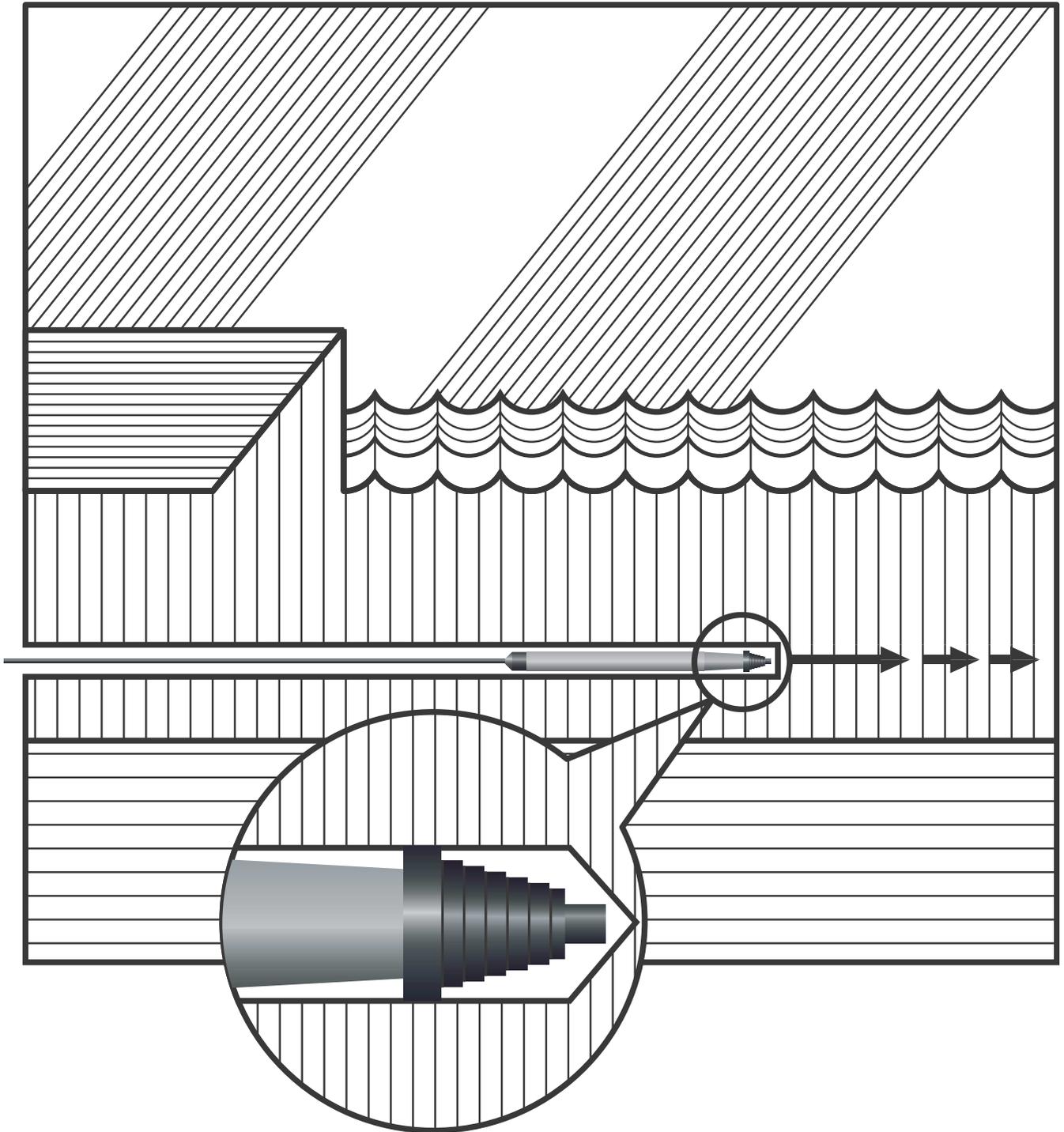


**Trenchless technologies**

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## MORE THAN 40 YEARS ON TRENCHLESS TECHNOLOGIES MARKET

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Our company – Gidroprom Ltd. (preceding name is Odessa Construction and Finishing Machinery Plant) for over 40 years has been known as a major manufacturer of construction equipment and tools that are used in various fields of construction and maintenance of public utilities. The quality of equipment and its reliability are checked for decades. Gidroprom Ltd. has wide experience of export to many countries in the world.

## TRENCHLESS TECHNOLOGIES

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Trenchless technologies represent a variation of works on underground construction without excavation.

NO-DIG methods are effectively used for the execution of such underground works as:

Cable laying

Installation of underground electrical cables;

Installation of oil, gas and heating pipes;

Laying and replacement of sewage and water supply system pipes;

Vertical use - formation of piles and pile constructions, wells and drill holes;

For trenchless replacement of pipes (are used for reconstruction of old sewage pipes made of breakable materials (ceramics, asbestos cement, cast iron)

Trenchless methods allow to considerably reduce the need of excavation – about 90% of all works are carried out underground, thus eliminating environmental damage and cutting down the social costs required for the restoration of road and pavements and connections with disrupting the usual urban life rhythm.

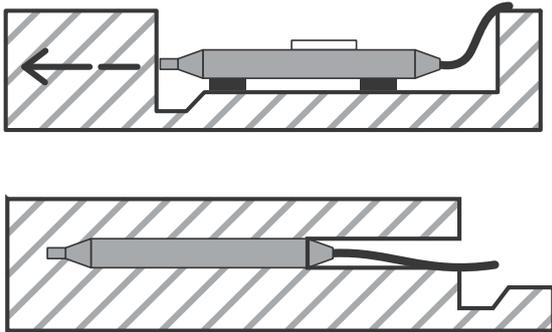
Trenchless technology more economical in comparison with convention trench-excavation methods and it is by far more friendly to the environment.

