



TIS GREAT FLAME Front PELLET BURNERS



Installation and operation guide

ATTENTION!

Start the installation and operation of the pellet burner only after thorough studying of the installation and operation manual (hereinafter – the manual).

- The usage of pellets made of chemically treated woods (such as MDF-medium density fiber board, particleboard, etc) is prohibited.
- Install the burner horizontally (important!) to ensure the horizontal position of the grates in the tunnel.
- The connection between the burner and the boiler must be tight to avoid leakage of flue gases. It is mandatory to use the fiber-glass cord supplied with the burner to seal the connection.
- Specialists certified by the manufacturer or, in their absence, an accredited service company recommended as service agent afterwards, must perform the first launch and further maintenance of the burner.
- While burning pellets with a large amount of impurities and/or forming slags pellets (with ash melting temperature below 1200°C), it may be necessary to clean the burner every few hours.
- It is necessary to clean the boiler from residues of combustion products before ash level reaches the burner tunnel and starts contact with it. This measure will help to avoid overheating, deformation and destruction of the tunnel burner.
- To clean the burner, turn off the power supply to the burner regulator and wait until the burner tunnel cool down to a safe temperature.
- The burner can be operated ONLY by persons who have reached the age of 18.
- The manufacturer warranty is valid only if the commissioning and maintenance of the equipment during the warranty period is carried out by a certified specialist or an authorized Service company.
- Check the appearance and completeness of the burner with the Seller at the time of purchase.
- The manufacturer will not accept claims for incompleteness and mechanical damage after Buyer acquired the burner from the Seller.
- Require your Seller and Service Company to fill in warranty documents correctly.

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1. General product information

1.1 TIS GREAT FLAME Front pellet burner (hereinafter – burner) is an automatic self-cleaning heating device working on fuel pellets. Heating capacity (thermal power) of the burner is in the range from 20 to 99 kW.

1.2. The burner is designed for installation into solid-fuel hot-water boilers (hereinafter – boilers) which conform to requirements of this instruction. The burner can be used as the replacement of gas and liquid fuel burners in hot-tube boilers in the case of fulfilling the requirements of this instruction.

2. Delivery set

2.1. The burner is supplied in the following configuration (Fig.1):

- assembled burner;
- controller with sensors and wires;
- fuel supply devices (auger, goffered sleeve);
- sealing cord made of fiberglass threads;
- fasteners (bolts, washers, nuts);
- Stoker tool (scraper);
- installation and operation manual for the burner and the burner regulator

FIGURE 1. Burner set



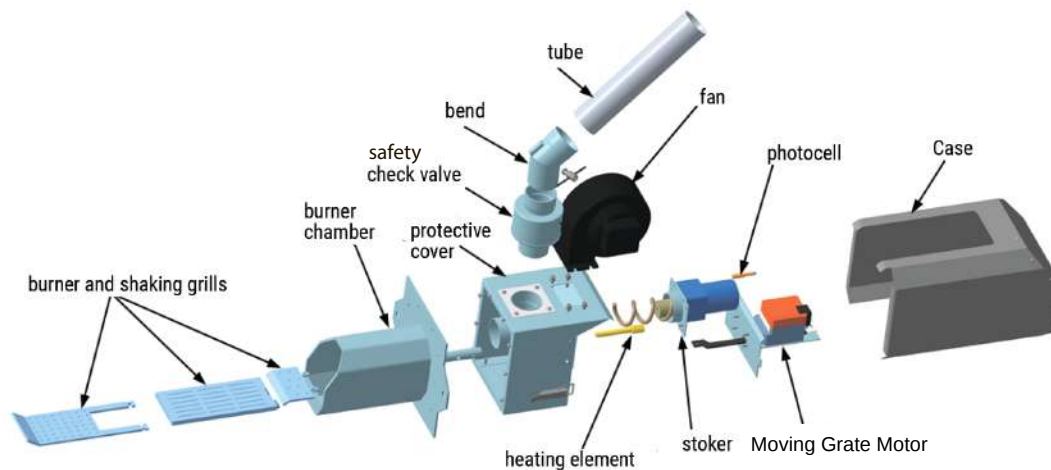
3. Elements and operating principle

3.1. The burner elements are shown in Fig.2.



Note: The size and shape of the burner elements, as well as the number of grate bars may vary depending on the model

