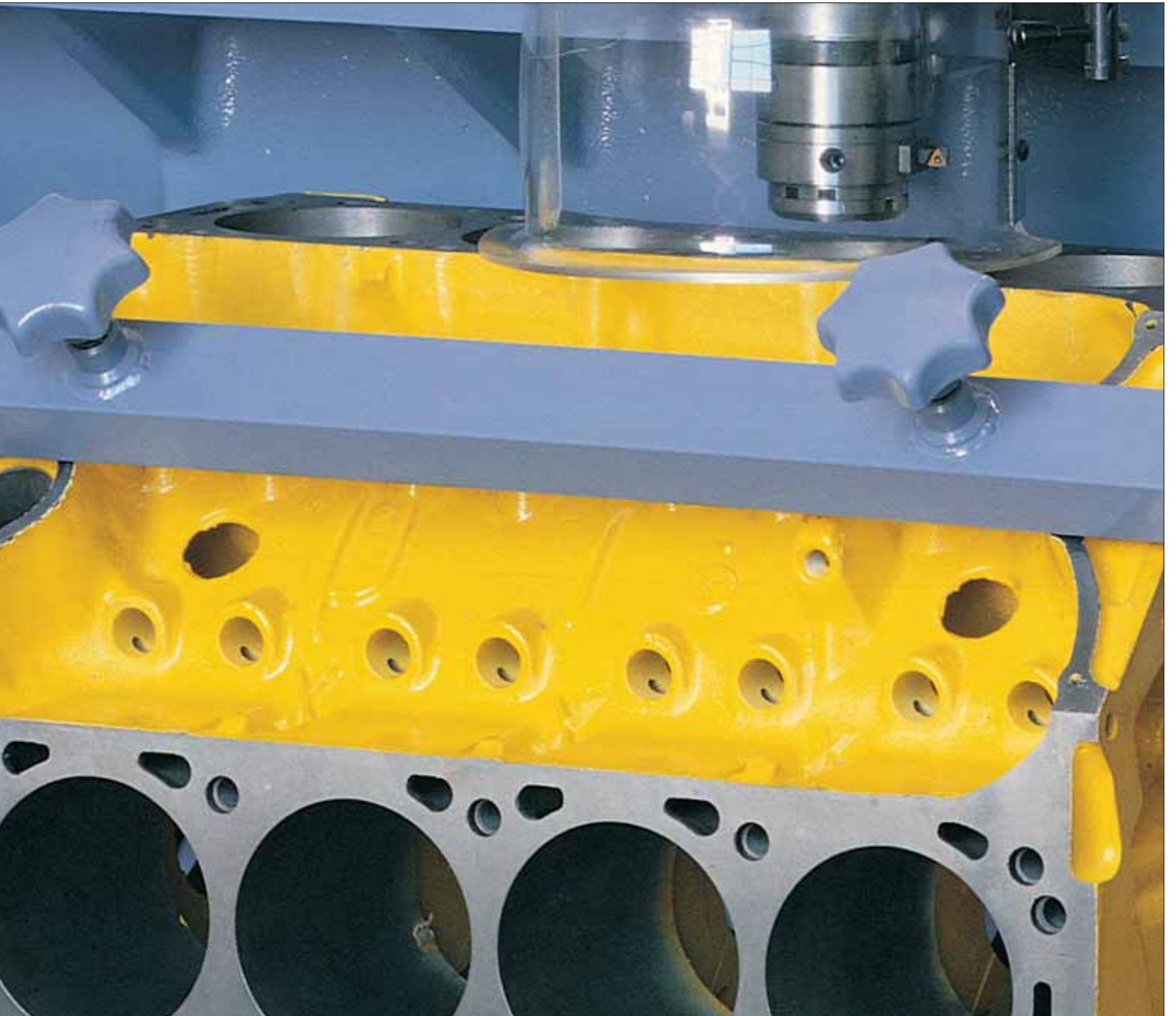


# ACP 160



**Cylinder boring machine**

# ACP 160

## Cylinder boring machine

Berco's high productivity ACP160 series presents the ultimate in engine block boring technology to the automotive and diesel engine rebuilding industry. Technological evolution has enabled Berco to develop a new generation of machines that are in the forefront of the rebuilding sector. Simple to operate, in spite of the introduction of greater electronic features, the ACP160 is the right choice even for those operators without a deep knowledge of electronics.

