Installation, use and maintenance instructions

GB

Forced draught gas burners

Modulating operation

CODE	MODEL
20130750	RS 68/E FGR TC FS1
20130751	RS 120/E FGR TC FS1

20133400 (1) - 06/2017

4.3 Burner categories

Country of destination	Gas category
AT - CH - CZ - DK - EE - ES - FI - FR - GB - GR - HU - IE IT - LT - LV - NL - NO - PT - RO - SE - SI - SK	I2H
DE - LU - PL - RO	I2E

Tab. B

4.4 Technical data

Model			RS 68/E FGR	RS 120/E FGR
Output (1)	Max.	kW Mcal/h	350 - 810 301 - 697	595 - 1150 516 - 989
	Min.	kW Mcal/h	195 168	300 258
Fuel			Natural gas: G20 (methane gas)	
Gas pressure at max. output (2) - Gas: G20		mbar	11.5	15.7
Operation			– Intermittent (min. 1 stop in 24 hours) – Modulating	
Standard applications			Boilers: water, steam, diathermic oil	
Ambient temperature		°C	0 - 40	
Combustion air temperature		°C max	60	
Noise levels (3)		dB(A)	80.5	83.0
Weight (4)		kg	96 - 98	101 - 103

Tab. C

(1) Reference conditions: Room temperature 20°C - Gas temperature 15°C - Barometric pressure 1013 mbar - Altitude 0 m above sea level.
(2) Pressure on the pressure switch socket (Fig. 27 on page 27) with zero pressure in the combustion chamber and at maximum burner output.
(3) Sound pressure measured in manufacturer's combustion laboratory, with burner operating on test boiler and at maximum output.
(4) Blast tube: short-long.

4.5 Electrical data

Model		RS 68/E FGR	RS 120/E FGR
Main electrical supply Control circuit power supply		3 ~ 400V +/-10% 50Hz 1N ~ 230V +/-10% 50Hz	
Fan motor IE3	rpm V kW A	2890 220/240 - 380/415 1.5 5.9 - 3.4	2880 220/240 - 380/415 2.2 8.0 - 4.6
Ignition transformer	V1 - V2 I1 - I2	230 V - 1 x 8 kV 1 A - 20 mA	
Absorbed electrical power	kW max	2.1	2.9
Protection level		IP 44	

Tab. D

4.6 Maximum dimensions

The dimensions of the burner are shown in Fig. 1.

Bear in mind that inspection of the combustion head requires the burner to be opened and the rear part drawn back on the guides.

The dimensions of the open burner are indicated by position I.

