E2 SYSTEMS

EN

Manual

Air-hydraulic Drilling Unit

Series BE 33

Read this manual before installation and commissioning of the product.
Keep for future reference.

MAN045 - Manual BE 33, EN, ORIGINAL, Rev. 03.doc

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DECLARATION OF INCORPORATION OF PARTLY COMPLETED MACHINERY ORIGINAL
According to the EC's Machinery Directive 2006/42/EC, Annex 2B

We,

E2 Systems a division of Tubex AB
Strömslundsgatan 3
507 62 Borås
Sweden,

declare that the partly completed machinery:

Model: BE33X

* Is designed to be embedded in a larger machinery or assembled with another machine, which together will constitute machinery covered by Directive 2006/42/EC "Machinery Directive" and which shall be constructed in compliance with this directive, and
* Must not be put into service until the machinery, which the partly completed machinery must be part of, has been found and thus as a whole is declared in accordance with the "Machinery Directive" and national legislation. We also confirm:
* That the item 1 and 2.3 from the "Machinery Directive" Annex 1 concerning essential health and safety issues in the design of machines, which are reported in the manual for the above partly completed machinery, have been performed, and
* That the relevant technical documentation is compiled in accordance with Annex 7, Section B of the Directive 2006/42/EC

At the substantiated request of national authorities will relevant documents on the partly completed machinery be handed over.

Following other directive
2004/108/EC Electromagnetic Compatibility (EMC)
and harmonized standards, including appendix, has been applied:
EN ISO 12100:2010 Safety of machinery -- General principles for design -- Risk assessment and risk reduction.
SIS ISO TR 14121-2:2007 Safety of machinery -- Risk assessment -- Part 2: Practical guidance and examples of methods.
SS EN ISO 4413:2010 Hydraulic fluid power -- General rules and safety requirements for systems and their components.
SS EN ISO 4414:2010 Pneumatic fluid power -- General rules and safety requirements for systems and their components.

Borås: 2009-12-18

Krister Johansson
CEO Tubex AB

Andreas Gabrielsson
responsible for the technical file

Table of content: **Page:**

Safety

WARNING!

- Ensure that the operator has read and understood this manual before the drilling unit is in use.

- For security reasons, any modification of the drilling unit and it's accessories, which may affect product safety, must be approved by the manufacturers technical manager.

- The unit is intended for drilling, countersinking and reaming and should not be used for any other application, unless approved by the manufacturers technical manager

- Always follow local security regulations regarding installation, operation and maintenance.

- The drilling unit must be securely fixed and the installation instructions must be strictly observed.

- The drilling unit must be protected against splash of emulsions, etc. This is to ensure the drilling units function as the lid for the micro-switches is not sealed against dust or liquid.

- When installing the unit on a stand or in a complete machine tool, necessary protective devices must be fitted to prevent injury caused by crushing (squeezing) or any other type of personal injury that might be caused by the unit or its rotating tool.

- All protective devices that are designed to prevent personal injury must be mounted in their intended position during the operation.

- When servicing or repairing the unit, the electrical system must be switched off and the pneumatic system depressurized.

- If the drilling unit is fitted with electrical limit switches, before any adjustment to the switches disconnect from the main electric supply.

- Beware of hands, hair and loose fit clothing – Watch out for rotating parts.

- Never operate the drilling unit without any eventual safety arrangements – Beware of risk for crushing.

- Make sure that all hoses and electrical wires are safely fastened – Beware of risk for crushing.

- Ignoring the instruction may invalidate the warranty.

More detailed information regarding risks related to the unit described below.

According to Machinery Directive 2006/42/EC the unit is a "partly completed machine". Thereby the manufacturer of the machine is responsible for the overall safety. This device should not be operational within EU before the machine, in which the device must be integrated in, assured to meet the Machinery Directive 2006/42/EC. This manual is developed according to Machinery Directive and also includes additional information to make it easy for the manufacturer of the machine to meet the Machinery Directive and the end user to maintain a high level of security

The machine is intended for use by a person with knowledge and experience of using a machine of this type, and without limited physical ability in arms and hands as well as fully sighted. The machine is designed to be serviced by a trained / qualified operator following the instructions provided in the manual. The accidents that are likely still might occur, is when the machine is running without protection or with inadequate protection, without a fence, clamps or jigs. Ill health may arise from issues or material used, for example:

- Noise generated during the drilling / threading;
- Drilling dust / chips;
- Fumes and substances released during drilling of impregnated or treated material.

General recommendations

- Apply a system for monitoring the tool in the machine. If no such system is at hand, we recommend user/operator to frequently control the tool. To ensure that no damages occurred.

Thorough review of the unit

Visual control of any external damages. Ensure there is possibility to quickly turn off the motor and air-supply and run a normal cycle without tool and material (to avoid further damages at the material and unit). Listen for noise from bearings and also control the run-out at the spindle nose. If not ok, unit has to be repaired and a new control for damages will be necessary. If a unit seems ok, perform a normal cycle and evaluate the processed result.

If accident or breakdown occurs:

When accident or breakdown occurs as results in damages, or risk for accident, should the unit be transferred to workshop or similar to ensure that unit can be repaired in a safe place. An accident or breakdown will assume that the entire machine is affected. Therefor is it up to the machine supplier to describe the work method when accident or breakdown occurs. E2Systems will with this manual make it easy to achieve a safe design of the machine.

Information about the manufacturer

Drill and thread unit is manufactured and supplied by E2 Systems a division of Tubex AB. E2 Systems are specialized in constructing and manufacturing drill and thread units. The units are compact and have a robust design constructed to be easy to use and have a long life-span with high precision. More of E2 Systems collection you will find at www.e2systems.com. If you would like to come in contact with E2 Systems regarding questions or comments on our products or documentation, our contact information follows:

E2 Systems
Strömslundsgatan 3
507 62 BORÅS
Telefon: 033-20 88 40
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E-mail: e2@e2systems.com

Device management

The BE33-series weight in most cases between 6,6-7,1kg and always lesser than 12kg (BE33 with the heaviest possible multi-spindle head VH084P) Thereby can the unit be carried of one person, BE33- series weight laterally is symmetrical. Since the unit is compact designed, there is a risk of crushing injury and other consequential damages due to the weight of the falling unit. Therefore, the unit has to be mounted at fixed position or be laid down on the page, prior to settings of hydraulic and pneumatic connection is made