Available in three versions; ACP160A, ACP160S, ACP160M; the new boring machines are suitable for the machining of in-line and "V" cylinder blocks, offering operators a wide choice of both roughing and finishing applications according to individual requirements.

All three models feature the following characteristics:

- Stepless variable boring bar feed;
- Precision ground ball screw control feed rate;
- Spindle chip guard (fig. 6);

- Lighting to facilitate operation;
- Airfloat and pneumatic clamping of the boring unit on the machine base;
- Fast clamping cutterheads (fig. 9);
- Centering fingers which can remain in position during boring (fig. 7);
- Pre-set tooling device;
- Universal clamping brackets to reduce block set-up time;
- Wide range of parallel supports for cylinder block set-up.
- Extensive range of optional equipment available to meet diverse working requirements.

Rebuilding operation of 90° V6's  
blocks Ø 92x170 mm  
(3<sup>10</sup>/<sub>16</sub>" x 6<sup>11</sup>/<sub>16</sub>" )  
Working time: 17 minutes for  
two blocks



Fig.1  
ACP160A set up with "V" 90° block fixture.

# ACP 160A

Fig. 2



With the introduction of this version, Berco offers the machine tool market the ultimate in automated cylinder block boring.

Featuring a two axis CNC system capable of automatic boring cycles on single and double blocks, the ACP160A allows the set-up of a second block during the boring operation on the first, without interruption of the work cycle. Uncomplicated programming makes the machine easy to use, with working cycles predetermined by a

self-memorised positioning process. The operator works directly on the control unit to store data and insert parameters, guided by way of a progressive message system. After programming, the operator can store the cycle to be recalled when next working the same block type.

With one push of the "Start Cycle" button, the ACP160A can be left unattended to perform the following automatic boring operation:

- Position the boring bar on the first cylinder to bore;

- Quick vertical approach of the boring spindle to the block;
- Precision self-centering and clamping;
- Start spindle rotation and feed;
- Cylinder boring, stop of spindle feed and rotation, tool positioning and rapid retraction of boring spindle;
- Release and repositioning of boring unit in preparation for the next boring operation.

The boring unit automatically returns to the start position at the end of the boring cycle.

Fig. 3



Fig. 2  
In-line block fixture.

Fig. 3  
ACP160A control panel.

# ACP 160S



6 cylinders block in-line engine  
rebuilding  $\varnothing$  125x250 mm  
( $4\frac{15}{16}$ " x 10")  
Working time: 20 minutes

Fig. 4  
ACP160S set up for reconditioning a 6 cylinder in-line block.

The ACP160S semiautomatic version has been designed for engine rebuilders with a significant number of "same type" engine blocks to bore. Thanks to the positioning control unit the machine is capable of reliable automatic boring operations as required. Electronic servo control of the positioning unit operates all the spindle axis movements. It is possible to enter data on the control panel to directly command the positioning unit.

The machine can work in either a manual or in a semiautomatic manner.

In the semiautomatic mode the operator can select the following functions:

- Cylinder boring;
- Counterboring, chamfering or sleeve cutting.

The ACP160S is available with either a 1300 mm ( $51\frac{3}{16}$ " ) or a 1700 mm ( $66\frac{15}{16}$ " ) base length and is characterised by:

- Self memorisation of the work start position;

- Quick approach to the start point;
- Boring depth set either by automatic recall of the first cylinder depth, or by entering and storing the value;
- Spindle stepless variable rotation and feed;
- Automatic feed stop when reaching the set boring depth;
- Spindle rotation stop and automatic tool orienting;
- Spindle rapid return.

# ACP 160M

Rebuilding operation of 90° V8's  
blocks Ø 100x180 mm  
(3<sup>15</sup>/<sub>16</sub>" x 7<sup>3</sup>/<sub>32</sub>")  
Working time: 16 minutes



Fig. 5  
ACP160M set up for reconditioning "V" 90° blocks.