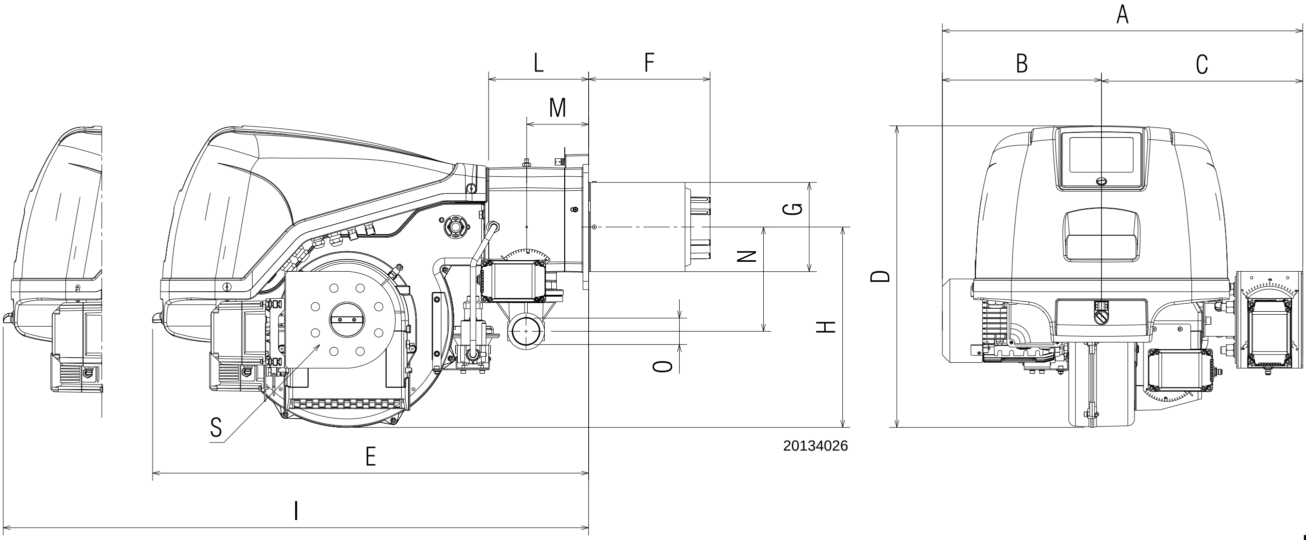


Fig. 1

mm	A	B	C	D	E	F (1)	G	H	I (1)	L	M	N	O	S
RS 68/E FGR	738	312	426	640	922	255-390	189	425	1393-1528	214	134	221	2”	DN65
RS 120/E FGR	763	337	426	640	922	255-390	189	425	1393-1528	214	134	221	2”	DN65

Tab. E

(1) Blast tube: short-long

4.7 Burner equipment

The burner is supplied complete with:

Gas train flange . . . . No. 1
Gasket for gas train flange . . . . No. 1
Thermal insulation screen . . . . No. 1
Screws M10x35 to fix the gas train flange . . . . No. 4
Screws M12x35 to fix the burner flange to the boiler . . . . . No. 4
PVP kit for leak detection . . . . No. 1
Gas pipe for pilot gas train inversion input . . . . No. 1
Instruction manual . . . . No. 1
Spare parts list . . . . No. 1

4.8 Firing rates

The **maximum output** is chosen within area A) of the diagram (Fig. 2).

The **minimum output** must not be lower than the minimum limit of the diagram.

WARNING

The firing rate (Fig. 2) was obtained considering a room temperature of 20°C and an atmospheric pressure of 1013 mbar (approx. 0 m above sea level), with the combustion head adjusted as shown at page 19.

