MODELS CSU 80AC, CSU 100/3RL and CSU 100/3DRL
ELECTRIC MAGNETIC DRILLS

OPERATING MANUAL

Safety procedures

Important: Do not use your magnetic drilling machine on the same structure when ARC welding is in progress. D.C. Current will earth back through the magnet and cause irreparable damage.

Warning: This appliance must be earthed (grounded)

1. Always secure the machine with the safety chain before starting to operate; this is to protect the user in case of power failure or breaking loose of the magnet while in use.
2. Always wear safety goggles, gloves and ear plugs.
3. Disconnect from the power source when changing cutters or working on the machine.
4. Always ensure cutter retaining screws are secure – they sometimes vibrate loose in use.
5. Regularly clean the work area and machine of steel shavings, swarf and dirt. Pay particular attention to the underside of the magnet base. It must be clean and dry.
6. With a gloved hand, after switching off, remove any shavings and swarf, which might have collected around the cutter and arbor before proceeding with the next hole.
7. Remove loose clothing like a tie, rings, watches and any loose adornments, which might become entangled with the rotating machinery.
8. Should the cutter become 'stuck' in the workpiece, stop the motor immediately to prevent personal injury. Disconnect from the power source and push and pull arbor by hand. DO NOT ATTEMPT TO FREE THE CUTTER BY SWITCHING THE MOTOR ON AND OFF.
9. If the machine is accidentally dropped, always thoroughly examine the machine for signs of damage and check that it functions correctly before trying to drill a hole.
10. Regularly inspect the machine and check that nuts and screws are tight.
11. Always ensure when using the machine in an inverted position that only the minimum amount of coolant is used and that care is taken to ensure that coolant does not drip into the motor unit. We advise you to use the special **CS Unitec cutting paste** (CS7030-712) which is specially designed for inverted position drilling.
12. ONLY use CS Unitec spare parts in combination with CS Unitec magnetic drilling systems to ensure optimum quality maintenance and trouble free working.
13. Use the magnetic drilling unit on clean flat surfaces only to prevent the machine breaking out because of poor clamping force.
14. If you discover any irregularity on machine or cables immediately bring the machine to the recognized dealer for a repair or maintenance service.

IMPORTANT!
Read these directions and safety instructions completely and attentively. Before using this apparatus, make sure that it is connected to the correct voltage and that all grips and parts are tightly attached. This is in the interest of your own safety. Should you have any doubt about the use of this apparatus, please contact your supplier.

Operating instructions

Available cutters

CS Unitec+HSS	100% rectified cutter for all carbon steel materials
CS Unitec+TiAIN	CS Unitec+ cutter with TiAIN coating for many materials
COBALT	HSS Co for high alloy steel (stainless steel)

Check power supply

Make sure the used current and voltage correspond with the machine specifications. When using a power cord cable extension make sure it can do the job. Use the correct wire gauge for the length. See the Extension Cord Selection Chart.

CSU 100/3

1. The CSU 100/3 has been designed for multi purpose applications and therefore has special functions and safety features.

The CSU 100/3 has thermal overload protection to protect the motor.
In case the motor stops because of overload, wait until the motor has cooled down. (Special tip: If you are able to start the motor again, let it run in **no load** at high speed. Thanks to the air blown into the unit it will cool down fast)

2. The CSU 100/3 has a mechanical clutch that prevents the machine from getting stuck.

Never try to bring the motor load close to the clutch release because it is not designed for all sizes tool break prevention.

3. The CSU 100/3 has a variable torque control switch.

The variable torque control is designed to prevent tool breakage from overloading the feed pressure. By turning the switch you are able to adjust the torque output of the motor unit without changing the rpm.
Adjust the torque power level during the first cut. Once adjusted you are secure that if any irregularity occurs the torque control prevents most accidents or cutter breakage.

IMPORTANT !!
Every cutter size needs it's own torque level. The amount of torque required is also related to the type of steel you are cutting. Therefore, if you change the situation or cutter size make sure you adjust the torque power supply to the right level.