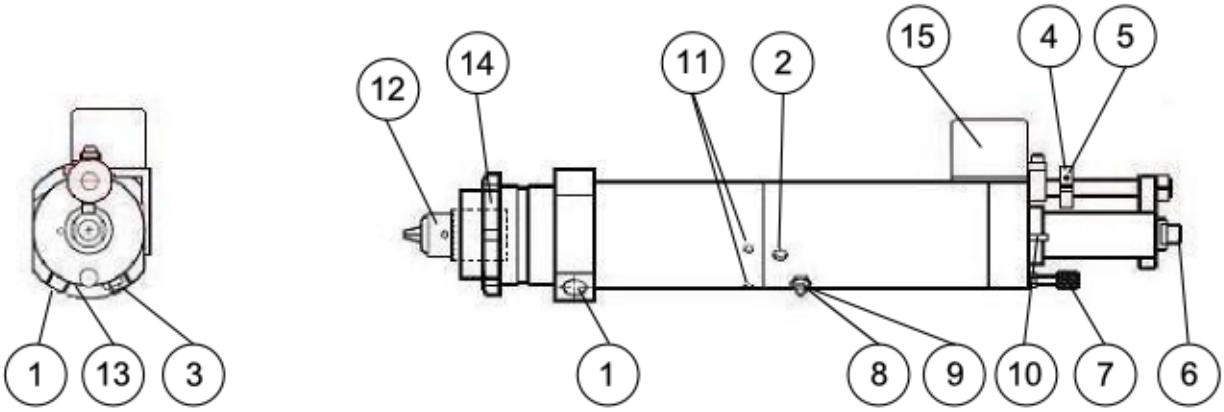
Description of the drilling unit

The **BE33** consists of a vane motor powered by compressed air, a pneumatic cylinder, and a closed hydraulic system. The total stroke length can be variably subdivided into rapid advance and working feed over the whole range. The throttle/check valve in the hydraulic system permits exact setting of the feed rate and high speed return.

Type and speed: See data label on drilling unit
Serial number: See data label on drilling unit

Description:

1. Main inlet port, G1/4" (NPT). Direct air from FRL unit.
2. Start and feed air inlet port, G1/8" (NPT). Direct air from 3/2 valve.
3. Air motor directed exhaust port, G1/4" (NPT).
4. Adjusting nut for drilling depth.
5. Locking screw for nut (4).
6. Adjustment screw for rapid advance and working feed length.
7. Adjustment screw with nut for working feed rate.
8. Hydraulic oil refilling nipple.
9. Seal screw (seals the oil refilling nipple).
10. Hydraulic oil-level indicator.
11. Locking screws för the turning of the upper housing in relation to the bottom housing.
12. Key Chuck or Collet Chuck.
13. Bleeding screw (for hydraulic oil).
14. Nut for attachment.
15. Pneumatic or electric limit switches.



Installation of the drilling unit

This Drilling and Tapping Unit is only intended for use in machinery which applies to the Machine Directive 2006/42/EC. This Drilling and Tapping Unit is designed for normal drilling, countersinking, reaming and tapping. In applications requiring high-precision hole placement or when drilling into rounded or slanted surfaces, drill bushings must be used.

To be able to use the unit, it must first be installed and fitted with control equipment. Regardless of how simple the installation is performed, the unit must be fitted with necessary protective devices to avoid personal injury. Special precaution must be taken to eliminate the risk of clothing, gloves, hair, etc. being caught in the rotating tool. The unit should always be mounted to a flat surface and be attached to a stable construction. Avoid adjacent parts enhancing resonance noise and vibrations wherever it is possible, which can create a resonance box effect.

The unit consists of many components and preassembled parts, the reliability of which is dependent upon proper maintenance. The pneumatic and hydraulic systems include a number of seals. It is essential to keep moving seal surfaces clean and free of marks and scratches

WARNING!

Never use the drilling unit without being securely fastened and that appropriate security arrangements have been organised.
Be careful with rotating and moving parts, to avoid personal injuries.
Ensure that the drilling unit is disconnected from the main air-supply, before any maintenance.

If the user feels the need to control the operation of this unit before it is installed in the machine, this is done AT YOUR OWN RISK

Air supply:

A complete air preparation unit (FRL unit) with a flow capacity exceeding 0,5 Nm^3/min (19 Cfm), air-filter with 5 µm (2500 mesh) filtration, pressure regulator and oil-mist lubricator shall be placed within 5 meters (16.4 Ft) of the drilling unit to provide clean and lubricated air to the drilling unit. The main pipe which the FRL unit is connect to should have a pipe dimension of 1 1 / 2 - 2". The oil-mist lubricator should be set to provide approx. 1 drop/10-20 cycles. 1 drop = 15 mm^3 (.000528 fl.oz. (UK), .000507 fl.oz. (US))
The oil/air mix ratio should be 50 mm^3 (.00176 fl.oz. (UK), .00169 fl.oz. (US)) per 1000 liter (219.97 Gallons (UK), 264.17 Gallons (US)) consumed air.
The lubricating oil viscosity should be between 50 and 300 cSt at the air motor operating temperature.
Recommended lubricant: Mineral based lubrication oil.

If multiple drilling units are used, each unit must have a separate air supply.

The drilling unit can be ordered with an air motor for lubrication free operation, without oil-mist lubrication, and is marked with a label. In this case an air preparation unit with (FR), in this case an air filter and a pressure regulator is only required.

We recommend that this unit is installed in a place with clean air and an ambient temperature between +10º - +40º C. (+50º - +104º F).

Connection:

Connection (1) is for continuous air supply and connected directly to the FRL unit.
Hoses and couplings must maintain a flow area equivalent to at least an inside diameter of ø6 mm (1/4"). No additional pneumatic devices, controllers, etc. may be fed from this line.

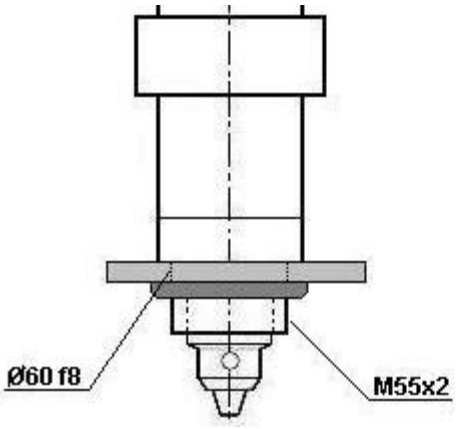
Connection (2) requires control of air during the drilling spindles feed. Control air is controlled via a 3/2 valve, 1/8", for this function. Hoses and couplings must maintain a flow area equivalent to at least an inside diameter of ø6 mm (1/4"). Reversion takes place immediately on venting through the 3/2 valve.
Oil-mist lubrication not required. Started lubrication must be continued. If the position of connection (2) needs to be moved in relation to connections (1) and (3), this can be done by loosening the locking screws (11) a few turnes and then rotate the upper part relative to the lower part in the desired direction.

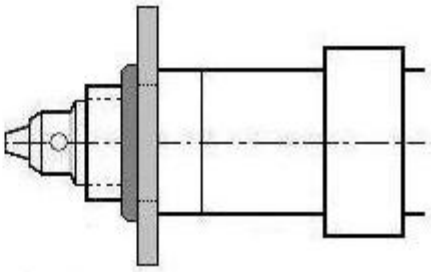
Connection (3) is for air motor exhaust, is normally equipped with a silencer, but can also be used to blow away chippings or led off with a longer hose. For lowest noise level, use an external silencer.