NO-DIG technologies give you an advantage over competitors in the distribution of orders by tender.

# TYPES OF WORKS

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## 1. Hole driving



The holes are driven by means of single (without expander) or multiple (with expander) impact moling from launch pit to receiving pit.

## 2. 2. Cable laying

The cable can be pulled into the hole by the mole during the impact moling or can be pulled through the hole with the help of accessory equipment while the mole returns to the launch pit.

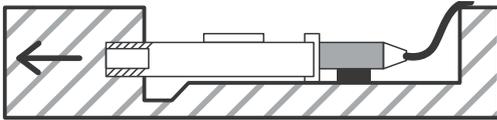
## 3. 3. Pipe installation

Pipe sections are pulled through the hole after it is formed or are attached to the mole and are pulled into the hole simultaneously with the movement of the mole. As the mole moves through the hole, the pipeline is augmented in the launch pit (with the use of treaded pipe joints, welding, etc.) Sometimes it is recommended to pull the pipe through a pre-punched hole with the aid of a winch.

## TYPES OF WORKS

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### 4.4. Pipe ramming



Pipes can be rammed both with the closed end (small diameters) and with the open end (large diameters). In the latter case, the soil accumulated inside the pipe is extracted with the help of a soil-removing device, which contains a special scoops driven by a mole of a smaller diameter. It is possible to ram pipes directly into the soil or into a pre-punched leading hole. This method is recommended for pipes of large diameters, and for executing works in granular and watered soils.

### 5. 5. Pipe replacement Steel:

The existing pipe is pushed out of the hole by a mole or pipe ramming machine and a new pipe is pulled into the formed hole with the help of a winch. In cases when both the old and the new pipes are made of steel (up-size or size-for-size), it is possible to ram the old steel pipe out directly with the new one.

### Ceramics, asbestos cement, cast iron:

A special lengthener driven by a pneumatic hammer, is fed into the old pipe (ceramics, asbestos cement, cast iron) and it sets the direction. The lengthener is followed by the breaking unit which destroys the old pipe. The broken pieces of the old pipeline are pressed into the surrounding soil by the expander, which follows the breaking unit. The stalk or the first section of the new polyethylene pipeline (which is augmented in the launch pit) is attached to the expander and pulled in. the working unit is directed and pulled by the winch with the help of a rope, which has been pulled through the old pipeline. While working with stalk, the pipe is fed into the launch pit through a pre-punched inclined hole.

# TECHNICAL SPECIFICATION

Parameters		IP 4610	IP 4605A	IP 4603A	CO 144A
Diameter of holes to be punched	mm	55	95/180	130/200	70/100/120
External diameter of steel pipes	mm			No more 159	
Length of holes to be punched/ pipes to be driven	m	30	40	40/20	30
Hole punched speed / pipe driven speed	m/min	0,02-0,75	0,17-0,9	0,02-0,78/ 0,03-0,036	0,09-0,9
<b>Impacting Unit</b>					
Weight	kg	14	54	90	28
Diameter	mm	60	95	130	70+2
Length	mm	1200	1500	1500	1350
Single impact energy	J (kgf*m)	15	110	250	46
Frequency of impacts	Hz	6,5	5,5	6,2	5,5
Operating pressure of compressed air	MPa	0,6	0,6	0,6	0,6
Air consumption	m <sup>3</sup> /min	1,32	3,2	5,3	1,5

Parameters		CO 134	CO 166	CO 166M	M400
Diameter of holes to be punched	mm	155/300	235	235	410
External diameter of steel pipes	mm	159...325	325:630	159...820	426...1400
Length of holes to be punched/ pipes to be driven	m	40/30	25-40	25	25-40
Hole punched speed / pipe driven speed	m/min	0,08-0,96/ 0,0036-0,3	0,0084-0,25	0,0084-0,25	0,0084-0,25
<b>Impacting Unit</b>					
Weight	kg	150	370	370	1800
Diameter	mm	155	235	235	470 with bandage
Length	mm	1700	1710	1750	2590
Single impact energy		500	1000	1900	4000
Frequency of impacts	Hz	4,2	3,8	2,5	2,8
Operating pressure of compressed air	MPa	0,6	0,6	0,6	0,6
Air consumption	m <sup>3</sup> /min	8	8	8	20

# HOLE-DRIVING MACHINE

## IP4610



### DESCRIPTION

---

The machine is intended for driving of through and blind horizontal, inclined and vertical holes of 55 mm in diameter in compactable soils.

Vertical holes can be used for micropiles.

The machine is used to best advantage under normal urban conditions when laying TV and telephone cables and if it is required to drive holes at a depth of 1 m, the depth of 0,5 m is ultimate.

Restrictions for use of the machine:

It is not advisable to employ the machine in soils with voids of over 0.3 m, remnants of building structures, etc.

The machine is not intended for operation in rock and frozen, granular and water-bearing soils.

It is prohibited to operate the machine at an ambient temperature below 0 and above 450 C.