How to mount a cutter? (See also pict. 2 further in this manual)

1. Make sure the machine is disconnected from the power supply.
2. Put the center pilot into the hole cutter.
3. Put the cutter into the arbor of the drill, making sure the 2 flat sides are lined up exactly in front of the arbor retaining set screws. Improper alignment can cause the cutter to break.
4. Tighten the retaining set screws into the flats.
5. Check that the centering pilot pin can move up and down inside the cutter.

Getting started!

1. Place the machine on the desired position. Note that in case of horizontal or upside-down drilling metal chips can easily enter the motor. Make sure this does not happen, as it will damage the speed control unit in top of the motor.
2. Switch on the magnet switch (red).
3. Ensure that the magnetic drilling unit is secure on the work piece.
4. Fill the arbor with lubrication-coolant oil in the specially located holes (see also picture 1). Always use the CS Unitec lubrication oils!! They have the right specifications for hole cutters. Ask your dealer for it.
5. Turn on the motor by pressing the green motor start button.
6. Start bringing the cutter to the work piece. Be careful not to apply too much pressure in the beginning. The cutter has to find its way into the material. After penetrating about 1/16“ (2 mm), the groove of the cut will help to maintain the cutter in its place. Now you can steadily increase the feed pressure. *Note: It is not necessary to use a lot of pressure! Forcing the cutter will not make the drilling process go faster. Too much pressure can cause cutter breakage.*
7. After the cut is finished the slug will automatically be ejected from the cutter, switch the machine off by pushing the red button. Be careful, the slug is very hot! Wear gloves!! You are now ready to move onto the next job.
8. If the slug sticks inside the cutter, move the machine to a flat, horizontal steel surface. Switch on the magnet and gently bring the cutter down to make contact with the surface. This usually allows a cocked slug to get straightened and ejected by the pilot pin.

Turning off the machine

1. Push the red button on the motor switch.
2. Switch the magnet off (0).

Tapping (only CSU 100/3)

1. Mount the tap into the arbor or the spindle using inserts or a tapping device.
2. Adjust speed and torque switch to the lowest level.
3. Start the motor. Put the tap gently into the material.
4. Adjust torque until the tap runs smoothly.
5. Stop motor before tap goes completely through the material. When tapping blind holes, the machine stops automatically at the end.
6. Stop motor, turn the left/right switch to left rotation (reverse).
7. Start motor and return tap. (Make sure the tap is directly removed from the material)

GENERAL MACHINE INSTRUCTIONS

Variable speed control:

The CSU 100/3 has an electronic speed control and two mechanical gears

Gear 1 55-150 rpm
Gear 2 185-490 rpm

		RPM schedule	
		1st mechanical gear	
Speed Regulation		rpm-1	cutter diameter
Position:	1	55	Do not use
	2	60	Do not use
	3	70	Do not use
	4	80	3-1/2 - 4“ (86-100mm)
	5	95	2-5/8 - 3-1/2“ (71-85mm)
	6	115	2-1/2 - 2-5/8“ (61-70mm)
	7	150	2 - 2-1/2“ (51-60mm)
		2nd mechanical gear	
	1	185	Do not use
	2	200	1-3/4 – 2“ (45-50mm)
	3	230	1-1/2 – 1-3/4“(35-44mm)
	4	265	1-1/8 –1-1/2“(30-34mm)
	5	315	1 – 1-1/8 (25-29mm)
	6	390	3/4 – 1“ (18-24mm)
	7	490	7/16“- 3/4“ (12-18mm)

The CSU 80AC has a fixed 4 speed mechanical gear box.
The switch to choose the desired speed is placed on each side of the drilling machine‘s gear box.

Gear 1	100 rpm	Gear 3	245 rpm
Gear 2	175 rpm	Gear 4	385 rpm

DRILL CHUCK

Many CS Unitec magnetic drilling systems can be used in combination with a drill chuck.