The ACP160M manual cylinder boring machine is the wisest economical and technological solution for the engine reconditioning business with a limited number of engine blocks to bore. This version is extremely versatile and suitable for rapid, safe and cost efficient cylinder boring applications. Available with either a 1300 mm (51<sup>3</sup>/<sub>16</sub>" ) or a

1700 mm (66<sup>15</sup>/<sub>16</sub>" ) base length, the ACP160M manual version is characterised by:

- Two spindle rotation speeds;
- Depth dial indicator to cut counter bores and chamfering;
- Adjustable electric limit switches;
- Manual expansion of centering finders and tool positioning.

# Standard outfit

Fig. 6



Fig. 7



Fig. 6  
Spindle chip guard.

Fig. 7  
Cutterhead during centering.

Fig. 8  
Tool box.

Fig. 9  
Cutterhead components and tooling.

- 1 spindle chip guard (fig. 6);
- 1 quick clamping right bracket assembly;
- 1 quick clamping left bracket assembly;
- 1 parallel support assembly consisting of three pairs support respectively 70, 120 and 180 mm high ( $2\frac{3}{4}$ " ,  $4\frac{23}{32}$ " and  $7\frac{3}{32}$ " ), with fastening nuts two pairs 70 and 120 mm high ( $2\frac{3}{4}$ " and  $4\frac{23}{32}$ " ) for ACP160M;
- 1 tool box (fig. 8);
- 1 DM 72 Measuring device 72-155 mm range, ( $2\frac{53}{64}$ " -  $6\frac{7}{64}$ " ) complete with metric micrometer A00A07703 (A00A07704 in inches);
- 4 centering rods, 57 mm long ( $2\frac{1}{4}$ " ), 73-106 mm range ( $2\frac{7}{8}$ " -  $4\frac{11}{64}$ " );
- 4 centering rods, 73 mm long ( $2\frac{7}{8}$ " ), 106-138 mm range ( $4\frac{11}{64}$ " -  $5\frac{7}{16}$ " );
- 4 centering rods, 89 mm long ( $3\frac{1}{5}$ " ), 138-170 mm range ( $5\frac{7}{16}$ " -  $6\frac{11}{16}$ " ) (for ACP160A and ACP160S only);
- 1 toolholder complete with spring and screw, 73-86 mm range ( $2\frac{7}{8}$ " -  $3\frac{25}{64}$ " );
- 1 toolholder complete with spring and screw, 84-106 mm range ( $3\frac{5}{16}$ " -  $4\frac{11}{64}$ " );
- 1 toolholder complete with spring and screw, 104-126 mm range ( $4\frac{3}{32}$ " -  $4\frac{41}{64}$ " );
- 1 toolholder complete with spring and screw, 124-155 mm range ( $4\frac{7}{8}$ " -  $6\frac{3}{32}$ " ) (for ACP160S and ACP160A only);
- 1 brazed tool for cast iron 25 mm long ( $\frac{63}{64}$ " ), 73-86 mm range ( $2\frac{7}{8}$ " -  $3\frac{25}{64}$ " );
- 1 brazed tool for cast iron 31 mm long ( $1\frac{7}{32}$ " ), 84-126 mm range ( $3\frac{5}{16}$ " -  $4\frac{41}{64}$ " );
- 1 brazed tool for cast iron 43 mm long ( $1\frac{11}{16}$ " ), 124-155 mm range ( $4\frac{7}{8}$ " -  $6\frac{3}{32}$ " ) (for ACP160S and ACP160A only);
- 1 tool holder extractor;
- 1 lubricator gun;
- 6 anchor bolt plates;
- Set of service spanners;
- Instruction manual for use and maintenance.



Fig. 8



Fig. 9

# Extra outfit

Fig. 10



- **A00A27928\***  
Centering rod 89 mm long ( $3\frac{1}{2}$ " ), 138-170 mm range ( $5\frac{7}{16}$ " -  $6\frac{11}{16}$ " ) (available in sets of 4ea only);
- **A00A07073\***  
Toolholder complete with spring and screw, 124-155 mm range ( $4\frac{7}{8}$ " -  $6\frac{3}{32}$ " );
- **U20267061\***  
Brazed tool for boring cast iron, 43 mm long ( $1\frac{11}{16}$ " ), 125-155 mm range ( $4\frac{7}{8}$ " -  $6\frac{3}{32}$ " );

\* Items required to reach the boring capacity up to 155 mm ( $6\frac{3}{32}$ " ) ACP160M only;