At an ambient temperature from 0 до 50 C and high humidity the use of moisture separator is a must



## SPECIFICATIONS

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Diameter of hole to be driven, not over	mm	55
Length of hole to be driven, not over	m	40
Average rate of hole driving	m/s	$0.27 \cdot 10^{-3} \dots 12.5 \cdot 10^{-3}$
Driving power		compressed air
Working pressure of compressed air	Mpa	$0.63 \pm 0.06$
Air flow rate, not over	m <sup>3</sup> /s	0.022
Single stroke power, at least	J	15
Stroke frequency, at least	Hz	6.5
Machine overall dimensions, not over		
length (less hose)	mm	1200
diameter	mm	60
Machine mass (less hose), not over	kg	14

## STANDARD DELIVERY SET

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1. Striking unit;
2. Hose (40 m);
3. Tools.

# HOLE-DRIVING MACHINE

## CO144A



### DESCRIPTION

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The machine CO 144A helps to mechanize the process of trenchless driving of holes in soil. The machine is intended for driving through and blind horizontal, inclined and vertical holes of 70 mm in diameter, through horizontal and inclined holes of 100 and 120 mm in diameter (with the use of expanders) in compactable soils at the depth of 0.6 and over from the surface. The length of a driven hole is up to 40 m.

The reversing mechanism makes it possible to change the direction of the hammer strikes against the body, and therefore to change the direction of the movement of the machine in order to return it back in emergencies or driving blind holes.

The use of this equipment makes it possible to lay underground communications without disturbing the topsoil surface or damaging the roads and overground structures as well as for other construction purposes.

### STANDARD DELIVERY SET

---

1. Striking unit;
2. Hose 40 m;
3. Expander  $\varnothing$ 100mm;
4. Expander  $\varnothing$ 120mm;
5. Tools.



## SPECIFICATIONS

Diameter of holes to be driven		
without expander	mm	70
with expander	mm	100; 120
Length of holes to be driven	m	40
Single impact energy	J	65 ± 6.5
Impact frequency	Hz	5.5
Operating pressure of compressed air	Mpa	0.6 ± 0.06
Compressed air consumption, not more than	m <sup>3</sup> /s	0.025
Average rate of hole driving without expander	m/s	1.5*10 <sup>-3</sup> – 15*10 <sup>-3</sup>
Overall dimensions		
length	mm	1350
diameter	mm	70
Weight (without hose, expander and extension)	kg	28

**Notes:** 1. The rate of hole driving depends on the soil properties (composition, density, homogeneity, humidity, etc.). Higher rates of driving are possible in some easily compactable soils.  
 2. Speed of reverse run of the machine and the rate of driving with the use of expanders are not specified.

# REVERSIBLE PNEUMATIC PUNCHER

## IP4605A



### DESCRIPTION

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The IP-4605A reversible pneumatic puncher is a device intended for punching the through and blind horizontal, inclined and vertical holes of 95 mm in diameter and through horizontal and inclined holes of 180 mm in diameter (using the expander) in the compactable soils and for driving the pipes into soil at trenchless laying of underground mains. The punching of holes is effected due to deformation (compaction) of soil to the sides from the axle of the hole.

The pneumatic puncher consists of a striking

unit, expander, hose (40 m) and can be completed with an extension to punch accurately directed holes jointly with the striking unit (in assembly).

The pneumatic puncher striking unit consists of a body, anvil, striker and slide valve. The striker moves inside the body, two position control valve mechanism allowing it to reverse the drift of the pneumatic puncher. The compressed air is supplied from the compressor to the puncher with the help of the hose.

### STANDARD DELIVERY SET

---

1. Striking unit;
2. Hose 40 m;
3. Expander Ø180mm;
4. Stepped nozzle;
5. Tools.

## ADDITIONAL EQUIPMENT

### 1. Universal Starting Carriage 2015.00.000

Intended for launching Pneumatic Punchers IP-4605 и IP-4603 at an angle from 0o to 90o. Applicable for moling horizontal, inclined and vertical holes at laying underground communications, deep compacting of soils, and building piles. The device allows gradual adjusting of the puncher's inclination.

### 2. Starting carriage IK9214.00.000

The starting carriage is designed for launching IP-4605, IP-4603 and CO-134A into soil. It is used for driving horizontal holes at laying underground communication lines.

### 3. Automatic lubricator MA.20.00

The unit is intended to feed oil for lubricating friction parts of pneumatic punchers and machines. It is used with IP-4603, IP-4605, CO-134A, CO-166, CO-166M, MPS-01, MPS-01.01 and can be completed with replacement adapters for hoses 25 and 38 mm in diameter.

### 4. Lengthener

Lengtheners allow to increase the accuracy of hole driving and are used, accordingly, with IP-4605A, IP-4603A and CO-134A

### 5. Expanders

IP-4603A can be supplied with expanders with the following diameters: 145 and 160 mm.

### 6. Spares set.



## SPECIFICATIONS

Diameter of holes to be punched		
without expander	mm	95
with expander	mm	180
Length of holes to be punched	m	40
Single impact energy	J	100
Impact frequency at rated pressure of 0.6 MPa	Hz	5,5 / 330± 10%
Operating pressure of compressed air	Mpa	0.6 ± 0.06 ( 6 ±0,6)
Compressed air consumption, not more than	m³/s	3,78 (0.063)
Speed of punching holes without expander	m/s	0.28x10 <sup>-3</sup> – 15x10 <sup>-3</sup> *
Overall dimensions, not more than:		
length	mm	1500
diameter	mm	95
Weight (without hose, expander, extension)	kg	55

**Notes:** 1. The speed of punching the holes and driving the pipes depends on soil properties, diameter and length of pipe.