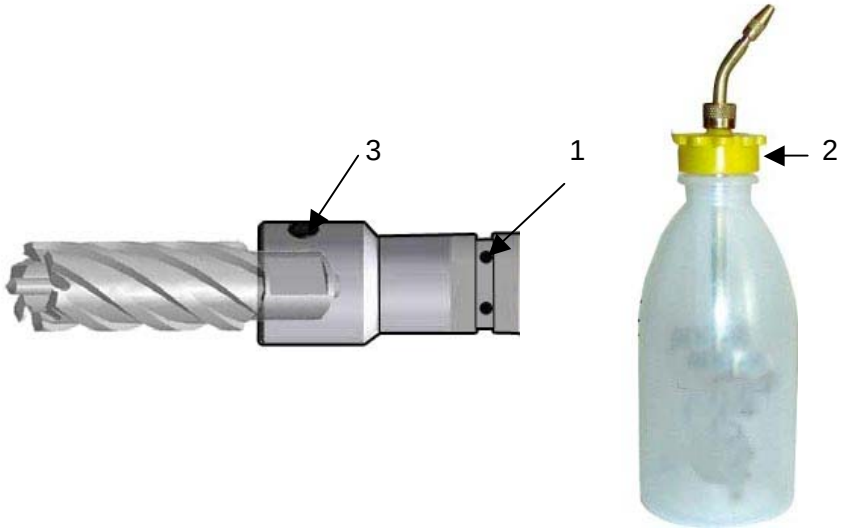
The CSU 100/3 and CSU 80AC have a Morse Taper no. 3 spindle.
The drill chuck to be used is the IBC 21 (3/4“ geared chuck with a MT3 adapter)

Please refer to your dealer for CS Unitec drill chucks.

Hint:
An easier way to mount a ½“ drill chuck into all machines is with the (OPTIONAL) part. no. **IBC 18**. This special ½“ geared chuck with a Weldon ¾“ shank makes it possible to mount the drill chuck directly into the arbor without dismantling any machine parts.

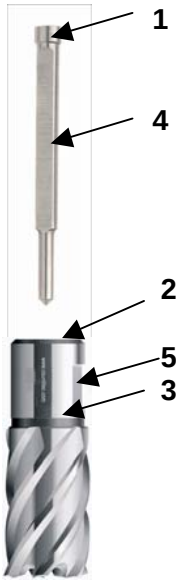
Picture explanation

Picture 1



Picture 1: 1: 4 holes around the arbor in which you can put the cutting fluid
2: Oil bottle with narrow nose (Sample)
3: Cutter retaining set screw

Picture 2



Picture 2:

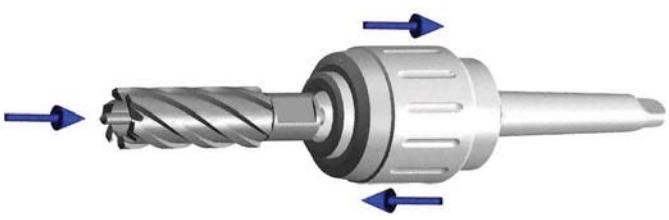
1: Center pilot pin
2: Center hole in cutter, for mounting the pilot pin

Put the center pilot pin (1) into the hole (2), then mount the cutter into the arbor.

3: Cutter shank, the piece which will slide into the arbor
4: Oil canal takes the oil down the cutter for optimum lubrication from the inside.
5: Flat side to tighten the cutter shank in the arbor.

Make sure the flat side is placed exactly in front of the cutter retaining set screws when mounting the cutter in the arbor.

Option: Keyless



TROUBLE SHOOTING

PROBLEM	CAUSE	REMEDY
Magnetic base won't hold effectively	Material being cut may be too thin for efficient holding	Attach an additional piece of metal under workpiece where magnet will be located, or mechanical clamp the magnetic base to workforce.
	Shavings or dirt under the magnet	Clean the magnet and make sure it is clean and dry.
	Irregularity on magnet contact or workpiece	Make sure the workpiece is smooth and flat or use a vacuum plate.
	Insufficient current going to the magnet during drilling cycle	Confirm power supply and output from the control unit to the magnet.
Cutter skips out of center – punch mark at initiation of cut	Magnetic base is not holding effectively enough	See causes and remedies above
	Worn out arbor or arbor is not straight	Replace! Only straight arbors are permitted to drill with. If not, please have unit checked at your dealer.
	Too much feed pressure at the start of the cut	Light pressure is required at the start of the cut until a groove is cut. The groove then serves the cutter as a stabilizer.
	Centerpoint is dull, worn, chipped or incorrectly sharpened	Replace or resharpen at your dealer.
	Poor center punch mark; weak pilot spring; pilot not centered in center punch mark	Improve center-punch mark and/or replace the center pilot.
	Worn or bent pilot, worn pilot hole	Replace worn out parts.
	Loose bolts on motor bushing support bracket, main casting or loose gib adjusting set screws	Adjust where necessary.

