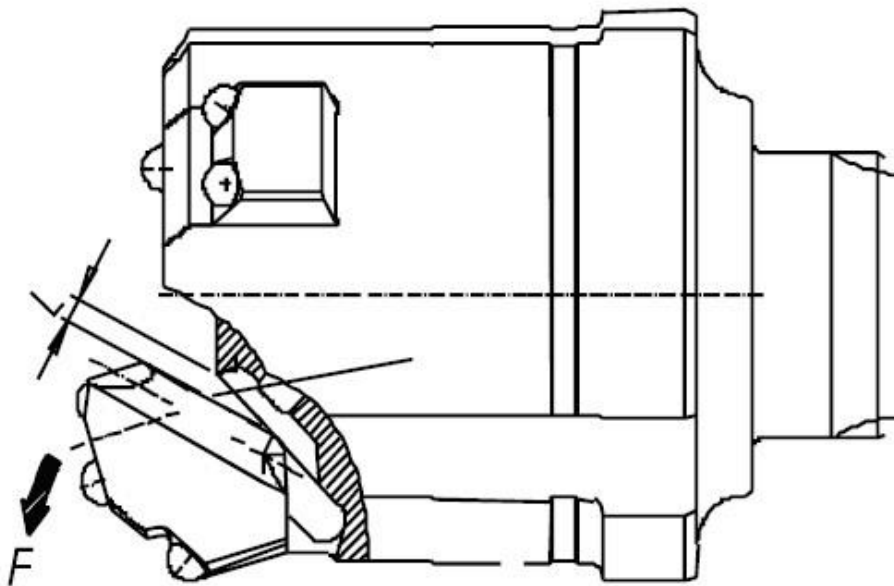
WHEN THE WING WEAR APPROACHES THE CONDITION OF IMMINENT LOSS, THE WING SHOULD BE REPLACED.

OVER TIME THE LEADING EDGE OF THE WINGS WILL WEAR TO THE EXTENT THAT GAGE BUTTONS WILL COMMENCE TO FALL OUT OR FAIL THROUGH SHEAR, AND DRILLING PERFORMANCE WILL DECREASE. A RISE IN TORQUE MAY ALSO OCCUR.

WHEN THE WEAR NOTICEABLY AFFECTS PERFORMANCE, THE WINGS SHOULD BE REPLACED.

ALLOWABLE WING PLAY

AS SHOWN BELOW, ALLOW FOR PLAY BETWEEN THE HAMMERED PLANE AND THE WING WHEN THE WING IS RETRACTED AND EXPANDED AS FAR AS IT WILL GO IN THE DIRECTION OF F. THEN MEASURE THE PLAY (L) WITH A MEASURING DEVICE. IF THE PLAY (L) EXCEEDS 5/16" (8mm), REPLACE THE WING.



SECTION 3 – MAINTENANCE

BUTTON MAINTENANCE

BIT SHARPENING

IN ABRASIVE DRILLING CONDITIONS, THE CARBIDE BUTTONS MUST BE RE-SHARPENED ON A REGULAR BASIS. THIS IS PARTICULARLY IMPORTANT FOR THE GAGE BUTTONS ON THE WINGS, TO AVOID PREMATURE FAILURE. WHEN THE FLATS ON THE GAGE BUTTONS BECOME A MAXIMUM OF 1/8" (3mm) WIDE, OR THE BUTTON PROTRUDES FROM THE BIT BODY BY MORE THAN HALF OF ITS DIAMETER, IT IS TIME TO RESHARPEN.

A HAND-HELD WET GRINDER USING A COMBINATION-GRINDING PIN (OR CUP) WILL RESTORE THE BUTTON TO THE ORIGINAL PROFILE QUICKLY AND AT THE SAME TIME REMOVE BODY METAL SURROUNDING THE BUTTON.

CLEAN AND LUBRICATE

PRIOR TO BEGINNING THE ASSEMBLY PROCESS, THE ENTIRE KOBRA WING BIT SHOULD BE THOROUGHLY CLEANED. MATING SURFACES SUCH AS WING POCKETS, WING SIDES AND RETENTION PINS SHOULD BE LIGHTLY LUBRICATED WITH AN APPROPRIATE GREASE OR OIL TO FACILITATE EASY ASSEMBLY.

THE ENTIRE BIT MAY BE TREATED WITH LIGHT OIL TO PREVENT CORROSION. THIS IS ESPECIALLY TRUE IF THE BIT IS TO BE STORED FOR ANY LENGTH OF TIME.

BIT ASSEMBLY

SLIDE THE NEW OR REFURBISHED WINGS INTO THE GUIDE DEVICE BODY FROM THE FACE SIDE, LYING THEM AGAINST THE POCKET FACE AND SLIDING THEM DOWN AND OUTWARDS INTO THE POCKETS.

WITH THE DOME SIDE OF THE NEW RETENTION PIN FACING UPWARDS, PLACE THE PIN INTO THE GROOVE SUPPLIED IN THE BACK FACE OF THE ASSEMBLED WING AND START IT INTO THE APPROPRIATE HOLE. USING A DRIFT AND A SMALL HAMMER, TAP THE RETENTION PIN INTO THE HOLE. KEEP THE PIN AS STRAIGHT AS POSSIBLE DURING THE INSERTION.

NOTES