2. The speed of reverse running of the pneumatic puncher and punching of holes using an expander is not specified.

# REVERSIBLE PNEUMATIC PUNCHER

## IP4603A



### DESCRIPTION

---

The IP-4603A reversible pneumatic puncher is a device intended for punching the through and blind horizontal, inclined and vertical holes of 130 mm in diameter and through holes of 200 mm in diameter (using the expander) in the compactable soils and for driving the steel pipes into soil or into beforehand punched hole at trenchless laying of underground mains. The punching of holes is effected due to deformation (compaction) of soil to the sides from the axle of the hole.

The pneumatic puncher consists of a striking unit, expander, hose (40 m) and can be completed with

an extension to punch accurately directed holes jointly with the striking unit (in assembly).

The pneumatic puncher striking unit consists of a body, anvil, striker and slide valve. The striker moves inside the body, two position control valve mechanism allowing it to reverse the drift of the pneumatic puncher. The compressed air is supplied from the compressor to the puncher with the help of the hose.

The modernized model IP4603AM is used to lay the PE pipes 110mm in diameter simultaneously with the hole formation (with the help of a rare nut for pipe pulling).

### STANDARD DELIVERY SET

---

1. Striking unit;
2. Hose 40 m;
3. Expander Ø200mm;
4. Stepped nozzle;
5. Tools.

## ADDITIONAL EQUIPMENT

### 1. Universal Starting Carriage 2015.00.000

Intended for launching Pneumatic Punchers IP-4605 и IP-4603 at an angle from 0o to 90o. Applicable for moling horizontal, inclined and vertical holes at laying underground communications, deep compacting of soils, and building piles. The device allows gradual adjusting of the puncher's inclination.

### 2. Starting carriage IK9214.00.000

The starting carriage is designed for launching IP-4605, IP-4603 and CO-134A into soil. It is used for driving horizontal holes at laying underground communication lines.

### 3. Pipe pulling device IP4603A.10.000

Pipe pulling device is intended for pulling of polyethylene pipes of 110 mm in diameter up to 40 m long with simultaneous driving of a hole. The device is used with IP-4603A

Reversible Pneumatic Puncher.

### 4. Automatic lubricator MA.20.00

The unit is intended to feed oil for lubricating friction parts of pneumatic punchers and machines. It is used with IP-4603, IP-4605, CO-134A, CO-166, CO-166M, MPS-01, MPS-01.01 and can be completed with replacement adapters for hoses 25 and 38 mm in diameter.

### 5. Lengthener

Lengtheners allow to increase the accuracy of hole driving and are used, accordingly, with IP-4605A, IP-4603A and CO-134A

### 6. Expanders

IP-4603A can be supplied with expanders with the following diameters: 160 and 180 mm.

### 7. Spares set.



## SPECIFICATIONS

Diameter of holes to be punched		
without expander	mm	130
with expander	mm	200
Length of holes to be punched	m	40
Inside diameter of pipes to be driven,	mm	100 – 120
Length of pipes to be driven	m	20
Single impact energy	J	250
Impact frequency at rated pressure of 0.6 MPa	Hz	6.2 ± 10%
Operating pressure of compressed air	Mpa	0.6 ± 0.06
Compressed air consumption, not more than	m <sup>3</sup> /s	0.073
Speed of punching holes without expander	m/s	0.3*10 <sup>-3</sup> – 13*10 <sup>-3</sup>
Speed of driving the pipes	m/s	6*10 <sup>-3</sup> – 4.86*10 <sup>-3</sup>
Overall dimensions, not more than:		
length	mm	1500
diameter	mm	130
Weight (without hose, expander and extension)	kg	90

**Notes:** 1. The speed of punching the holes and driving the pipes depends on soil properties, diameter and length of pipe. 2. The speed of reverse running of the pneumatic puncher and punching of holes using an expander is not specified.

# HOLE DRIVING AND PIPE RAMMING MACHINE CO134A



## DESCRIPTION

---

CO-134A is essentially a pneumatic impacting unit with a set of additional accessories and is operated from a stationary or mobile compressed air source. The machine is intended for driving through and blind horizontal, inclined and vertical holes of 155 mm in diameter, through horizontal and inclined holes of up to 300mm in diameter (with the use of an expander), and also for ramming steel pipes of outer diameter of up to 325 mm into compactable soil or preliminary driven hole. It is used in case of trenchless laying of underground service lines without disturbing the topsoil, road surfaces, and ground structures. Hole and pipe driving is performed by compacting the soil aside from the machine (pipe) axis. The zone of practically perceptible deformation of soil does not exceed three to five diameters of the machine (pipe). The precision of hole driving (pipe ramming) is deter-

mined by the accuracy of aiming only at starting and can not be corrected after introducing the machine (pipe) into soil. The reversing mechanism makes it possible to change the direction of strokes of the striker on the body and the direction of the machine movement to return it back in driving blind holes and in emergency cases.

Especially effective is the use of the machine in building communication passages under highways, freeways, streets, railways, on the territories of functioning factories, in zones of green plantations, etc. The driven holes are intended for laying into them sheaths or various kinds of service lines including cables, pipelines, etc. Vertical holes can be used for forming cast-in-place piles or for depth compaction of soils. The driven steel pipes can be used as pipelines or as sheaths for laying service lines.

## STANDARD DELIVERY SET

---

1. Striking unit;
2. Hose 40 m;
3. Set of head pieces (Ø219, 273, 325 mm);
4. Tools.

## ADDITIONAL EQUIPMENT

### 1. Starting carriage IK9214.00.000

The starting carriage is designed for launching IP-4605, IP-4603 and CO-134A into soil. It is used for driving horizontal holes at laying underground communication lines.