Excessive drilling pressure required	Dull cutter, incorrectly resharpened, or chipped cutter	Resharpen or replace.
	Coming down on chips lying on the surface of the workpiece	Take care not to start a cut on shavings, therefore always keep working piece and cutter clean.
	Gibs out of adjustment or lack of lubrication	Adjust gib screws and lubricate where necessary.
	Steel shavings accumulated (packed) inside the cutter	Clear cutter
Excessive cutter breakage	Steel shavings or dirt under the cutter	Remove cutter, clean part thoroughly and replace.
	Dull cutter, incorrectly resharpened or worn out cutter	Always have a new cutter on hand to refer to for correct tooth geometry, along with instruction sheet.
	Cutter skipping	See cause and remedy above.
	Slideway needs adjustment	Adjust gibs.
	Cutter not attached tightly in the arbor	Retighten.
	Insufficient use of cutting oil or unsuitable type of oil	Inject oil of light viscosity into the mentioned holes place in the arbor. Check if the oil can drop through the cutter by moving the center pilot up and down.
	Too much space between cutter hole and center pilot	Make sure the fit is tight enough between cutter and center pilot. Are you using the original pilot?
Excessive cutter wear	See cause and remedy above	
	Incorrect resharpened cutter	Refer to instruction and a new cutter for proper tooth geometry.
	Insufficient or spasmodic cutting pressure. Do not peck. Use steady feed pressure.	Use efficient steady pressure to slow the drill down. This will result in optimum cutting speed and chip load performance.

Service:
All CS Unitec magnetic drilling systems are developed and designed for professional use. However if the units are damaged or the performance comes down do not hesitate to contact your dealer.

CAUTION: Do not operate your tool on a current on which the voltage is not within correct limits. Do not operate tools rated A.C. only on D.C. current. To do so may seriously damage the tool.

EXTENSION CORD SELECTION

If an extension cord is used, make sure the conductor size is large enough to prevent excessive voltage drop which will cause loss of power and possible motor damage. A table of recommended extension cord sizes will be found in this section. This table is based on limiting line voltage drop to 5 volts (10 volts for 230 volts) at 150% of rated amperes.

If an extension cord is to be used outdoors it must be marked with the suffix W-A following the cord type designation. For example – SJTW-A to indicate it is acceptable for outdoor use.

RECOMMENDED EXTENSION CORD SIZES FOR USE WITH PORTABLE ELECTRIC TOOLS

		Length of Cord in Feet								
	115V	25 Ft.	50 Ft.	100 Ft.	150 Ft.	200 Ft.	250 Ft.	300 Ft.	400 Ft.	500 Ft.
	230V	50 Ft.	100 Ft.	200 Ft.	300 Ft.	400 Ft.	500 Ft.	600 Ft.	800 Ft.	1000 Ft.
Nameplate Ampere Rating	0-2	18	18	18	16	16	14	14	12	12
	2-3	18	18	16	14	14	12	12	10	10
	3-4	18	18	16	14	12	12	10	10	8
	4-5	18	18	14	12	12	10	10	8	8
	5-6	18	16	14	12	10	10	8	8	6
	6-8	18	16	12	10	10	8	6	6	6
	8-10	18	14	12	10	8	8	6	6	4
	10-12	16	14	10	8	8	6	6	4	4
	12-14	16	12	10	8	6	6	6	4	2
	14-16	16	12	10	8	6	6	4	4	2
	16-18	14	12	8	8	6	4	4	2	2
	18-20	14	12	8	6	6	4	4	2	2