- **A00A27730**  
DM72A Measuring device, 72-204 mm range ( $2\frac{53}{64}$ " -  $8\frac{1}{32}$ " ) complete with metric micrometer A00A07835 (A00A07808 in inches);
- **A00A27929**  
Centering rod 107 mm long ( $4\frac{7}{32}$ " ), 170-206 mm range ( $6\frac{11}{16}$ " -  $8\frac{7}{64}$ " ) (available in sets of 4ea only);
- **A00A07207**  
Toolholder complete with spring and screw, 153-176 mm range ( $6\frac{1}{32}$ " -  $6\frac{59}{64}$ " );

Fig. 11



- **A00A07208**  
Toolholder complete with spring and screw, 174-204 mm range ( $6\frac{27}{32}$ " -  $8\frac{1}{32}$ " );
- **A01A37710**  
AAC 38 Boring equipment, 38-75 mm range ( $1\frac{1}{2}$ " -  $2\frac{61}{64}$ " ), maximum boring height 138 mm cylinder (fig. 10);
- **A01A37700**  
AAC55, Boring equipment, 55-82 mm range ( $2\frac{11}{64}$ " -  $3\frac{15}{64}$ " ), maximum boring height 160 mm cylinder ( $6\frac{19}{64}$ " ) (fig. 12);
- **A00A07842**  
AAC Clamping tooling to complete the A01A37710 and A01A37700 equipment (fig. 11);
- **A00A27820**  
Tool sharpening device;
- **A00A07602B**  
Sharpening jig for tool sharpening device;
- **A00.67506**  
Diamond wheel;
- **A00A07723**  
"V" 60° block fixture;
- **A01A07824**  
"V" 60° and 90° block fixture (fig. 5);

Fig. 12



- **A00.56934**  
Motorcycle cylinder clamping fixture (fig. 17);
- **A00.58100**  
Extractor tool for studs 8-13 mm diameter ( $\frac{5}{16}$ " -  $\frac{33}{64}$ " );
- **A00.58105**  
Extractor tool for studs 12-25 mm diameter ( $\frac{15}{32}$ " -  $\frac{63}{64}$ " ).

Fig. 10  
Boring equipment  
(38-75 mm capacity  $1\frac{1}{2}$ " -  $2\frac{61}{64}$ " ).

Fig. 11  
Small dimension block fixtures.

Fig. 12  
Boring equipment  
(55-82 mm capacity  $2\frac{11}{64}$ " -  $3\frac{15}{64}$ " ).

# Extra outfit

Fig. 13



## BORING INSERT TOOLHOLDERS (fig. 13):

- **A00A07876**  
Boring insert toolholder 25 mm long ( $63/64''$ ), without insert complete with screw and spanner, 73-86 mm range ( $27/8'' - 325/64''$ );
- **A00A07879**  
Boring insert toolholder 31 mm long ( $17/32''$ ), without insert complete with screw and spanner, 84-126 mm range ( $35/16'' - 461/64''$ );
- **A00A07882**  
Boring insert toolholder 43 mm long ( $111/16''$ ), without insert complete with screw and spanner, 124-204 mm range ( $47/8'' - 81/32''$ ).

## BORING AND FACING INSERT TOOLHOLDERS (fig. 13):

- **A01A07777**  
Boring and facing insert toolholder 20 mm long ( $25/32''$ ), without insert complete with screw and spanner, 55-65 mm range ( $211/64'' - 29/16''$ );
- **A00A07885**  
Boring and facing insert toolholder 25 mm long ( $63/64''$ ), without insert complete with screw and spanner, 64-82 mm range ( $233/64'' - 315/64''$ );
- **A00A07888**  
Boring and facing insert toolholder 30 mm long ( $13/16''$ ), without insert complete with screw and spanner, 78-96 mm range ( $35/64'' - 325/32''$ );
- **A00A07891**  
Boring and facing insert toolholder 36 mm long ( $127/64''$ ), without insert complete with screw and spanner, 94-132 mm range ( $345/64'' - 513/64''$ );
- **A00A07894**  
Boring and facing insert toolholder 48 mm long ( $157/64''$ ), without insert complete with screw and spanner, 130-210 mm range ( $51/8'' - 817/64''$ ).