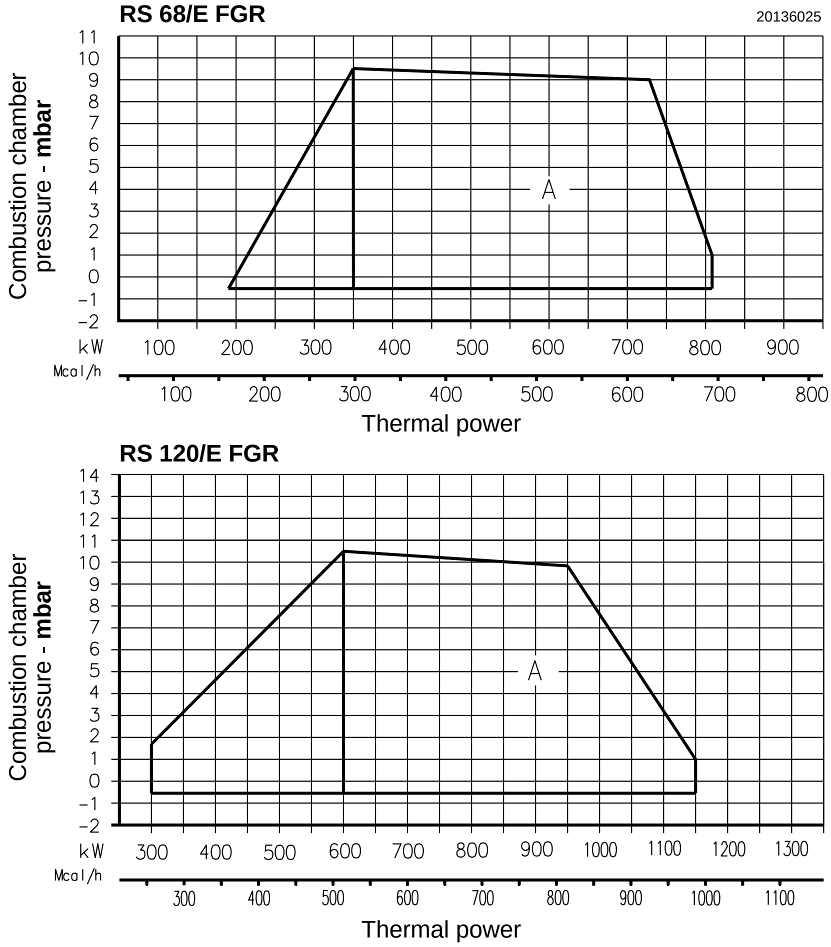


Fig. 2

4.9 Test boiler

The firing rates were obtained in special test boilers, according to EN 676 regulations. Fig. 3 indicates the diameter and length of the test combustion chamber.

Example:
Output 756 kW (650 Mcal/h) - diameter 60 cm, length 2 m.

The coupling is ensured when the boiler is EC type-approved; for boilers or ovens with combustion chambers of very different dimensions compared to those shown in the diagram of Fig. 3, preliminary checks are recommended.