Before start up, check that the FRL unit (set at 6 – 7 Bar (87 – 100.5 Psi)) is connected correctly, a filter cartridge is mounted in the air-filter and the oil-mist lubricator is set correctly.

Attachment

The use of E2 Systems monting clamps and brackets for driling units is recommended. If other way of attachment is desired the front nut as shown in the below example shall be used. The drilling unit can be mounted vertically or horizontally. When attaching the drilling spindle upwards the feed force can be affected if for example a multi-spindle head is used. Optional attachment should be discussed with E2's technician.





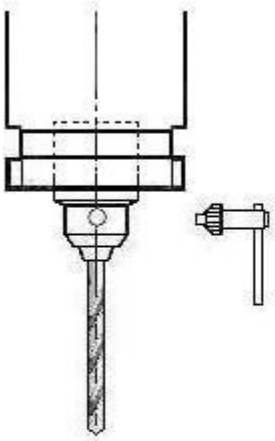
Mounting of cutting tools

The following cutting tools can be used with drilling unit:

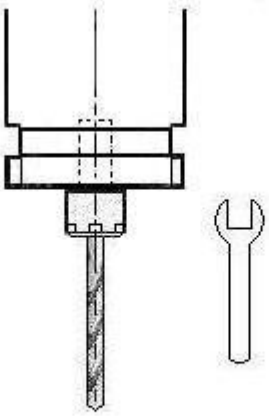
Drills, hole saws, core drills, shank end mills, countersinkers, reamers or broaches.

The drilling unit can be fitted with either key chuck, collet chuck or multi-spindle head.

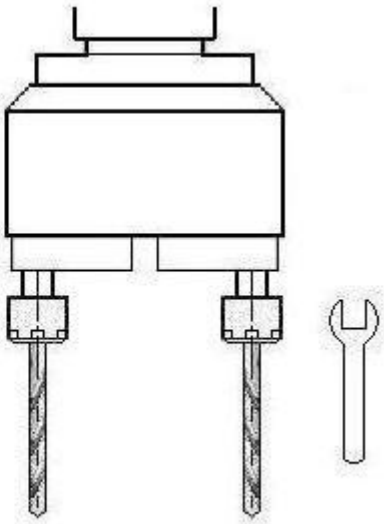
Key Chuck:



Collet Chuck:



Multi-spindle head:



Setting

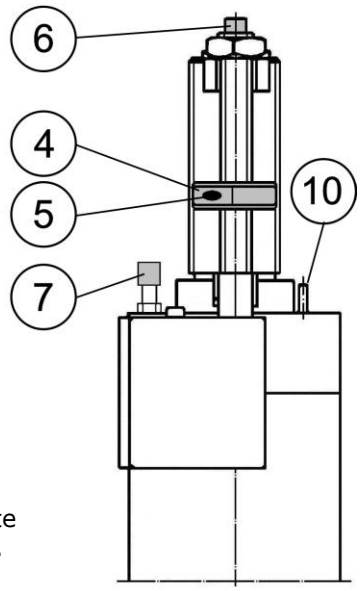
1. Ensure that the FRL unit is working properly.

2. Check the oil-level indicator (10). (See Maintenance instruction)

3. The desired drilling depth is set with adjusting nut (4). One revolution on the adjusting screw is 1 mm (.039 In). Down screwed in adjusting nut provides a short drilling depth and up screwed adjusting screw provides a long drilling depth. Adjusting nut (4) is locked with locking screw (5) in the set position.

4. The total stroke length of 50 mm composed of rapid and working feed duration. Both are only at the same time adjustable, i.e. more rapid feed length results in a reduced working feed duration and vice versa.
   One revolution on adjusting nut (6) corresponds to 1 mm (.039 In) shorter rapid feed duration. Adjusting nut (6) is locked in set position with the locking nut on top.

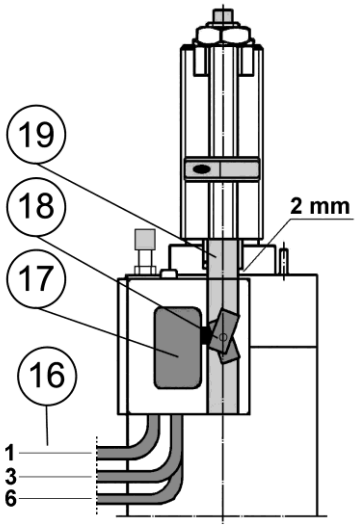
5. The working feed rate is set by adjusting screw (7) so that the right feed rate is obtained in relation to the drill diameter and the material to be processed.



Description of limit switches, accessories

Drilling unit BE 33 with pneumatic limit switch

The limit switch unit (micro-valves) is preset and operates independently of the set drilling depth. If the drilling depth is changed, resetting of micro-valves V3 and V4 is not necessary.



16. 3 pcs air hoses, Polyamide Ø 4/2,7 mm (5/32") and 1 pce Y-coupling.
17. 2 pcs pneumatic micro-valves (3-way), normally closed.
    V3 = outer micro-valve, actuated in rear spindle position = home position.
    V4 = inner micro-valve, actuated in front spindle position = return position.
18. 2 pcs Cams.
19. 1 pce Actuating lever with bar.

Installation and function:

Constant air supply, 3 - 7 Bar (44 - 101 Psi), filtered air, is connected to the common air hose marked (1). Oil-mist lubrication is not required. (If lubricated, too much lubrication can cause malfunction.)

The micro-valves provides pneumatic signals as follows:

V3 provides a pneumatic signal in the hose marked (3) when the drilling spindle is in home position.
V4 provides a pneumatic signal in the hose marked (6) when the drilling spindle is in return position.
This signal is generally used for the return of the drilling spindle to the home situation.

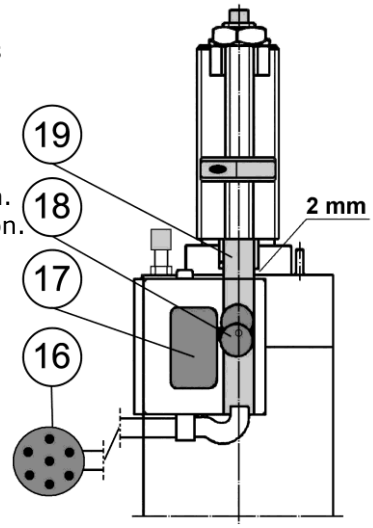
When the pneumatic signal is lost, the micro-valves vent through their exhaust ports.