FIGURE 2. The burner elements



3.2. Heat-resistant, acid-resistant and corrosion-resistant materials are used in the burner.

3.3. The combustion process takes place in the combustion chamber, which is located in the tunnel of the burner.

3.4. Before operation, the burner must be connected to the controller and auger, which is inserted into the hopper.

3.5. The burner operates in five modes set by automation - ignition, stabilization, operation, quenching and standby.

The ignition process starts by turning on the fan in order to blow the burner combustion chamber and the furnace of the boiler for cleaning and ash removing accumulated gases, then the first portion of the fuel is supplied. Inside the combustion chamber and the ignition electrode (heating element) is switched on. When the controller receives a signal of fuel ignition in the combustion chamber from the fire sensor (photocell), the ignition mode is changed to the stabilization mode, which continues until the flame is stabilized, after which the burner goes into the operating mode. The suppression mode is activated when the operating temperature is exceeded. In this mode, the remains of the fuel are removed from the burner. The burner then goes into standby mode.

Detailed information about the settings of the burner is given in the the burner controller installation and operation manual.

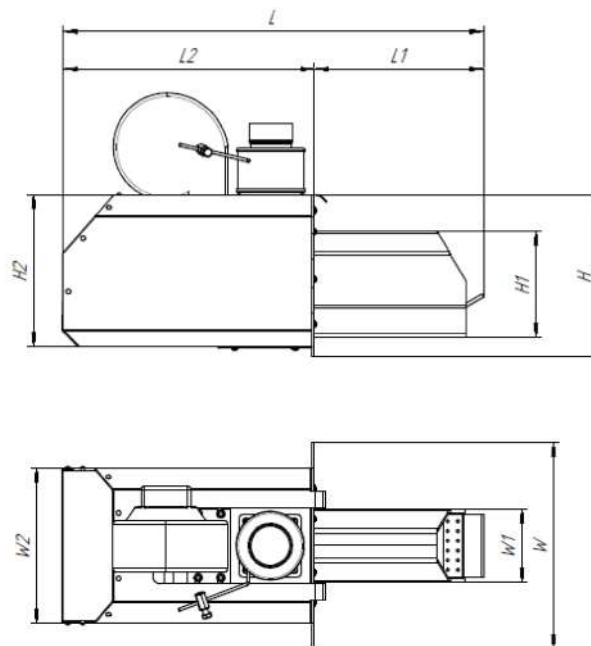
4. Technical parameters

4.1. Figure 3 shows the burner with dimensions.



Note: dimensions are shown without external burner elements (fan, safety valve, etc.)

FIGURE 3. Overall dimensions of the burner



4.2. Technical characteristics of the burners, including overall dimensions, are given in the table 1.

Table 1.

Burner parameter\Burner model	GREAT FLAME Front..	20	30	50	80	99N
Maximum heat power	kW	20	30	50	80	99
Minimum heat power	kW	6	9	15	24	30
Maximum noise level	dB	64	64	64	64	66
Maximum power consumption (ignition / operation)	W	110/410	110/410	110/410	115/415	180/480
Voltage (AC/50 Hz)	V	230	230	230	230	230
Screw diameter	mm	60	60	60	60	80
Screw length	mm	1750	1750	1750	1750	2150
Goffered sleeve diameter	mm	60	60	60	60	80
Goffered sleeve length	mm	700	700	700	700	1000
Kit weight (without scraper and automation)	kg	24	24.5	26.5	32	41
Overall length (L)	mm	625	625	660	700	800
Tunnel length (L1)	mm	245	245	280	320	350
Rack length (L2)	mm	380	380	380	380	450
Total width (W)	mm	300	300	300	330	305
Tunnel width (W1)	mm	107	127	150	190	160
Rack width (W2)	mm	225	225	225	265	305
Total height (H)	mm	230	230	230	230	235
Tunnel height (H1)	mm	153	153	154	154	180
Rack height (H2)	mm	220	220	220	220	225

Note: The manufacturer can make changes to the burner construction and associated equipment. These changes do not degrade the quality of consumer goods.

5. Fuel requirements

5.1. The burner is designed to work on fuel pellets.

For maximum efficiency, it is recommended to use wood pellets with the characteristics listed in table 2.