### 2. Automatic lubricator MA.20.00

The unit is intended to feed oil for lubricating friction parts of pneumatic punchers and machines. It is used with IP-4603, IP-4605, CO-134A, CO-166, CO-166M, MPS-01, MPS-01.01 and can be completed with replacement adapters for hoses 25 and 38 mm in diameter.

### 3. Lengthener

Lengtheners allow to increase the accuracy of hole driving and are used, accordingly, with IP-4605A, IP-4603A and CO-134A

### 4. Expanders

CO-134A can be supplied with expanders with the following diameters: 200, 245, 273 and 300 mm.

### 5. Stepped nozzle.

It allows to increase the accuracy of hole driving.

### 6. Device for pipe ramming CO134A.40.100

It is intended for vertical and horizontal pipes ramming. This device allows to attach the machine CO-134A to a pipe.

### 7. Spares set.



## SPECIFICATIONS

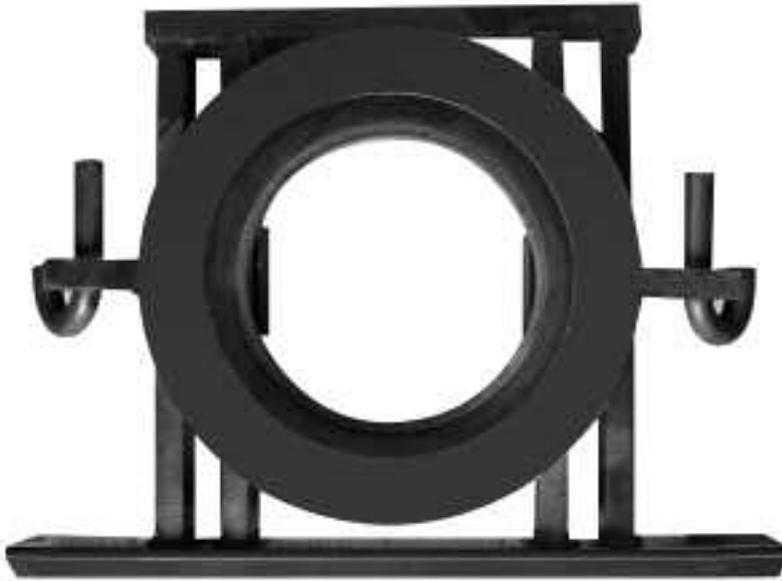
Diameter of holes to be driven		
without expander	mm	155
with expander	mm	300
Length of holes to be driven	m	40
Length of pipes to be rammed	m	10-30
Single impact energy	J	500 ± 504.2 / 252 ± 10%
Impact frequency	Hz	4.2 / 252 ± 10%
Operating pressure of compressed air	Mpa	0.6 ± 0.06 (6 ± 0,6 )
Compressed air consumption, not more than	m <sup>3</sup> /s	8 (0.133)
Average rate of hole driving	m/s	1.3x10 <sup>-3</sup> – 16x10 <sup>-3</sup>
Average rate of pipe ramming	m/s	0.06x10 <sup>-3</sup> – 5x10 <sup>-3</sup>
Overall dimensions		
length	mm	1700
diameter	mm	155
Weight (without hose, expander and extension)	kg	150

**Notes:** 1. The speed of driving the holes and ramming the pipes depends on soil properties, diameter and length of pipe.

2. The speed of reverse running of the pneumatic puncher and punching of holes using an expander is not specified.

# PIPE RAMMING MACHINE

## CO166



### DESCRIPTION

---

The machine is designed for ramming the steel pipes into the ground in the horizontal, inclined or vertical direction in trenchless running of underground service lines. The pipes can be rammed in with its end closed (with a cap piece) up to 325 mm in diameter or with an open end (with the pipe filled with the ground) up to 630 mm in diameter. In the latter case, upon driving-in the pipe completely or partially the ground is removed out of it with the aid of a special soil removal device (not included in the delivery set). The rammed steel pipes are used directly as pipe lines or as enclosures for laying service lines or else as piles (vertical) in erecting the trestles as well as

electrodes of active electrochemical protection of gas and oil pipe lines, etc. An especially efficient use of machine CO-166 is in arranging the passages under highways and railway lines on the territories of functioning enterprises, in green plantation zones, etc. The length of the pipe to be rammed depends on its diameter, type of the ground and driving-in method (with the end closed or open). The machine CO-166 is a pneumatic impacting unit provided with adapters (set of head pieces) for connecting it with a pipe and operates from a stationary or mobile compressed air source.

### STANDARD DELIVERY SET

---

1. Striking unit;
2. Hose 20 m;
3. Set of head pieces (Ø426, 530, 630 mm);
4. Tools

## ADDITIONAL EQUIPMENT

### 1. Supporting device CO-166.60.000

The device is designed for supporting and junction of the pipe to be rammed with the pipe ramming machine CO-166. It is attached to the rear nut of the machine and secured to the pipe to be rammed with the aid of belts.

### 2. Automatic lubricator MA.20.00

The unit is intended to feed oil for lubricating friction parts of pneumatic punchers and machines. It is used with IP-4603, IP-4605, CO-134A, CO-166, CO-166M, MPS-01, MPS-01.01 and can be completed with replacement adapters for hoses 25 and 38 mm in diameter.

### 3. Soil removal device

It is intended for extracting soil from pipes which is rammed with the open end. It is driven by IP-4605A (for pipes 325mm in diameter and over), by IP-4603A (for pipes 425mm and over), by CO-134A (for pipes 530mm and over).