## DEAD-END BORE INSERT TOOLHOLDERS (fig. 13):

- **A00A07897**  
Dead-end bore insert toolholder, 26 mm long ( $11/32''$ ), without insert complete with screw and spanner, 78-94 mm range ( $35/64'' - 345/64''$ );
- **A01A07700**  
Dead-end bore insert toolholder, 32 mm long ( $117/64''$ ), without insert complete with screw and spanner, 92-106 mm range ( $35/8'' - 411/64''$ );
- **A01A07703**  
Dead-end bore insert toolholder, 38 mm long ( $11/2''$ ), without insert complete with screw and spanner, 104-126 mm range ( $43/32'' - 461/64''$ );
- **A01A07706**  
Dead-end bore insert toolholder, 44 mm long ( $147/64''$ ), without insert complete with screw and spanner, 124-204 mm range ( $47/8'' - 81/32''$ ).

Fig. 13  
Toolholder inserts for boring, spot-facing and blind hole applications.

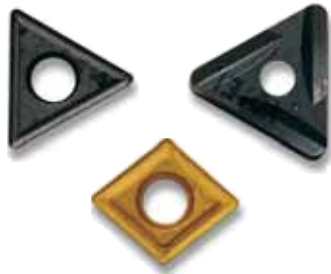
Fig. 14  
Assorted hard metal inserts.

Fig. 15  
Brazed tools for spot facing and dead-end bores.



# Extra outfit

Fig. 14



## INSERTS (fig. 14):

- **U010101060**  
Insert for cast iron for toolholder part Nos:  
- A00A07876;  
- A00A07879;  
- A00A07882;
- **U003101000**  
Insert for cast iron for toolholder part Nos:  
- A00A07777;  
- A00A07885;  
- A00A07888;  
- A00A07891;  
- A00A07894;  
- A00A07897;  
- A01A07700;  
- A01A07703;  
- A01A07706.

## TOOLBITS SPARE PARTS:

- **U900202060**  
Fixing screw for insert U010101060;
- **U900202070**  
Fixing screw for insert U003101000;
- **U900990000**  
Torx spanner.

Fig. 15



## BRAZED SPOT-FACING TOOLS (fig. 15):

- **U202265341**  
Brazed tool for spot-facing cast iron, 30 mm long ( $1\frac{3}{16}$ " ), 78-96 mm range ( $3\frac{5}{64}$ " -  $3\frac{25}{32}$ " );
- **U202265351**  
Brazed tool for spot-facing cast iron, 36 mm long ( $1\frac{27}{64}$ " ), 94-132 mm range ( $3\frac{45}{64}$ " -  $5\frac{13}{64}$ " );
- **U202265361**  
Brazed tool for spot-facing cast iron, 48 mm long ( $1\frac{57}{64}$ " ), 130-210 mm range ( $5\frac{1}{8}$ " -  $8\frac{17}{64}$ " ).

## BRAZED CHAMFERING TOOLS:

- **U202269071**  
Brazed tool for chamfering cast iron, 23 mm long ( $\frac{29}{32}$ " ), 55-68 mm range ( $2\frac{11}{64}$ " -  $2\frac{43}{64}$ " ) for A00A07749 (AAC 55);
- **U202269081**  
Brazed tool for chamfering cast iron, 28 mm long ( $1\frac{7}{64}$ " ), 73-88 mm range ( $2\frac{7}{8}$ " -  $3\frac{15}{32}$ " );

## • U202269091

Brazed tool for chamfering cast iron, 34 mm long ( $1\frac{11}{32}$ " ), 86-130 mm range ( $3\frac{25}{64}$ " -  $5\frac{1}{8}$ " );

## • U202269101

Brazed tool for chamfering cast iron, mm 46 long ( $1\frac{13}{16}$ " ), 128-208 mm range ( $5\frac{3}{64}$ " -  $8\frac{3}{16}$ " ).

## BRAZED TOOLS FOR DEAD-END BORES (fig. 15):

### • U202248061

Brazed tool for dead-end holes in cast iron, 26 mm long ( $1\frac{1}{32}$ " ), 78-94 mm range ( $3\frac{5}{64}$ " -  $3\frac{45}{64}$ " );

### • U202248081

Brazed tool for dead-end holes in cast iron, 32 mm long ( $1\frac{17}{64}$ " ), 92-106 mm range ( $3\frac{5}{8}$ " -  $4\frac{11}{64}$ " );

### • U202248091

Brazed tool for dead-end holes in cast iron, 38 mm long ( $1\frac{1}{2}$ " ), 104-126 mm range ( $4\frac{3}{32}$ " -  $4\frac{41}{64}$ " );

### • U202248111

Brazed tool for dead-end holes in cast iron, 44 mm long ( $1\frac{47}{64}$ " ), 124-204 mm range ( $4\frac{7}{8}$ " -  $8\frac{1}{32}$ " ).