Should a new adjustment of the limit switch prove to be necessary, ensure the following:

1. Turn off the air supply to the drilling unit's air connection (1).
2. Push the drilling spindle forward to an intermediate position (approx. 10 mm (.393 In)) to deactuate the micro-valves.
3. Check the distance between the actuating lever (19) and the drilling unit's body, readjust to 2 mm (.079 In).
4. Remove (loosen) the limit switch protective cover and then loosen the screw holding the cams (18) slightly.
5. Adjust the cams (18) into a position actuating the micro-valve plunge approx 0,3 mm (.012 In).
6. Tighten the screw holding cams (18).
7. Check thereafter that signal hoses (3) and (6) are without air pressure in un-actuated position and that the cams (18) activate the micro-valve plunge when pushing actuating lever (19) approximately 2 mm (.079 In) in each direction.
8. Put back the limit switch protective cover.

Drilling unit BE 33 with electric limit switch

The limit switch unit (micro-valves) is preset and operates independently of the set drilling depth. If the drilling depth is changed, resetting of micro-valves M1 and M2 is not necessary.



16. 1 pce 7-pole plug, male and female, with 2 m (6.56 Ft) cable.
17. 2 pcs electric micro-switches.
    M1 = outer micro-switch, actuated in rear spindle position = home position.
    M2 = inner micro-switch, actuated in front spindle position = return position.
18. 2 pcs Cams.
19. 1 pce Actuating lever with bar.

Installation and function:

The limit swiches provides electrical signals in both home and return position the plug (16). The micro-switches are universally connected to a 7-pole male plug for normally closed and normally open functions and requires no internal access work. During installation, only the supplied plug has to be connected to desired connection for the desired function as below table:

Connection of plug. (See Example of connection)

M1, Pin 1 – 2 normally closed
M1, Pin 1 – 3 normally open
M2, Pin 4 – 5 normally closed
M2, Pin 4 – 6 normally open
Centre pin is for earthing.

Should a new adjustment of the limit switch prove to be necessary, ensure the following:

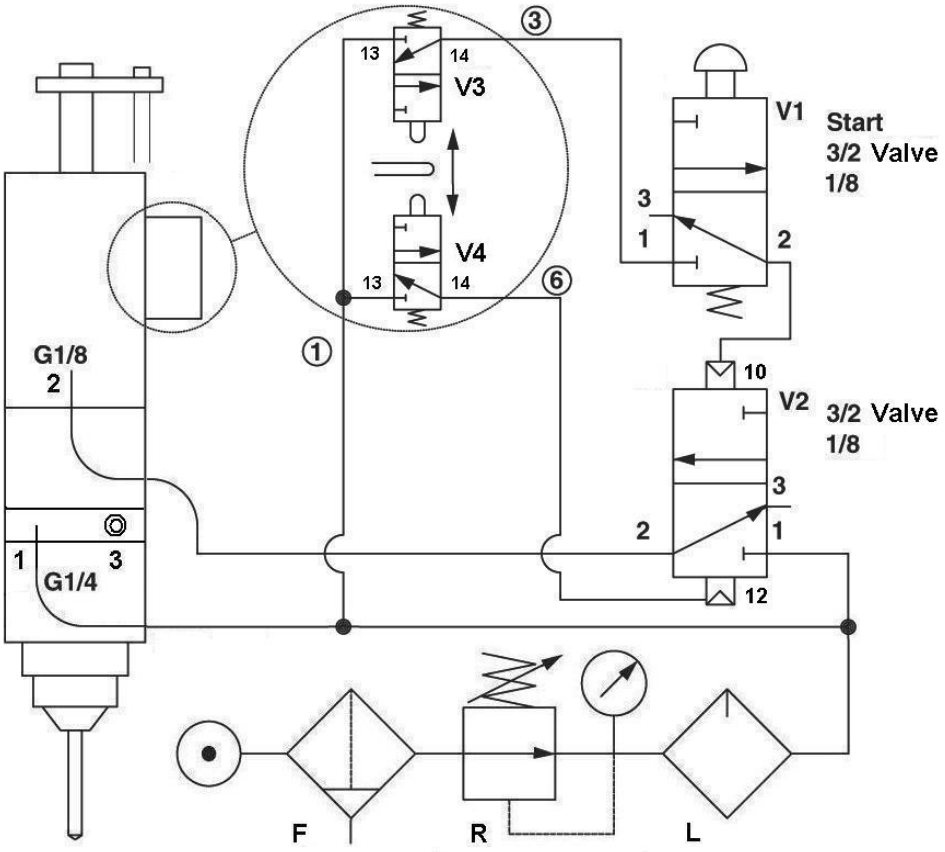
WARNING!

Before any adjustments are made, make sure that the electrical power to the limit switch is cut off.

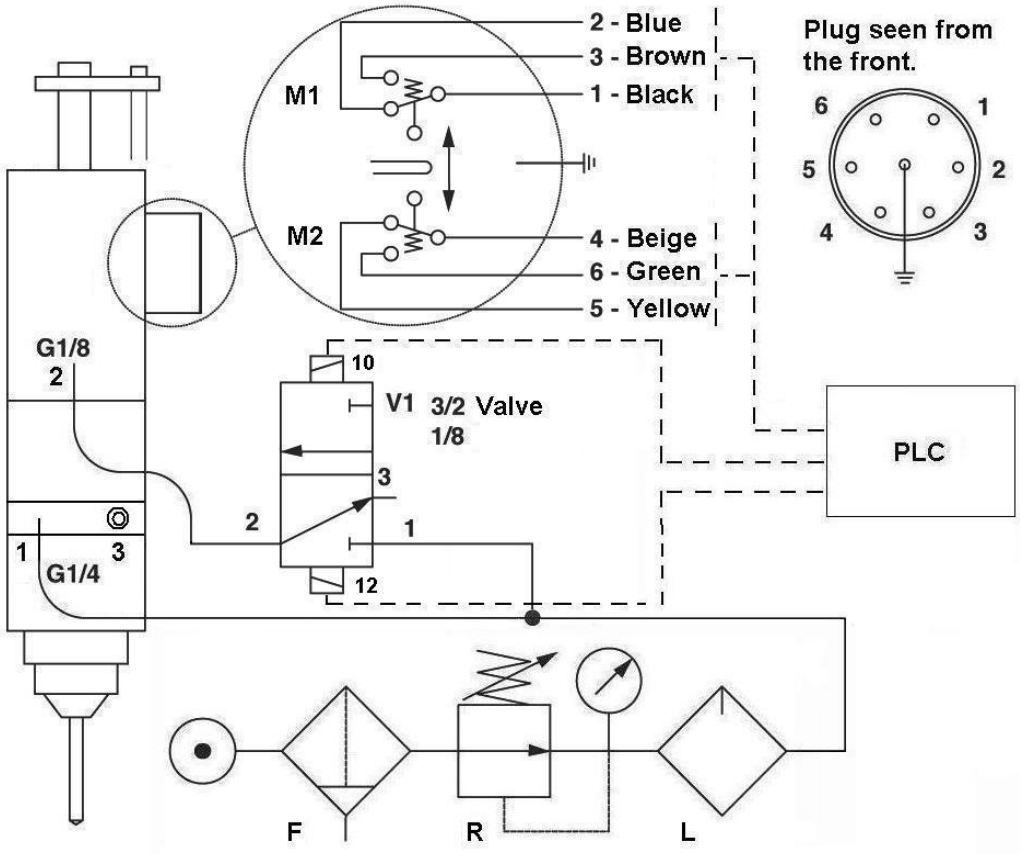
1. Turn off the electrical power and air-supply to the drilling unit's air connection (1).
2. Push the drilling spindle forward to an intermediate position (approx. 10 mm (0,393 In)) to deactuate the micro-valves.
3. Check the distance between the actuating lever (19) and the drilling unit's body, readjust to 2 mm (.079 In).
4. Remove the limit switch protective cover and then loosen the screw holding the cams (18) slightly.
5. Adjust the cams (18) to positions as close as possible to the micro-switch plungers and tighten the screw holding cams(18).
6. Put back the limit switch protective cover.
7. Put on the power and air supply to the drilling units port (1) again.