WARNING: The usage of pellets made of chemically treated woods (such as MDF-medium density fiber board, particleboard, etc) is prohibited.

Table 2.

Pellet characteristic	Measure unit	Value
Diameter	mm	6-8
Length	mm	5-50
Specific density / bulk density	Kg/m ³	1200 – 1400 / not less than 650
Small fractions content (less than 3 mm)	%	not more than 1
Calorific value not less than 17,2 (4,8)e	MJ/kg (kW·h/kg)	not less than 17,2 (4,8)
Humidity	%	8 – 12
Ash content	%	not more than 0.7
Ash melting temperature	°C	not less than 1200



Note: When using pellets that do not meet the requirements of table 2, deviations in the declared characteristics of the burner are possible.

6. Boiler requirements

6.1. Depending on the boiler design it is necessary to choose the installation method that provides the full performance, safety and the ability to clean the boiler and burner from ash.

6.2. The minimum required boiler characteristics (corresponding to the burners), including the minimum dimensions of the furnace, which ensures complete combustion, are given in table 3.

Table 3.

Boiler parameter\Burner model	GREAT FLAME Front...	20	30	50	80	99N
Minimum furnace volume	dm3	69	90	138	228	300
Minimum furnace length *	cm	33	43	58	60	80
Surface area of the heat-exchange unit	m2	1.2	2	3.2	4.8	7.6
Efficiency	%	80	80	80	80	80
Water volume	liter	80	100	130	160	170
Water temperature	°C	85	85	85	85	85
Furnance pressuer	Pa	13	13	15	17	17
Minimum chimney draft	Pa	18	18	20	22	22
Diameter of chimney	mm	159	159	180	180	180

* - the length parameter means the size of the furnace, corresponding to the direction of the flame

6.3. The air in the combustion chamber must be supplied exclusively through the burner , i.e. the supply of secondary air to the furnace must be excluded.

6.4. The boiler doors must be insulated.

7. Requirements for the installation inside the boiler

7.1. The following conditions must be met during the installation process:

- The boiler mounting surface must be vertical for ensuring the horizontal placement of the grates inside the burner;
- The burner tunnel lower plane must be above the lower point of the boiler heat exchanger (also known as water jacket)
- Distance from the boiler furnace bottom to the burner tunnel lower plane should be at least 50 mm. If the bottom is not part of the heat exchanger, it is recommended to install the thermal insulation protection at the boiler bottom (the minimum distance from the boiler furnace bottom to the bottom the plane of the tunnel of the burner should be calculated from the top point of thermal insulation)

7.2. Installation of the boiler burner can be done by installing it in a pre-prepared mounting hole. Fixing the burner flange through the sealing cord to the boiler mounting surface it is carried out through mounting holes with M10x50 bolts and M10 nuts, supplied with the burner.

7.3. For the burner operation it is necessary to connect the burner electric circuit with the of 10 contact connector to the burner regulator electric circuit by connecting the corresponding (marked) wires to the controller contacts. The connection diagram of the burner controller is given in the burner controller installation and operation guide. Connection scheme of the burner is shown in Fig.4, the burner circuit board connectors in Fig. 5.

7.4. The chimney attached to the boiler is recommended to be made of acid-resistant stainless steel (single-walled - in brick channel, double-walled (insulated) – free-standing).

Also, the described chimney should be made according to European standards EN 1856-1:2009

"Chimneys - Requirements for metal chimneys - Part 1: System chimney products" and EN 1856-2:2009
"Chimneys - Requirements for metal chimneys - Part 2: Metal flue liners and connecting flue pipes "

Figure 4. Burner connection diagram.