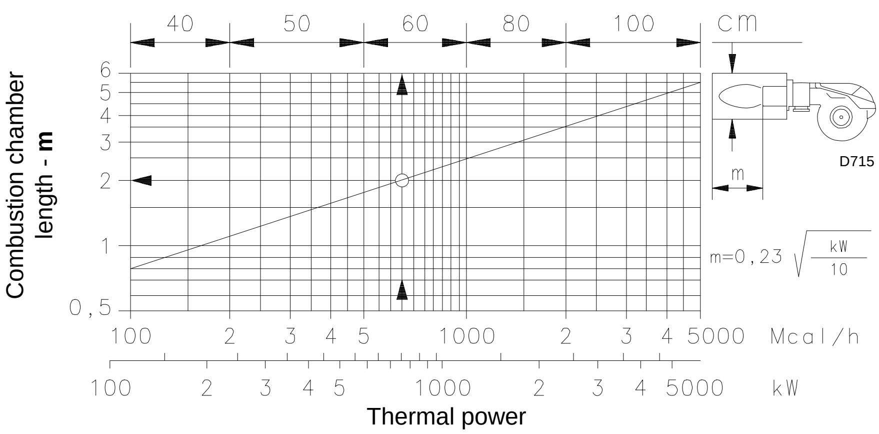


Fig. 3

4.10 Burner description

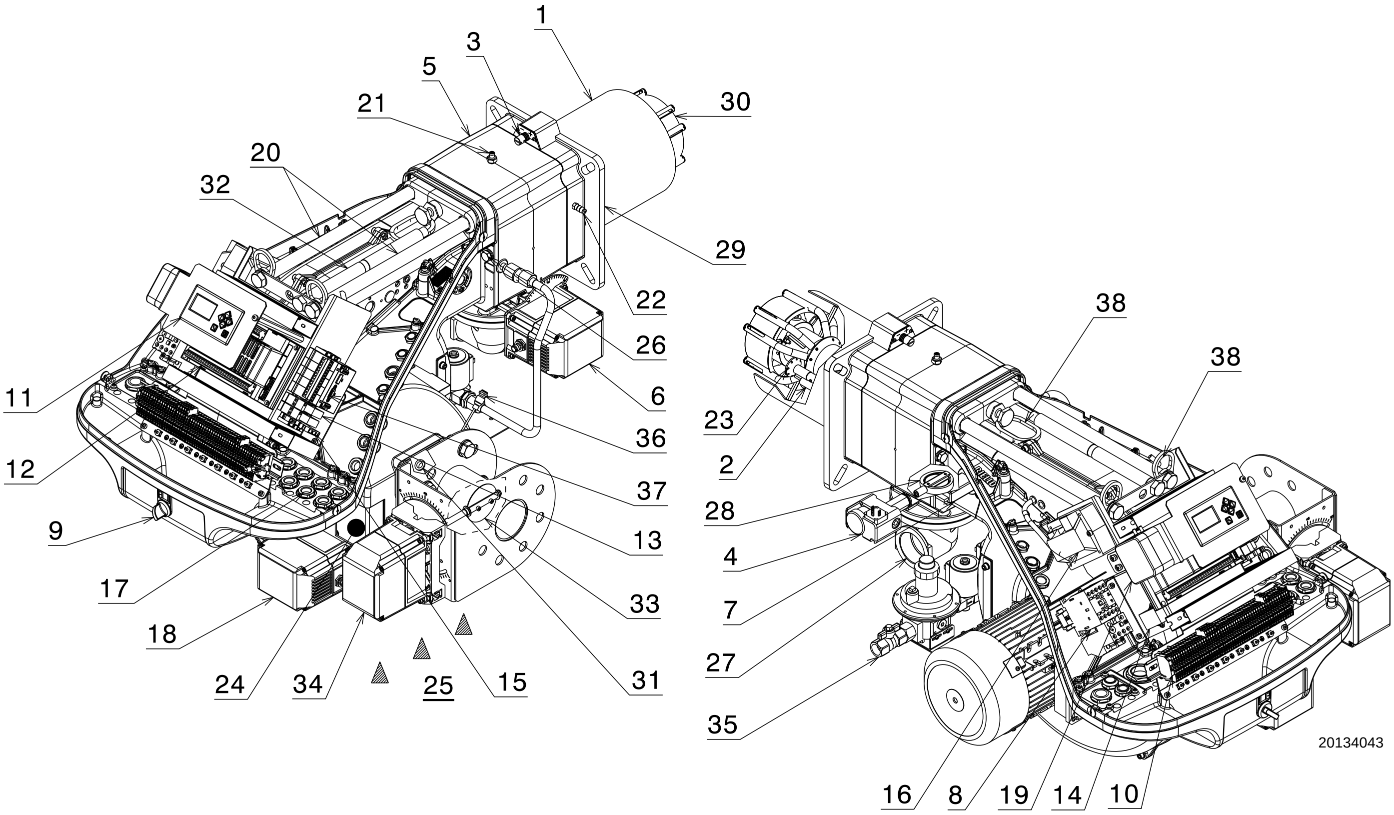


Fig. 4

1 Combustion head
2 Ignition electrode
3 Screw for combustion head adjustment
4 Maximum gas pressure switch
5 Pipe coupling
6 Gas servomotor
7 Flame sensor
8 Motor contact maker and thermal relay with reset button
9 Operation on/off switch
10 Terminal board for electrical wiring
11 Operator panel with LCD display
12 Control box for checking flame and air/fuel ratio
13 Clean contact relay
14 Filter to protect against radio disturbance
15 Auxiliary circuit fuse
16 Ignition transformer
17 Cable grommets for electrical wiring (to be carried out by the installer)
18 Air servomotor
19 Air pressure switch (differential type)
20 Guides for opening the burner and inspecting the combustion head
21 Gas pressure test point and head fixing screw
22 Air pressure socket
23 Pilot
24 Air damper
25 Fan air inlet
26 Screws to secure fan to pipe coupling
27 Gas input pipe
28 Gas butterfly valve
29 Boiler fixing flange
30 Flame stability disc
31 Connector G1/4
32 Extensions for guides 20)
33 Flue gas recirculation butterfly valve
34 Flue gas recirculation servomotor
35 Pilot gas train
36 Flue gas temperature probe
37 LCM 100 module
38 Lifting rings

4.11 Control box for the air/fuel ratio (BT330)

Warnings

WARNING

To avoid accidents, material or environmental damage, observe the following instructions!