Example of connection with limit switch

Pneumatic:



Electric:



Maintenance instruction

Daily check:

- Check the air-pressure on the FRL-unit, 6 – 7 bar (87 – 101.5 Psi). Max 7 bar (101.5 Psi).
- Check for any leakages of air or oil. If a leakage is detected, contact service staff.
- Check the oil-level indicator pin (10). If the oil-level indicator has sunken to approx. 1 mm (.039 In) above the level of the housing, contact service staff. For refilling see instruction Every 6 months below.

Weekly check:

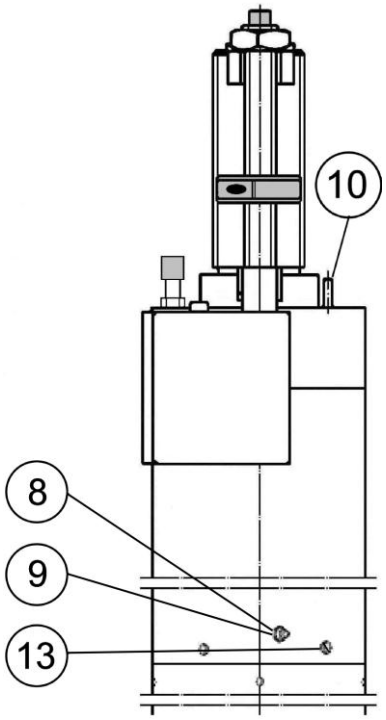
- Check that the oil-mist lubrication is working, approx. 1 drop/10-20 cycles. 1 drop = 15 mm^3 (.000528 fl.oz. (UK), .000507 fl.oz. (US))
- Check that the drilling unit is clean.

Monthly check:

- Check that no abnormal play is present in the drilling spindle.
- Check that external silencer is not clogged.
- Check that the air filter in the FRL unit is working or replace the air filter.

Every 6 months:

Pay special attention to the height of the oil-level indicator pin (10).
Maximum and minimum levels must be kept.
Max level = The oil-level indicator protrudes 8 mm (5/16'').
Min level = The oil-level indicator is flush with housing.



Oil must be refilled before the oil-level indicator reaches the minimum level and according to the following procedure:

1. Place the oil guns nozzle onto the oil-filling nipple (8).
2. Open seal screw (9) which seals the oil duct a half turn.
3. Immedialtely press in oil with the oil gun until the oil-level indicator pin (10) reach the max level.
4. Tighten seal screw (9).
5. Take off the oil gun and wipe off any oil on the drilling unit.
6. Check for any oil leakage from seal screw (9).

Max oil volume (filled): Approx. 12 cl (.35 fl.oz. (UK), .34 fl.oz. (US))
Recommended oil: Castrol Hyspin VG 46 SS or equivalent hydraulic oil.

Should the oil-level indicator sink below the minimum level the oil system must be bled according to the following procedure:

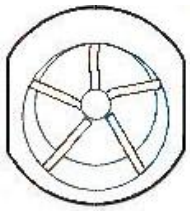
1. Dismount the drilling unit and place it on an inclined plane (30º) with the oil-filling nipple (13) pointing upwards.
2. Open bleed screw (13) one turn.
3. Place the oil guns nozzle onto the oil-filling nipple (8).
4. Open seal screw (9) which seals the oil duct a half turn.
5. Immedialtely press in oil with the oil gun until pure oil, without any air bubbles, is coming out through bleed screw (13). Thereafter tighten bleed screw (13).
6. Continue filling oil until the oil-level indicator pin is at maximum level.
7. Tighten seal screw (9).
8. Take off the oil gun and wipe off any oil on the drilling unit.
9. Remount and connect the drilling unit and pressurize.
10. Check for any oil leakage at seal screw (9) and bleed screw (13).

Tool kit 40-013, complete (incl. oil gun), ordering number: 041J000013

Cont.

Every 12 months:

Perform overhauling and clean the air motor every 12 months alternatively after 1500 – 2000 working hours operation depending on which occurs first. Planetary gear, ball bearings and needle bearings are greased with ball bearing grease.



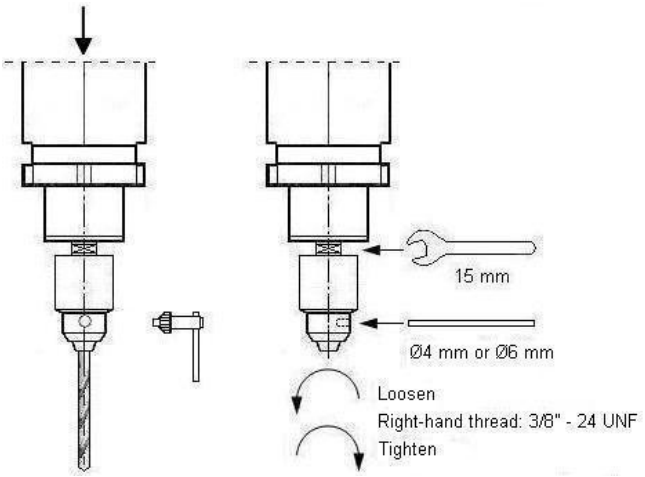
The air motor is of so called vane type. The air motors service life depends to a high degree on the air motors operating conditions. The vanes in an air motor intended for oil-mist lubrication have a life expectancy between 1500 to 2000 working hours at normal operation conditions. Other mechanical parts such as bearing have a service life between 3000 – 5000 hours.
The service life for an air motor intended for lubrication free operation is 1/3 of the service life compared with a lubricated air motor at normal operation.

If hard operation, overhauling and cleaning should be perfomed with tighter intervals.