### 4. Pneumatic soil removal device

It is designed for removing soil from pipes Ø108, 133, 159, 219, 273, 325, 426, 530 mm with the aid of compressed air (when ramming pipes with an open end).

### 5. Spares set.



## SPECIFICATIONS

Diameter of pipes to be driven-in		
with end open	mm	425, 530, 630
with end closed	mm	219, 273, 325
Length of pipes to be driven-in	m	25
Single impact energy	J	1000 ± 100
Impact frequency	Hz	3.8 (228± 10%)
Operating pressure of compressed air	Mpa	0.6 ± 0.06 (6±0,6)
Compressed air consumption, not more than	m <sup>3</sup> /s	0.133
Driving-in speed of pipes	m/s	0.14x10 <sup>-3</sup> – 4.2x10 <sup>-3</sup>
Overall dimensions , not over:		
length, mm	mm	1710
diameter, mm	mm	235
Weight of set,	kg	600

# PIPE RAMMING MACHINE

## CO166M



## DESCRIPTION

---

The machine is designed for ramming the steel pipes into the ground in the horizontal, inclined or vertical direction in trenchless running of underground service lines. The pipes can be rammed in with its end closed (with a cap piece) up to 325 mm in diameter or with an open end (with the pipe filled with the ground) up to 820 mm in diameter (and up to 1020mm when the properties of a ground are appropriate). In the latter cases, upon driving-in the pipe completely or partially the ground is removed out of it with the aid of a special soil removal device (not included in the delivery set). The rammed steel pipes are used directly as pipe lines or as enclosures for laying service

lines or else as piles (vertical) in erecting the trestles as well as electrodes of active electrochemical protection of gas and oil pipe lines, etc. An especially efficient use of machine CO-166 is in arranging the passages under highways and railway lines on the territories of functioning enterprises, in green plantation zones, etc. The length of the pipe to be rammed depends on its diameter, type of the ground and driving-in method (with the end closed or open). The machine CO-166 is a pneumatic impacting unit provided with adapters (set of head pieces) for connecting it with a pipe and operates from a stationary or mobile compressed air source.

## ADDITIONAL EQUIPMENT

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1. Supporting device CO-166.60.000

The device is designed for supporting and junction of the pipe to be rammed with the pipe ramming machine CO-166. It is attached to the rear nut of the machine and secured to the pipe to be rammed with the aid of belts.

2. Automatic lubricator MA.20.00

The unit is intended to feed oil for lubricating friction parts of pneumatic punchers and machines. It is used with IP-4603, IP-4605, CO-134A, CO-166, CO-166M, MPS-01, MPS-01.01 and can be completed with replacement adapters for hoses 25 and 38 mm in diameter.

3. Soil removal device

It is intended for extracting soil from pipes which is rammed with the open end. It is driven by IP-4605A (for pipes 325mm in diameter and over), by IP-4603A (for pipes 425mm and over), by CO-134A (for pipes 530mm and over).

4. Pneumatic soil removal device

It is designed for removing soil from pipes Ø108, 133, 159, 219, 273, 325, 426, 530 mm with the aid of compressed air (when ramming pipes with an open end).

5. Spares set.

## SPECIFICATIONS

---

Diameter of pipes to be driven-in		
with end open	mm	820
with end closed	mm	325
Length of pipes to be driven-in	m	25 *
Single impact energy	J	1900 ± 100
Impact frequency	Hz	2.5
Operating pressure of compressed air	Mpa	0.6 ± 0.06
Compressed air consumption, not more than	m <sup>3</sup> /s	0.11
Driving-in speed of pipes	m/s	0.14*10 <sup>-3</sup> – 4.2*10 <sup>-3</sup> *
Overall dimensions, not over		
length	mm	1750
diameter	mm	235
Weight of set	kg	675

## STANDARD DELIVERY SET

---

1. Striking unit;
2. Hose 20 m;
3. Set of head pieces (Ø219, 273, 426, 530, 630 mm);
4. Tools.

# PIPE RAMMING MACHINE

## M200

### DESCRIPTION

The pneumatic machine is designed for ramming the steel pipes up to 1020mm in diameter into the ground in the horizontal, inclined or vertical direction in trenchless running of underground service lines.

The machine M-200 is a pneumatic impacting device that makes it possible to mechanize laying of steel pipes into soil, which can be used as pipelines, sheaths for laying service lines including cables, pipelines, and also as piles, etc. Especially effective is the use of the machine in building communication passages under highways and railways, on the territories of functioning factories, in the zones of green plantations, etc. The machine M-200 differs from the known devices of similar purpose (devices for pressing through soil, drilling units, etc.) by its small overall dimensions, mobility, high performance, sharp reduction in expenditures for auxiliary operations, simplicity of maintenance and reliability in operation.

The pipe is rammed into soil under the action of impacts of the machine connected with the pipe with the aid of the adapter. The machine operates from a stationary or mobile compressed air source with flow rate not less 10м<sup>3</sup>/min and working pressure 0.4-0.6 Мпа.

The pipes up to 426 mm in diameter can be rammed in with its end closed and more diameters with an open end (with the pipe filled with the ground). In the latter cases, upon ramming-in the pipe completely or partially the ground is removed out of it with the aid of a special soil removal device (not included in the delivery set).