The control box is a safety device! Avoid opening or modifying it, or forcing its operation. Riello S.p.A. cannot assume any responsibility for damage resulting from unauthorised interventions!

Risk of explosion!

An incorrect configuration can provoke fuel overcharging, with the consequential risk of explosion! Operators must be aware that incorrect settings made on the operating unit and incorrect settings of the fuel and / or air actuator positions can lead to dangerous burner operating conditions.

For the safety and reliability of the equipment, also follow these guidelines.

- ➤ After commissioning and after each maintenance action check the exhaust gas values across the entire power range!
- ➤ Qualified specialist staff are required to carry out all activities (assembly, installation, servicing, etc.).
- ➤ Before working in the connection area, switch off the power supply to the plant from all poles. Ensure that it cannot be switched back on and that the plant is voltage-free. There is a risk of electric shock when the plant is not switched off.
- ➤ Place and secure the protection against contact on the BT300 and on all connected electrical parts. The cover must fulfil the design, stability and protection requirements of EN 60730.
- ➤ After each activity (e.g. assembly, installation, servicing, etc.) check wiring and parameters to make sure it is in good working condition.
- ➤ If the equipment is dropped or suffers impact, you should no longer commission it. The safety functions may also be impaired but fail to show any obvious external damage.
- ➤ When the ratio curves are being programmed, the adjuster will continually monitor the quality of the plant's combustion (e.g. using an exhaust gas analysis station). In the event that the combustion values are inadequate or the conditions are potentially harmful, the adjuster will take suitable action, e.g. switch off the system manually.
- ➤ These operating instructions describe many possible applications and functions and should be used as guidelines. Carry out functional tests on the test bench and/or in the plant application to ensure correct functioning and document the results.
- ➤ Condensation and humidity are to be avoided. If necessary, make sure that the installation is sufficiently dry before you switch it on.
- ➤ Avoid static charge having a destructive effect in case of touching the device's electronic components.

Fig. 5

Technical data

Model	BT330
Power supply	230 V +10/-15% 50-60 Hz
Power consumption	max. 30 VA
Cable length: - control Load - external reset button - Fuel valve - other lines	 Max. 20 m Max. 20 m Max. 10 m Max. 20 m
Weight	1 kg
Environmental conditions:	
- climatic conditions - mechanic conditions - temperature range	Class 3K5 (DIN EN 60721-3) Class 3M5 (DIN EN 60721-3) -20...+60 °C (condensation is prohibited)
Electronic safety	IP40 (housing) IP20 (terminals)

Tab. F

4.13 Servomotor (662R5...)

Warnings

WARNING

To avoid accidents, material or environmental damage, observe the following instructions!

Avoid opening, modifying or forcing the actuators.

- ➤ All interventions (assembly and installation operations, assistance, etc.) must be carried out by qualified personnel.
- ➤ Before modifying the wiring in the servomotor connection area, fully disconnect the burner control device from the power supply (omnipolar separation).
- ➤ To avoid the risk of electrocution, protect the connection terminals in a suitable manner and correctly fix the cover.
- ➤ After any operation (mounting, installation and service, etc.), check that the wiring is in order, so do the security checks.
- ➤ Falls and collisions can negatively affect the safety functions. In this case, the unit must not be operated, even if it displays no evident damage.

WARNING

Assembly notes

The connection between the actuator command shaft and the control element must be rigid, without any mechanical play.

Installation notes

- ➤ The static torque is reduced when the electrical supply of the actuator is switched off.

WARNING

During the maintenance or replacement of the actuators, be careful not to invert the connectors.

WARNING

Condensation, the formation of ice and the entry of water are prohibited!