# Extra outfit

Fig. 16



Fig. 16  
Cylinder block line up gauge.

Fig. 17  
Motorcycle cylinder clamping  
fixture.

Fig. 18  
Machine set up with small block  
fixture.

Fig. 19  
Machine dimensions.

## EXTRA OUTFIT (for ACP160A only):

- **A01A07709**  
Universal holding and aligning  
fixture for two in-line blocks  
(fig. 2);
- **A01A07781**  
Pair of fixtures for setting up  
of two "V" 90° or 60° blocks;  
(fig. 1);
- **A00A07705**  
Assembly consisting of three  
pairs of parallel supports  
respectively 70, 120 and 180  
mm high ( $2\frac{3}{4}$ ",  $4\frac{23}{32}$ " e  $7\frac{3}{32}$ " ),  
with fastening nuts (clamping  
bolts) (two pairs 70 and 120  
mm high for ACP160M);
- **P00A27850**  
Cylinder block line up gauge;
- **V91A37002**  
Safety guard according to **CE**  
standards.

Fig. 18

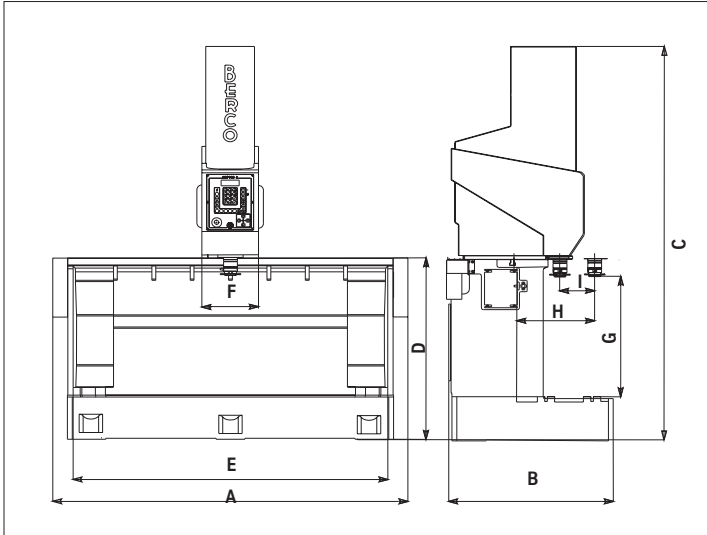


Fig. 17



# Technical data

Fig. 19



	units	ACP160M	ACP160S	ACP160A
<b>Working capacity</b>				
Bore capacity	(inch) mm	(2 <sup>7</sup> / <sub>8</sub> " ÷ 4 <sup>41</sup> / <sub>64</sub> ") 73 - 126	(2 <sup>7</sup> / <sub>8</sub> " ÷ 6 <sup>3</sup> / <sub>32</sub> ") 73 - 155	(2 <sup>7</sup> / <sub>8</sub> " ÷ 6 <sup>3</sup> / <sub>32</sub> ") 73 - 155
Minimum bore capacity with special boring bar	(inch) mm	(1 <sup>1</sup> / <sub>2</sub> " ÷ 3 <sup>1</sup> / <sub>4</sub> ") 38 - 82	(1 <sup>1</sup> / <sub>2</sub> " ÷ 3 <sup>1</sup> / <sub>4</sub> ") 38 - 82	(1 <sup>1</sup> / <sub>2</sub> " ÷ 3 <sup>1</sup> / <sub>4</sub> ") 38 - 82
Maximum bore capacity with special boring tools	(inch) mm	(4 <sup>41</sup> / <sub>64</sub> " ÷ 8") 126 - 203	(6 <sup>3</sup> / <sub>32</sub> " ÷ 8") 155 - 203	(6 <sup>3</sup> / <sub>32</sub> " ÷ 8") 155 - 203
Max. spindle travel vertical	(inch) mm	(14 <sup>3</sup> / <sub>8</sub> ") 365	(14 <sup>3</sup> / <sub>8</sub> ") 365	(14 <sup>3</sup> / <sub>8</sub> ") 365
Max. spindle travel horizontal	(inch) mm	-	-	(54 <sup>21</sup> / <sub>64</sub> ") 1380
Working stroke programming		mechanical	electronic	electronic
Cylinder position programming		-	-	electronic
<b>Spindle speed RPM</b>				
Spindle speed (50Hz)	rpm	235 ÷ 470	150 ÷ 1000	150 ÷ 1000
Spindle speed (60Hz)	rpm	280 ÷ 565	150 ÷ 1000	150 ÷ 1000
Number of spindle speeds	number	2	stepless	stepless
<b>Feed per revolution</b>				