### SPECIFICATIONS

Диаметр забиваемых труб	мм	426 -1020
Энергия единичного удара	Дж	1800 ± 200
Частота ударов	Гц / Уд.мин (мин <sup>-1</sup> )	3,5 / 210± 10%
Рабочее давление сжатого воздуха	МПа (кгс/см <sup>2</sup> )	0.6 ± 0.06 (6 ± 0,6)
Расход сжатого воздуха, не более	м <sup>3</sup> /мин	10
Габаритные размеры (без насадок и шланга)		
длина	мм	2265
диаметр корпуса	мм	266
диаметр банджа	мм	353
Масса (без насадок и шланга)	кг	660
Внутренний диаметр воздухоподводящих рукавов	мм	38/50

### STANDARD DELIVERY SET

1. Striking unit;
2. Hose 20m.
3. Tools.

# PIPE RAMMING MACHINE

## M400

### DESCRIPTION

The machine is designed for ramming the steel pipes into the ground in the horizontal, inclined or vertical direction in trenchless running of underground service lines. The pipes can be rammed in with its end closed (with a cap piece) up to 426 mm in diameter or with an open end (with the pipe filled with the ground) up to 1420 mm in diameter. In the latter cases, upon driving-in the pipe completely or partially the ground is removed out of it with the aid of a special soil removal device (not included in the delivery set). The rammed steel pipes are used directly as pipe lines or as enclosures for laying service lines or else as piles (vertical) in erecting the trestles. An especially efficient use of machine M-400 is in arranging the passages under highways and railway lines, on the territories of functioning enterprises, in green plantation zones, etc. The length of the pipe to be rammed depends on its diameter, type of the ground and driving-in method (with the end closed or open).

The machine M-400 is a pneumatic impacting unit provided with adapters (set of head pieces) for connecting it with a pipe and operates from a stationary or mobile compressed air source.

### SPECIFICATIONS

Диаметр забиваемых труб, не более		
открытым концом	мм	1420
закрытым концом	мм	426
Энергия единичного удара	Дж	3700 ± 300
Частота ударов	Гц / Уд.мин (мин <sup>-1</sup> )	2,8 / 168 ± 10%
Рабочее давление сжатого воздуха	МПа (кгс/см <sup>2</sup> )	0.6 ± 0.06 (6 ± 0,6)
Расход сжатого воздуха, не более	м <sup>3</sup> /мин	20
Габаритные размеры (без комплекта насадок и шланга)		
длина	мм	2580
диаметр корпуса	мм	408
диаметр банджа	мм	464
Масса (без насадок и шланга)	кг	1800
Внутренний диаметр воздухоподводящих рукавов	мм	63/75

### STANDARD DELIVERY SET

1. Striking unit;
2. Tools.

# SET OF EQUIPMENT FOR PIPE REPLACEMENT

## MPS 01, MPS 01-01

### DESCRIPTION

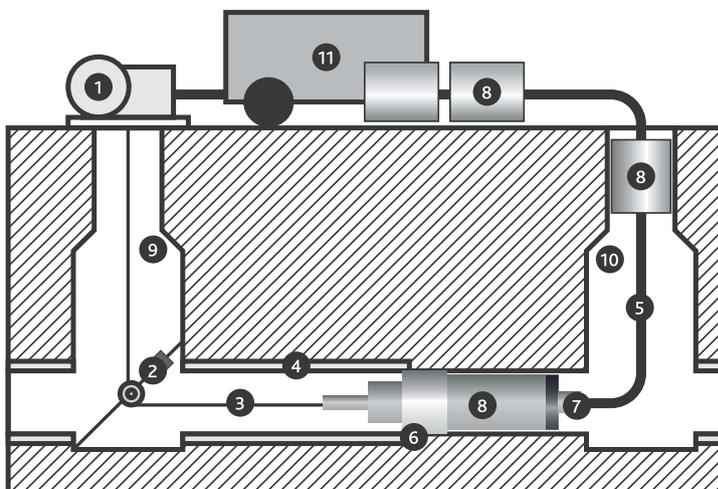


Sets of equipment for trenchless replacement of pipes are used for reconstruction of old sewage pipes made of breakable materials (ceramics, asbestos cement, cast iron) for PE pipes of diameter 225, 315mm without disturbing the road surface and the sewage well. The set makes it possible to replace the emergency pipeline at one go.

When replacing utility installations, the emergency part of the pipeline net is locked in the starting and the recipient wells. The hammer with the operational expander is immersed into the starting well. It is pulled from the receiving well with the help of a pneumatic winch. A special lengthener, driven by a pneumatic hammer, is fed into the old pipe and it sets the direction. The lengthener is followed by the breaking unit which destroys the old pipe. The broken pieces of the old pipeline are pressed into the surrounding soil by the expander, which follows the breaking unit and simultaneously pulls in a new PE pipe. As the hammer moves, the new pipe acquires new sections 650mm in length. The stalk or the first section of the new polyethylene pipeline (which is augmented in the launch pit) is attached to the expander and pulled in. The working unit is directed and pulled by the winch with the help of a rope, which has been pulled through the old pipeline. While working with stalk, the pipe is fed into the launch pit through a pre-punched inclined hole. On reaching the receiving well, the pneumatic hammer and the expander are extracted. The maximum length of driving at one go is 50m.

In cases when the sections of the pipeline to be replaced are coaxial, the reconstruction work can be implemented through wells in transit.