Fig. 7

Technical data

Model	662R5...
Floating time	5 sec / 90°
Direction of rotation 0° to 90°	left - seen from the drive shaft
Rated torque (max)	3 Nm
Static torque (max)	3 Nm
Weight	about 1,4 kg
Type of protection	IP54 as per DIN EN 60529-1
Environmental conditions:	
- climatic conditions - mechanic conditions - temperature range	Class 3K5 (DIN EN 60721-3) Class 3M5 (DIN EN 60721-3) -20...+60 °C (condensation is prohibited)
Electrical safety	Protection class 2 as per DIN EN 60730

Tab. H

5.4 Operating position

WARNING

- The burner is designed to operate only in positions **1**, **2**, **3** and **4** (Fig. 9).
- Installation **1** is preferable, as it is the only one that allows the maintenance operations as described in this manual.
- Installations **2**, **3** and **4** permit operation but make maintenance and inspection of the combustion head more difficult.

DANGER

- Any other position could compromise the correct operation of the appliance.
- Installation **5** is prohibited for safety reasons.

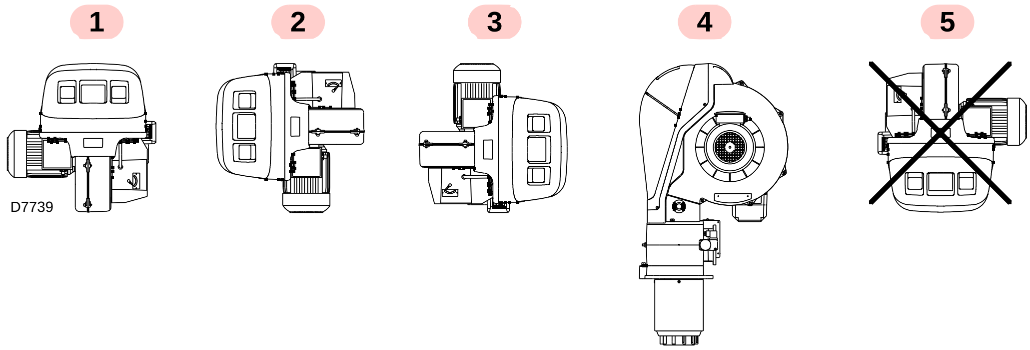


Fig. 9

5.5 Preparing the boiler

5.5.1 Boring the boiler plate

Drill holes in the plate shutting off the combustion chamber, as illustrated in Fig. 10.

The position of the threaded holes can be marked using the thermal insulation screen supplied with the burner.

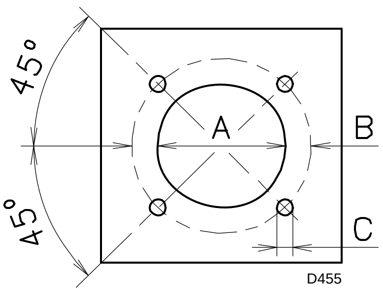


Fig. 10

mm	A	B	C
RS 68-120/E FGR	195	275 - 325	M 12

Tab. J

5.5.2 Blast tube length

The length of the blast tube must be selected according to the indications provided by the manufacturer of the boiler, and in any case it must be greater than the thickness of the boiler door complete with its refractory.

The lengths L available are:

Blast tube	Short (mm)	Long (mm)
RS 68-120/E FGR	255	390

Tab. I

For boilers with front flue passes 13)(Fig. 13 on page 18), or flame inversion chambers, a protection in refractory material 11) must be inserted between the boiler refractory 12) and the blast tube 10).

This protection must not compromise the extraction of the blast tube.

For boilers with a water-cooled frontal, a refractory cover is not necessary 11)-12)(Fig. 13), unless expressly requested by the boiler manufacturer.

5.6 Positioning electrode and pilot

WARNING

Before fixing the burner to the boiler, check the correct positioning of the electrode and pilot as indicated Fig. 11.