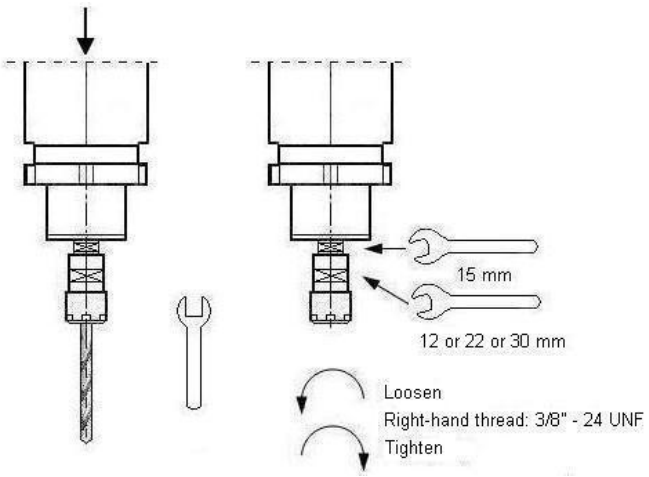
Replacement of chuck

1. Start the drilling unit and quickly turn off the air supply to the drilling unit when the key chuck or collet chuck and quill is visible.
2. Remove eventual cutting tool from the key chuck or collet chuck.
3. Remove and replace the key chuck or collet chuck as shown below.
4. Remount the cutting tool.
5. Turn on the air supply to the drilling unit again.

Key Chuck:



Collet Chuck:



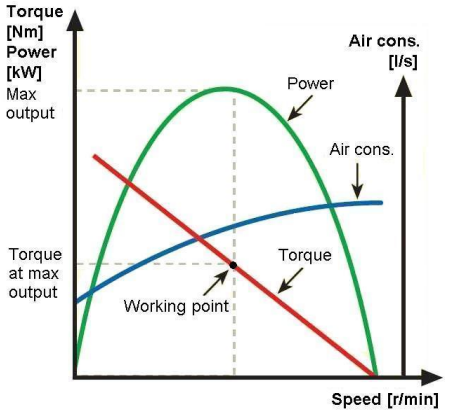
Technical information

Technical features, at 6,3 Bar (91.35 Psi):

Thrust, axial force	:	See Thrust table below.
Power, air motor	:	See Power table below.
Stroke	:	Max. 50 mm (1 15/16"), 100% controlled.
CC spindle spacing	:	Single spindle min. 65 mm (2 9/16") Double spindle head min. 11 mm (7/16")
Run-out at spindle nose	:	Max. 0,05 mm (.002 In)
Depth, accuracy	:	+/- 0,01 mm (.004 In)
Rapid advance rate	:	10 m/min (400 In/min)
Controlled feed rate	:	> 0,01 m/min (>.4 In/min)
Working pressure range	:	6 – 7 bar. Max 7 bar (85 – 100 Psi. Max. 101.5 Psi)
Air consumption	:	< 0,5 Nm^3/min (< 19 Cfm)
Ambient temperature	:	+10º - +40º C. (+50º - +104º F)
Sound level	:	70 dB(A)
Spindle thread for chuck	:	3/8" – 24 UNF
Chuck	:	As standard the drilling unit is fitted with an ordinary key chuck Ø 0,8 – 10,0 mm (.03 – 3/8"). A smaller key chuck and collet chuck with collets are available as an option.
Electric limit switches	:	Micro-switch: 10A 125V AC / 10A 250V AC
IP classification	:	N/A

Power and Thrust, at 6,3 Bar (91.35 Psi):

Type	Power, kW	Power, Hp	Thrust N
BE 335	0,36	0,48	1000
BE 337	0,36	0,48	1000
BE 3313	0,36	0,48	1000
BE 3326	0,36	0,48	800
BE 3333	0,36	0,48	800
BE 3360	0,36	0,48	800
BE 33210	0,36	0,48	800



Typical air motor caracteristics.

Speed and torque, at 6,3 Bar (91.35 Psi):

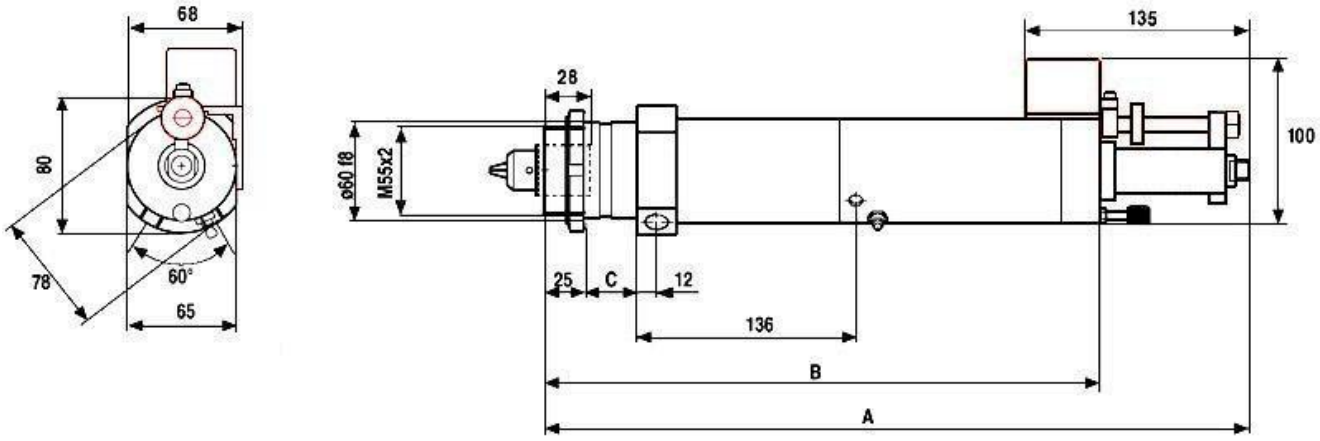
Type	Speed * (idle) Rpm	Speed (at max power) Rpm	Torque (at max power) Nm	Torque (at max power) Lbf-in
BE 335	500	250	12,6	225
BE 337	700	350	10,4	225
BE 3313	1300	650	5,7	225
BE 3326	2600	1300	2,9	180
BE 3333	3300	1650	2,3	180
BE 3360	6000	3000	1,3	180
BE 33210	21000	10500	0,37	180

* Lubrication free air motors have 95% of shown idle speed.

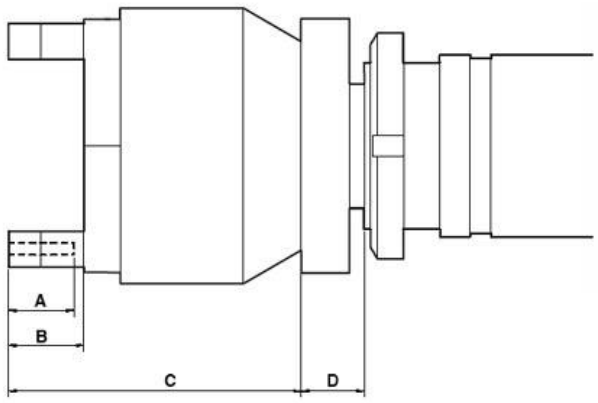
Maximum power is produced when the drilling spindle during operation rotates at half speed max speed.