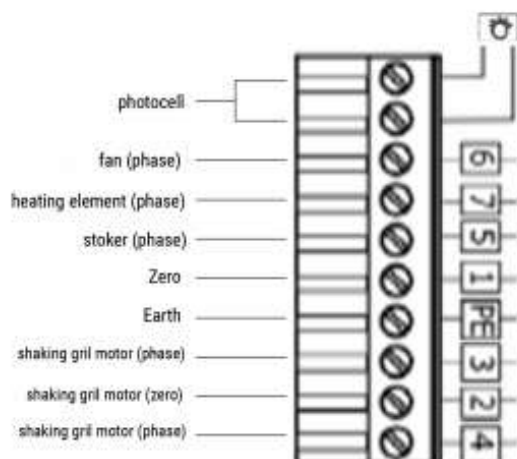
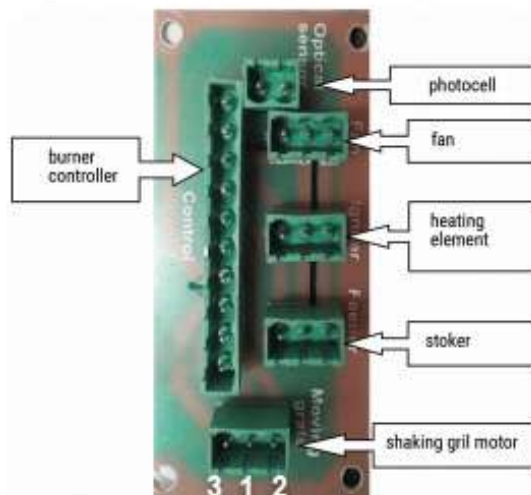


Figure 5. Burner circuit board connectors

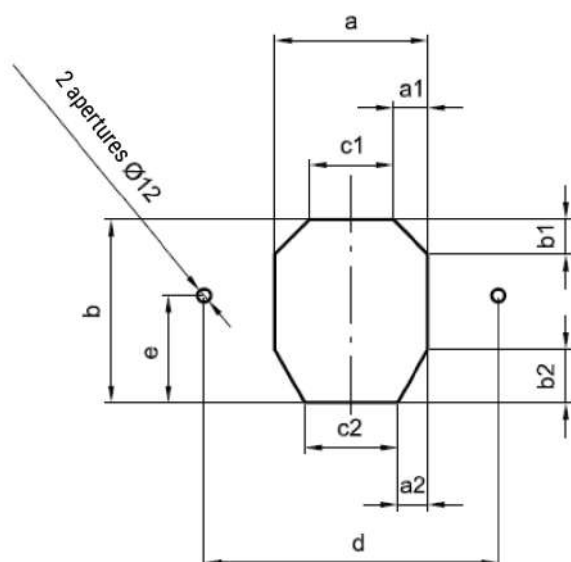


8. Installation procedure

8.1. Prepare the boiler for installation of the burner.

Make one mounting hole for tunnel and 2 mounting holes for bolts on the mounting surface according to the dimensions specified in figure 6.

Figure 6. Dimensions of mounting holes for different models of burners (in millimeters)



Model	20	30	50	80	99N
a	115	135	158	198	168
a1	30	30	30	30	25
a2	26	26	26	27	25
b	161	161	161	161	188
b1	30	30	30	30	25
b2	47	47	47	47	25
c1	54	74	97	137	118
c2	62	82	105	145	118
d	259	259	259	299	265
e	94	94	94	94	94

8.2. Install the burner in the boiler mounting hole until the mounting holes on the burner flange match the boiler mounting surface. Before doing so, lay the fiberglass sealing cord between the burner and the mounting surface. Sealing cord made of fiberglass threads is supplied with the burner.



WARNING: The Burner must be installed horizontally to ensure the horizontal position of the gratings in the tunnel.v

8.3. Insert the bolts and washers into the mounting holes on the side of the burner rack. Clamp them with nuts on the side of the burner tunnel.



WARNING: The use of a fiberglass cord is mandatory for sealing the connection. Sealing cord made of fiberglass is supplied with the burner.

8.4. Install the safety valve, elbow and outlet in the burner inlet sequentially (if delivered unassembled). The counterweight of the safety valve damper must work without jamming and wedging, independently return to the closed position after opening and should not interfere with the operation of the fan damper counterweight.

8.5. Install the auger at an angle not exceeding 45° from the horizontal into a pre-prepared fuel container. The outlet of the auger should be directed downwards.

8.6. Connect the screw outlet to the burner outlet using a goffered sleeve to be installed as close as possible to the vertical line and with minimal deflection.

8.7. Make the electrical connections of the controller to the burner and to the auger according to the connection scheme given in the burner regulator installation and operation guide.

9. Operation and maintenance



WARNING: The first runup and further maintenance of the burner must be performed by manufacturer's certified specialists or, in their absence, by the accredited service company. You must conclude a service contract with this company.