The following is required to perform the check:
- ➤ remove the screw 1)(Fig. 12);
- ➤ extract the inner part 2) of the head, and adjust them.

WARNING

Observe the dimensions shown in Fig. 11.

5.6.1 Pilot operation parameters

WARNING

For the correct operation of the burner, gas pressure at the pilot must be between 15 and 30 mbar and the air damper must have an opening angle between 0° and 15°.

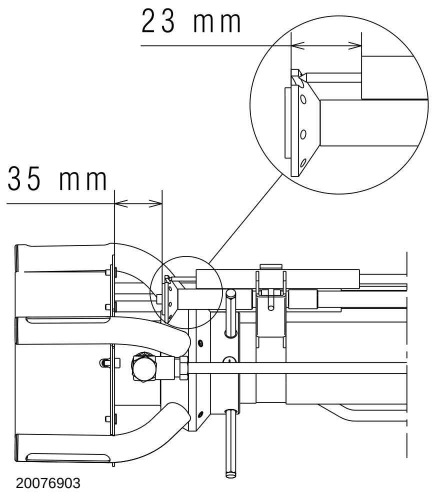


Fig. 11

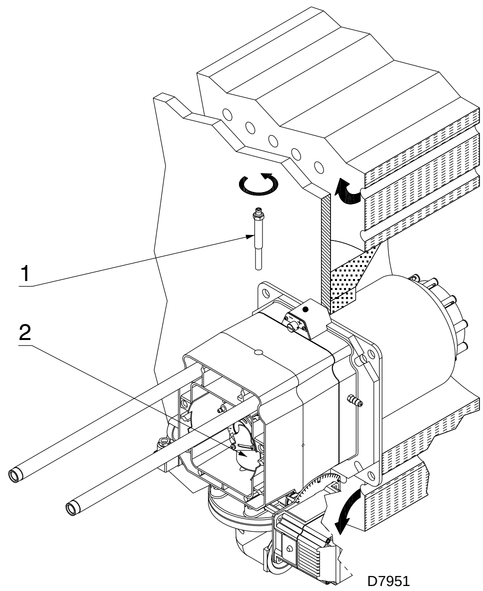


Fig. 12

5.8 Combustion head adjustment

At this point of the installation, the combustion head is fixed to the boiler as shown in Fig. 12. It is therefore especially easy to adjust, and this adjustment depends only on the maximum output of the burner.

In the diagram (Fig. 15) find the notch at which to adjust both air and central gas/air.

External air R1 adjustment

➤ Rotate the screw 4)(Fig. 14) until the notch you have found corresponds with the front surface 5) of the flange.

WARNING

To facilitate adjustment, loosen the screw 6), adjust and then lock.

NOTE:

the diagram (Fig. 15) indicates the optimum adjustment for a type of boiler according to Fig. 3 on page 10.

WARNING

The adjustments indicated can be modified during the initial start-up.