### NO-DIG TECHNOLOGY OF REPLACEMENT OF THE PIPELINE.



1. winch pneumatic
2. anchor
3. cable of the winch
4. substituted pipeline
5. air-conducting hose
6. expander
7. pneumatic hammer
8. section of the new pipeline
9. receiving pit
10. launch pit
11. compressor

# SPECIFICATIONS

Diameter of hammer,	mm	170
Diameter of old pipes,	mm	150-200
Diameter of new pipes,	mm	225
Length of pipeline to be laid	m	50
Diameter of wells, mm	mm	800
Working pressure of compressed air,	Mpa	0.6
Air flow rate	m <sup>3</sup> /s	0.16
Material of old pipes		Ceramics, asbestos cement, cast iron
Material of new pipes		PE
Pipe laying capacity, not over	m/hr	6
Tractive force of winch	kH	9-30
Weight	kg	630

Diameter of hammer,	mm	185
Diameter of old pipes,	mm	200-250
Diameter of new pipes,	mm	315
Length of pipeline to be laid	m	50
Diameter of wells, mm	mm	1000
Working pressure of compressed air,	Mpa	0.6
Air flow rate	m <sup>3</sup> /s	0.17
Material of old pipes		Ceramics, asbestos cement, cast iron
Material of new pipes		PE
Pipe laying capacity, not over	m/hr	6
Tractive force of winch	kH	9-30
Weight	kg	750

# STANDARD DELIVERY SET

- |                                     |                                       |
|-------------------------------------|---------------------------------------|
| 1. Pneumatic hammer LGM170K.00.000; | 1. Pneumatic hammer MPS62B.00.000;    |
| 2. Destructive expander MPS70.000;  | 2. Destructive expander MPS71.000.01; |
| 3. Anchor MPS11A.000;               | 3. Anchor MPS11A.000;                 |
| 4. Pipe pulling device MPS72.000;   | 4. Pipe pulling device MPS72.000.02;  |
| 5. Hook for rope pulling MPS73.000; | 5. Hook for rope pulling MPS73.000;   |
| 6. Pipe wrench MPS13.000.02;        | 6. Pipe wrench MPS13.000.04;          |
| 7. Hose 40m;                        | 7. Hose 40m;                          |
| 8. Pneumatic winch MPS90.00.000.    | 8. Pneumatic winch MPS90.00.000;      |
|                                     | 9. Base for hammer.                   |

## ADDITIONAL EQUIPMENT



### Universal Starting Carriage

2015.00.000

Intended for launching Pneumatic Punchers IP-4605 и IP-4603 at an angle from 0o to 90o. Applicable for moling horizontal, inclined and vertical holes at laying underground communications, deep compacting of soils, and building piles. The device allows gradual adjusting of the puncher's inclination.



### Starting carriage

IK9214.00.000

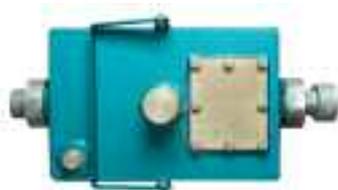
The starting carriage is designed for launching IP-4605, IP-4603 and CO-134A into soil. It is used for driving horizontal holes at laying underground communication lines.



### Expander

IP4605A.03.000 (Ø 145 mm)  
 IP4605A.04.000 (Ø 160 mm)  
 IP4603A.06.000 (Ø 160 mm)  
 IP4603A.05.000 (Ø 180 mm)  
 CO134A.09.000 (Ø 200 mm)  
 CO134A.04.000 (Ø 245 mm)  
 CO134A.05.000 (Ø 273 mm)  
 CO134A.06.000 (Ø 300 mm)

Expander is intended for expanding of holes during horizontal through punching.



### Lubricator

MA.20.000 (Ø 25мм)  
 MA.20.000 (Ø 38мм)  
 MA.20.000 (Ø 25 и 38мм)

The unit is intended to feed oil for lubricating friction parts of pneumatic punchers and machines. It is used with IP-4603, IP-4605, CO-134A, CO-166, CO-166M, MPS-01, MPS-01.01 and can be completed with replacement adapters for hoses 25 and 38 mm in diameter.

### Pneumatic Soil Removal Device

PV1.00.000 (Ø 108мм)  
 PV1.00.000-01 (Ø 133мм)  
 PV1.00.000-02 (Ø 159мм)  
 PV1.00.000-03 (Ø 219мм)  
 PV1.00.000-04 (Ø 273мм)  
 PV1.00.000-05 (Ø 325мм)  
 PV1.00.000-06 (Ø 426мм)  
 PV1.00.000-07 (Ø 530мм)

The pneumatic soil removal device is designed for removing soil from pipes with the diameter of 108, 133, 159, 219, 273, 325, 426, 530 mm (when ramming pipe with an open end) with the aid of compressed air.





### Soil removal device

IP4605A.10.000

IP4603A.20.000

CO134A.60.000

The soil removal device is intended for extracting soil from driven open pipes 325, 425, 530, 630 mm in diameter. It is used with IP4605 (325 and 425 in diameter), IP-4603A (425 and 530 in diameter) and CO-134A (530 and 630 mm in diameter). The soil is extracted on the reverse movement of the mole.



### Pipe pulling device

IP4603A.10.000

Pipe pulling device is intended for pulling of polyethylene pipes of 110 mm in diameter up to 40 m long with simultaneous driving of a hole. The device is used with IP-4603A Reversible Pneumatic Puncher.



### Device (nozzle) for vertical pipe ramming

CO134A.40.100

The device is used with CO-134A. It is intended for vertical and horizontal pipes ramming. This device allows to attach the machine to a pipe.

### Supporting Device

CO166.60.000

Intended for supporting and junction of the driven pipe with Pipe ramming machines CO-166 and CO-166M. It is attached to the rear nut of the machine and fastened to the driven pipe with the aid of belts.





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