9.1. To start the burner, it is necessary to turn on the controller and set the required parameters of the boiler, according to the installation and operation guide.

9.2. After starting the burner, the further operation is carried out automatically.

9.3. When you turn off the burner on the controller is activated fire suppression mode, which is performed automatically.

9.4. When changing the type of pellets or fuel supplier, it is necessary to reconfigure the controller settings by yourself or with the involvement of authorized service company.

9.5. To ensure the burner proper operation and maintenance during the exploitation process of the boiler with the burner it is necessary to:

- monitor the fuel level in the hopper and as its amount decreases, replenish it through the feed of the hopper. The hopper can be filled while the burner is in operation.
- provide the necessary air supply for combustion in the room where the burner is installed;
- clean the burner from the remains of combustion (ash, slag) products at least once a week. If necessary, clean more often, depending on the quality of the fuel used;



WARNING: While firing the pellets with a large amount of impurities and/or forming slags pellets (with ash melting temperature below 1200°C), it may be necessary to clean the burner every few hours.
- if necessary, the boiler must be cleaned of residues of combustion products



WARNING: It is necessary to clean the boiler from residues of combustion products before their level reaches the burner tunnel and starts contact with it. This measure prevent overheating of the equipment, deformation and destruction of the tunnel burner.

- maintain the room clean where the burner is installed;
- regularly check the condition and cleanliness of the chimney and ventilation;
- before the beginning of the heating season, inspect the burner with the involvement of an authorized service specialist or by yourself.

9.6 Disassembly and cleaning of the burner is carried out in the following order:

WARNING: To clean the burner, turn off the power supply to the burner regulator and wait until the burner tunnel will cool to a safe temperature.

- remove the cover of the burner. In order to do this, you need to raise it above the burner rack and remove the lugs of the cover from the engagement with the burner flange ;
- disconnect the connector of the system cleaning electric drive;
- snap off the latches, which mount cleaning system to the burner body;
- remove the electric drive of the cleaning system with the movable grate from the burner;
- remove the fixed grate from the burner tunnel by lifting it up until it disengages from the ridges on the flange of the burner;
- clean the gratings of any residues – all openings of the gratings must be free.



Note: It is necessary to clean the boiler in accordance with the boiler instructions, it is also recommended to clean the boiler at the same time as cleaning the burner

9.7. The order of burner assembly after the cleaning procedure:

- insert the fixed grate into the burner tunnel (making sure it engages with the ridges on the flange of the burner);
- insert the electric drive of the cleaning system with the movable grate into the burner until it stops, directing the moving grate in the gap between the stationary grate and the firing unit;
- snap the latches mounting the cleaning system to the burner rack;
- connect the connector of the electric drive of the cleaning system;
- put the burner cover on the rack with the engagement of the cover lugs behind the burner flange.

11. Common problems and methods of their elimination

11.1. Typical faults of the burner and methods of their elimination are as follow in table 4.



Note: If there is a malfunction of the burner, the controller shows an error.
In order to continue working after the cause of the fault has been corrected, the error must be removed according to the burner regulator installation and operation guide.

Table 4.

Problem	Possible causes	Elimination methods
The burner does not ignite	No fuel	Fill the fuel tank
	Incorrect electrical connections	Perform electrical connections according to the schemes specified in this manual
	Slag in the burner tunnel	1.Allow it to cool to a safe temperature 2.Clean the air ducts of the tunnel grate
	Controller does not work	Replace the fuse Contact the service company or burner seller
	Ignition electrode does not work	Contact the service company or burner seller
	The screw does not work	Contact the service company or burner seller
The fan does not turn off during quenching	Flame detection settings are not set correctly	Adjust the flame detection settings Remove and clean the fire sensor Contact the service company or burner seller
The burner smokes, soot is formed	An excessive amount of fuel compared to air	Change the automation settings (the amount of fuel and the number of revolutions of the fan)
	The burner grates are clogged with slag	1.Allow it to cool to a safe temperature 2.Clean the air ducts of the tunnel grate
Burner grates are too often clogged with slag	Non-compliant fuel is used	Change the fuel supplier

10. Safety instructions

10.1. The burner has a built-in safety system consisting of the following elements:

- safety valve preventing possible reverse movement of the flame;
- temperature sensor, which gives a signal to the automation to turn off the fuel supply from the hopper when critical temperature rise in the safety valve area;
- corrugated hose, melting to isolate the hopper from the burner at the reverse flame slip and if other elements of the security system did not work for any reason.