For other data such as drilling capacity we refer to our website www.e2systems.com.

Dimensional drawing

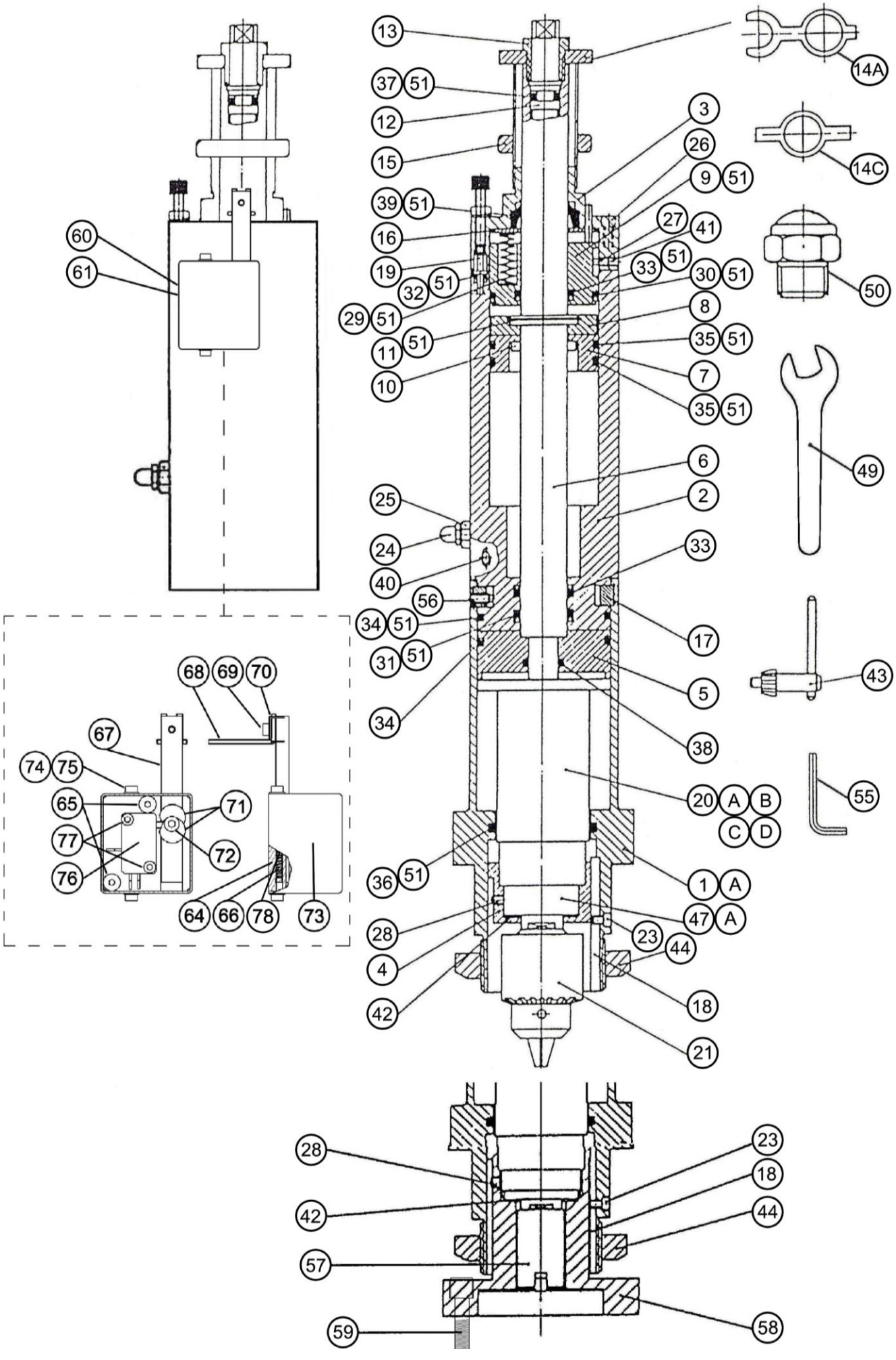


Type	A mm	B mm	C mm	D mm	Weight in Kgs	Weight in Lbs
BE 335	472	380	67	94,5	7,1	15,65
BE 337	472	380	67	154,5	7,1	15,65
BE 3313	472	380	67	94,5	7,1	15,65
BE 3326	438	346	33	154,5	6,6	14,55
BE 3333	438	346	33	94,5	6,6	14,55
BE 3360	438	346	33	154,5	6,6	14,55
BE 33210	438	346	33	94,5	6,6	14,55



Multi-spindle head, type	A mm	B mm	C mm	D mm	Adaptor, weight Kgs	Adaptor, weight Lbs
MBKV-402	20	35	117	13	0,5	1,1
VH 042P/ 043P / 043LP / 044P	22	25	97	13	0,5	1,1
MBK-6V2	21	56	117	13	0,5	1,1
MBK-6V3 / 6V4	21	56	121	20	0,5	1,
MBKV-6VR3	21	56	137	20	0,5	1,1
MBKV-602 / 603 / R603 / 604	21	35	127	13	0,5	1,1
VH 062P / 063P / 063LP / 064P	25	34	136	14	0,5	1,1
VH 082P / 083P / 083LP / 084P	28	40	148	14	0,5	1,1

Spare parts drawing



Spare parts list

BE 33			
Pos.	**Qty**	**Description**	**Part no.**
1	1	Motor housing, BE 335, 337, 3313	041U000100
1	1	Motor housing, BE 3326, 3333, 3360, 33210	041U000129
1A	1	Motor housing with quill, BE 335, 337, 3313	041R000051
1A	1	Motor housing with quill, BE 3326, 3333, 3360, 33210	041R000052
2	1	Cushioning housing	041U000101
3	1	Cushioning cover	041U000102
4	1	Quill	041R000103
5	1	Feed piston, complete.	041R000062
6	1	Feed shaft	041U000106
7	1	Cushioning piston	041U000107
8	1	Piston stop with piston lock, complete.	041R000050
9	1	Compensation piston, complete.	041U000109
10	1	Lifting washer	041U000111
11	1	O-ring, 20,0x1,0 Nitril	See pos. 51
12	1	Fine feed spindle, complete.	041U000113
13	1	Spindle lock	041U000116
14A	1	Stop, type A	041U000206
14C	1	Stop, type C (standard).	041U000117
15	1	Stop nut, complete.	041R000063
16	1	Washer	041U000119
17	1	Locking ring, complete	041R000049
18	2	Key	041U000121
19	1	Throttle valve with check screw, complete.	041R000061
20A	1	Air motor, BE 335, 3326	041U000138
20B	1	Air motor, BE 337, 3313, 3333, 3360, 33210	041U000137
20C	1	Set of vanes for **oil lubricated** air motor, pos. 20A or 20B, complete.	041R000031
20C	1	Set of vanes for **non-lubricated** air motor, pos. 20A or 20B, complete.	041R000029
20D	1	Bearing kit for air motor, see pos. 20A or 20B, complete.	041R000041
21	1	Key Chuck, Ø 0,5 - 6,5 mm (.02 - 1/4'')	041J004003
21	1	Key Chuck, Ø 0,8 - 10,0 mm (.03 - 3/8''), (standard chuck).	041J004002
21	1	Collet Chuck ER11, Ø 1,0 – 8,0 mm (.04 – 5/16'')	040J000122
21	1	Collet Chuck ER20, Ø 1,0 – 15,0 mm (.04 – 9/16'')	040J000121
21	1	Collet Chuck ER32, Ø 2,0 – 20,0 mm (.08 – 13/16'')	040J000124
23	1	Screw, 3x6 DIN 7984	411A121011
24	1	Oil refilling nipple, M6X1, straight.	420A000004
25	1	Seal screw	041U000022
26	2	Screw, MC6S 5x25 FZB	411A121008
27	2	Screw, T6SS 4x8 FZB	411A151145