Spindle rapid travel in both directions	(inch) mm/min	(118") 3000	(118") 3000	(118") 3000
Feed per revolution	(inch) mm/rev.	(0 ÷ 0.017") 0 ÷ 0.44	(0 ÷ 0.017") 0 ÷ 0.44	(0 ÷ 0.017") 0 ÷ 0.44
Variable spindle feed		stepless	stepless	stepless
Step feed		manual by pulse	selectable	selectable
<b>Boring unit travel speed</b>				
Boring unit travel speed	(inch) mm/min	-	-	(177") 4.500
<b>Spindle motor</b>				
Spindle motor	kW	1.45/1.9	2.2	2.2
<b>Overall dimensions (Fig. 19)</b>				
Length (A)	(inch) mm	(51 <sup>3</sup> / <sub>16</sub> " ÷ 66 <sup>15</sup> / <sub>16</sub> ") 1300/1700	(51 <sup>3</sup> / <sub>16</sub> " ÷ 66 <sup>15</sup> / <sub>16</sub> ") 1300/1700	(75") 1905
Width (B)	(inch) mm	(35 <sup>7</sup> / <sub>16</sub> ") 900	(35 <sup>7</sup> / <sub>16</sub> ") 900	(35 <sup>7</sup> / <sub>16</sub> ") 900
Height (C)	(inch) mm	(74 <sup>51</sup> / <sub>64</sub> ") 1900	(74 <sup>51</sup> / <sub>64</sub> ") 1900	(82 <sup>43</sup> / <sub>64</sub> ") 2100
Base height (D)	(inch) mm	(37 <sup>7</sup> / <sub>16</sub> ") 945	(37 <sup>7</sup> / <sub>16</sub> ") 945	(37 <sup>7</sup> / <sub>16</sub> ") 945
Maximum inside admitted length (E)	(inch) mm	(47 <sup>1</sup> / <sub>4</sub> " ÷ 63") 1200/1600	(47 <sup>1</sup> / <sub>4</sub> " ÷ 63") 1200/1600	(47 <sup>1</sup> / <sub>4</sub> " ÷ 63") 1200/1600
Boring unit width (F)	(inch) mm	(11 <sup>3</sup> / <sub>16</sub> ") 284	(11 <sup>3</sup> / <sub>16</sub> ") 284	(11 <sup>3</sup> / <sub>16</sub> ") 284
Cutterhead to machine base (G)	(inch) mm	(25 <sup>25</sup> / <sub>32</sub> ") 655	(25 <sup>25</sup> / <sub>32</sub> ") 655	(25 <sup>25</sup> / <sub>32</sub> ") 655
Max. distance between cutterhead and base (depth capacity) (H)	(inch) mm	(12 <sup>5</sup> / <sub>16</sub> ") 313	(12 <sup>5</sup> / <sub>16</sub> ") 313	(12 <sup>5</sup> / <sub>16</sub> ") 313
Cutterhead traverse stroke (I)	(inch) mm	(2 <sup>9</sup> / <sub>16</sub> ") 65	(2 <sup>9</sup> / <sub>16</sub> ") 65	(2 <sup>9</sup> / <sub>16</sub> ") 65
<b>Weight</b>				
Weight of standard version with equipment	(lbs) kg (ca.)	(2778/3594) 1260/1630	(2866/3682) 1300/1670	(3858) 1750

Measurements, weights and execution are not binding on the manufacturer and can be changed without notification.

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