10.2. The floor in the boiler room should be made of non-combustible material.

10.3. The space in front of the boiler must be at least 1 meter.(Including the installed burner).

10.4. All electrical connections must be done by authorized personnel only.

10.5. It is forbidden to make any constructive changes of the burner without written manufacturer's permission.

10.6. For safety reasons, the following requirements must be kept when operating the burner:

- make sure that there are no children nearby during the operation of the burner.



WARNING: ONLY persons who have reached the age of 18 could operate the burner.

- be sure to read this manual before using the burner;
- check the connection of the burner to the boiler and the connection of the boiler to the chimney;
- do not open the boiler door while the burner is in operation;
- do not touch the rotating parts of the burner and screw;
- before cleaning the burner or carrying out other maintenance work, it is obligatory to disconnect the power supply and wait for it to cool down to a safe temperature;
- maintain the room where the boiler with a burner is installed clean and do not store it inflammable material;
- maintain the burner in good technical condition. If repairs are necessary, use only spare parts provided or approved by the manufacturer;

12. Warranty information

WARNING: the guarantee of producer is valid only if a specialist, certified by producer or an authorized service company executes putting burner into operation and its warranty handling.

12.1. Guarantee period of the burner and associated components is 12 months from the date of sale by a trade company.

12.2. Guarantee does not cover components referring to expendables: goffered middle leg, sealing cord, fasteners, firing electrode, grates, scraper.



WARNING: when buying the burner check with the seller its completeness and appearance. The producer does not accept any claims for shortage and mechanical damage after sale.

12.3. Guarantee does not cover damages arising from:

- Misuse of burner with violation of rules stated in the manual;
- Mechanical damage of burner elements
- Changing of burner construction
- Setting wrong parameters for burner using controller;
- Damages in electricity grid;
- executing maintenance and repairs during guarantee period by unauthorized staff.

12.4. After identifying malfunction you shall contact service company or Seller immediately.

12.5. The document entitling a buyer to receive repairing service is this instruction, which has information on selling and putting into operation with required stamps and signatures.

12.6. Only service companies authorized by the manufacturer are entitled to execute repairing service

Note: when contacting service company for repairing works a customer shall provide workers of service company full access and conditions for work.

12.7. After execution of guarantee repair a service company fills in warranty certificate. Warranty certificate is regarded invalid in case of missing signatures, stamps, and dates.



WARNING: require from your Vendor filling-in of the warranty documents correctly.

13. Disposal information

Recyclable materials are used in the burner design.

For recycling provide components to the companies specializing in recycling.

15. Manufacturing, acceptance and sale information:

Pellet Burner TIS GREAT FLAME Front _____ serial №_____ Produced in accordance with technical specification BY 590831167.002-2017 and found ready for use.

Production date: «_____» _____ 20__

Packer _____ production stamp

Date of sale: «_____» _____ 20__

Stamp here

Signature _____

Assembling, exploitation and guarantee conditions agreed and accepted

Buyer: _____

(Name)

16. Installation and commissioning information

Installation address: _____

Installation date: _____

Burner is installed by (company): _____

Date of putting into operation: _____

(Name, Company) _____

Stamp here

Signature _____

17. Maintenance notes.

Date	Technical notes	Operations made	Service company, expert name

18. Warranty card

Expert name _____

Company_____

Date of repair works_____

Company stamp _____Signature_____

Replaced parts:

All operations have been done in full.

Client Name_____

Signature_____

Warranty card

Expert name _____

Company_____

Date of repair works_____

Company stamp _____Signature_____

Replaced parts:

All operations have been done in full.

Client Name_____

Signature_____

Warranty card

Expert name _____

Company_____

Date of repair works_____

Company stamp _____Signature_____

Replaced parts:

All operations have been done in full.

Client Name_____

Signature_____

Warranty card

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Company_____

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Company stamp _____Signature_____

Replaced parts:

All operations have been done in full.

Client Name_____

Signature_____