Pos.	Qty	Description	Part no.
28	1	Screw, SK6SS 5X5 Black	411A151209
29	8	Pressure spring, 0,95x6,1x54	See pos. 51
30	1	V-seal, 40x48x45	See pos. 51
31	1	V-seal, DI 075, Black	See pos. 51
32	1	V-seal, N3-2	See pos. 51
33	2	V-seal, blue	See pos. 51
34	2	O-ring, 50,8x3,53 Nitril	See pos. 51
35	2	O-ring, 42,2x3,0 Nitril	See pos. 51
36	1	O-ring, 46,04x3,53 Nitril	See pos. 51
37	1	O-ring, 8,3x2,4 Nitril	See pos. 51
38	1	O-ring, 13,1x2,62 Nitril, BE 335, 336, 3313	See pos. 51
38	1	O-ring, 39,69x3,53 Nitril, BE 3326, 3333, 3360, 33210	See pos. 51
39	1	Scraper	See pos. 51
40	1	Bleed screw	041U000127
41	2	Screw, SK6SS 4x4 Black	411A151199
42	1	Ball bearing washer	414A132002
43	1	Chuck Key for Key Chuck pos. 21. Ø 0,5 - 6,5 mm (.02 - 1/4'')	041J004071
43	1	Chuck Key for Key Chuck pos. 21. Ø 0,8 - 10,0 mm (.03 - 3/8'')	041J004072
43	1	Wrench for Collet Chuck Nut pos. 21. ER11.	041J004083
43	1	Wrench for Collet Chuck Nut pos. 21. ER20.	041J004084
43	1	Wrench for Collet Chuck Nut pos. 21. ER32.	043J000002
44	1	Front nut, M55x2	413A192011
47	1	Planetary gear, BE 335, complete.	041R000046
47	1	Planetary gear, BE 337, complete.	041R000037
47	1	Planetary gear, BE 3313, complete.	041R000038
47	1	Planetary gear, BE 3326, complete.	041U000142
47	1	Planetary gear, BE 3333, complete.	041U000141
47	1	Planetary gear, BE 3360, complete.	041U000140
47	1	Planetary gear, BE 33210, complete.	041U000139
47A	1	Bearing kit for Planetary gear BE 335, 337, 3313, complete.	041R000042
47A	1	Bearing kit for Planetary gear BE 3326, 3333, 3360, 33210, complete.	041R000043
49	1	Tool for chuck removal.	041J004047
50	1	Silencer, G 1/4"	057F000502
51	1	Seal kit, complete.	041R000011
55	1	Allen key, NV 5	041J004011
56	1	Screw, T6SS 4x8 FZB	411A151152
57	1	Drive adaptor, VH04, MBK V60-.	041V400198
57	1	Drive adaptor, VH06 och VH08.	041V400199
57	1	Drive adaptor, MBK 6V.	041V400235
58	1	Quill, for multi-spindle head VH042, VH043L, VH044.	041V300098
58	1	Quill, for multi-spindle head VH043-.	041V300219
58	1	Quill, for multi-spindle head VH062, VH063, VH084, MBK V60-.	041V300220

Pos.	Qty	Description	Part no.
58	1	Quill, for multi-spindle head MBK 6V2.	041V300100
59	4	Screw, MC6S 6x12 FZB, for VH04.	411A121134
59	4	Screw, MC6S 6x16 FZB, for VH06, VH08, MBK V60-.	411A122039
60	1	Electric limit switch assembly, complete.	041J000008
61	1	Pneumatic limit switch assembly, complete.	041J000028
64	1	Plate	041U000192
65	2	Screw, MF6S 4x12 FZB	411A121038
66	1	Pressure spring, 0,8x4x19,5	416A111024
67	1	Bar	041U000200
68	1	Stop	041U000202
69	1	Screw, MC6S 4x8 FZB	411A121007
70	1	Clip	041U000248
71	2	Cam, for electric limit switch.	041U000193
71	2	Cam, for pneumatic limit switch.	041U000242
72	1	Screw, MC6S 4x22 FZB	411A121006
73	1	Cover, for electric limit switch.	041V400749
73	1	Cover, for pneumatic limit switch.	041V400752
74	2	Screw, MC6S 3x8 black	411A121010
75	2	Washer, BRB 3,2x7x0,5 FZB	414A112001
76	2	Micro-switch, for electric limit switch. 10A 125V AC / 10A 250V AC.	604A000012
76	2	Micro-switch, for pneumatic limit switch.	604A000011
77	2	Screw, MC6S 3x25 FZB	411A121098
78	2	Flat key, TK 8x7x14, for pneumatic limit switch.	415A141008
	1	Plug, 7-pole, male. 5 A 300V AC/DC.	504A000006
	1	Plug, 7-pole, female. 5 A 300V AC/DC.	504A000007
	1	Cable gland	418A260004
	1	Cable clamp	420A000119
	1	Cable, 7x0,25, length 2,15 m (7.05 Ft).	514A000001

Warranty conditions

The warranty period for the product is 4 000 000 drilling cycles or 12 months after installation/ commissioning or 18 months after delivery, which of these occurs first, and provided that the product installed/stored in a satisfactory manner and that the product is used in normal operation, the mounting/ clamping and handling conditions. The warranty is not valid if unauthorized change/modification have been performed on the product and that this may make the product unsafe.

Environmental declaration

Drilling unit, Type BE 33

Housing	:	Steel
Quill	:	Brass
Other parts	:	Aluminium, Brass and steel.
Gaskets	:	Rubber
Hydraulic oil	:	Oil. The drilling unit contains a small amount hydraulic oil.

Housing, quill and other metallic parts	:	Dispose as metal waste; Aluminium, brass and steel.
Gaskets	:	Dispose as combustable waste.
Hydraulic oil	:	Dispose as hazardous waste.

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