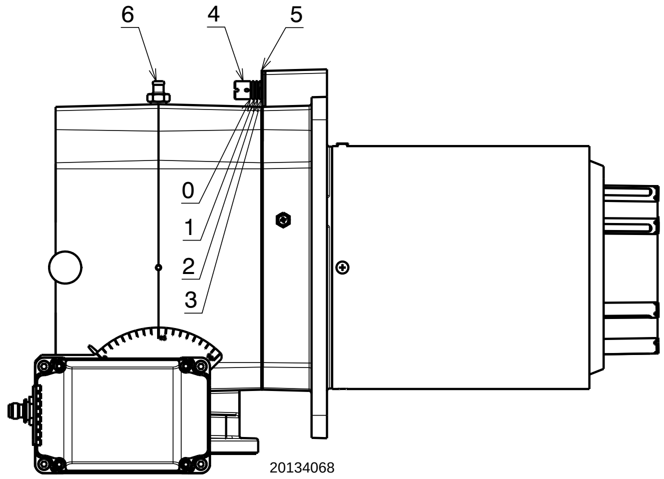


Fig. 14

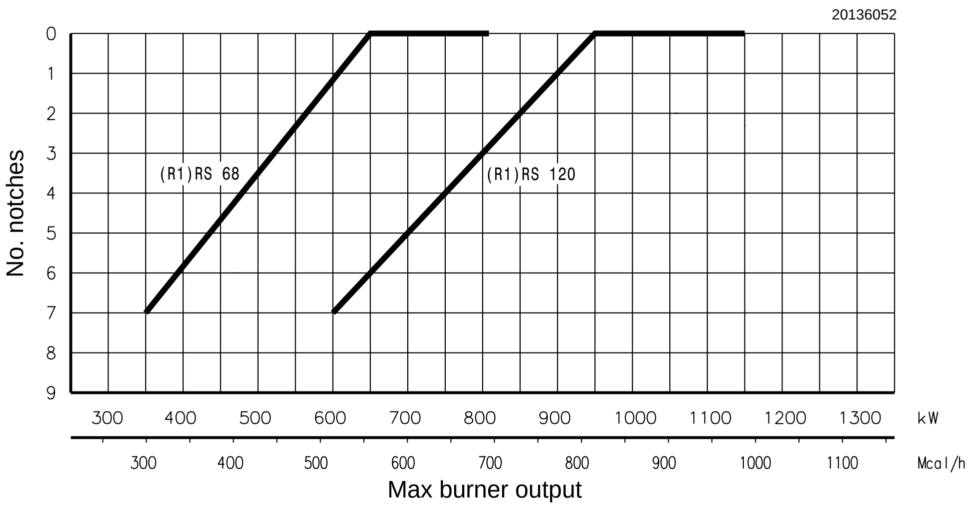


Fig. 15

5.9 FGR duct system

- Normally the duct would connect to the stack as shown in Fig. 16, with a 45° cut facing the flue gas flow and with the center of the cut centered in the stack.
  The duct could be made to the smoke box, but must still be located with the same 45° cut facing the flue gas flow stream and with the center of the cut in the center of the stream.
- The duct should be routed in a manner that has the minimum number of elbows and provides for the normal expansion and contraction of the piping.
  Long duct runs can change length by over 1” and can put an extreme load on the connecting points that could cause component failures.
  The design must include offsets that will allow for the required movement of the piping without undue force on the burner or stack.
- Duct expansion and contraction can be managed by using two relatively long duct runs that are 90° apposed to each other.
  A small movement in the angle between these two legs will provide the space needed to absorb the expansion and contraction. The ends of the FGR duct must be securely attached to allow this to work properly, and prevent high loads from being applied to the burner or stack.
- A condensation drip leg must be provided upstream of the FGR control valve and the FGR shutoff valve (if used). There must be sufficient condensate drip legs and catch space (volume of drip legs) to prevent the condensation from flowing through the control valves and into the fan.
  In cases of heavy condensation, a condensate drip leg may be required on the bottom of the housing, to remove condensate.
- Determine if pipe reducers are needed for the connection to the FGR control valve and the FGR shutoff valve.
- The duct must be properly supported, handling both the weight of the duct and to control the thermal expansion and contraction. The supports may need to be anchored to provide this stability in the FGR duct.

CAUTION

Uncontrolled condensation can cause premature failure of the control valves, fan and motor.

Adequate means must be provided to remove condensation from the system.

Cold startup will generate significant amounts of condensation.

- The FGR duct is normally made from schedule 40 pipe because it is easily obtainable and inexpensive.
  Schedule 20 pipe can also be used for this application.
- The duct components must be seal welded, flanged or screwed together to provide an air tight duct.
  Air leakage into the duct will prevent the system from working properly. It is sufficient to only inspect the welds for a proper seal, they do not need to be leak tested.

WARNING

The duct and connectors must be duly insulated to prevent accidental burns.

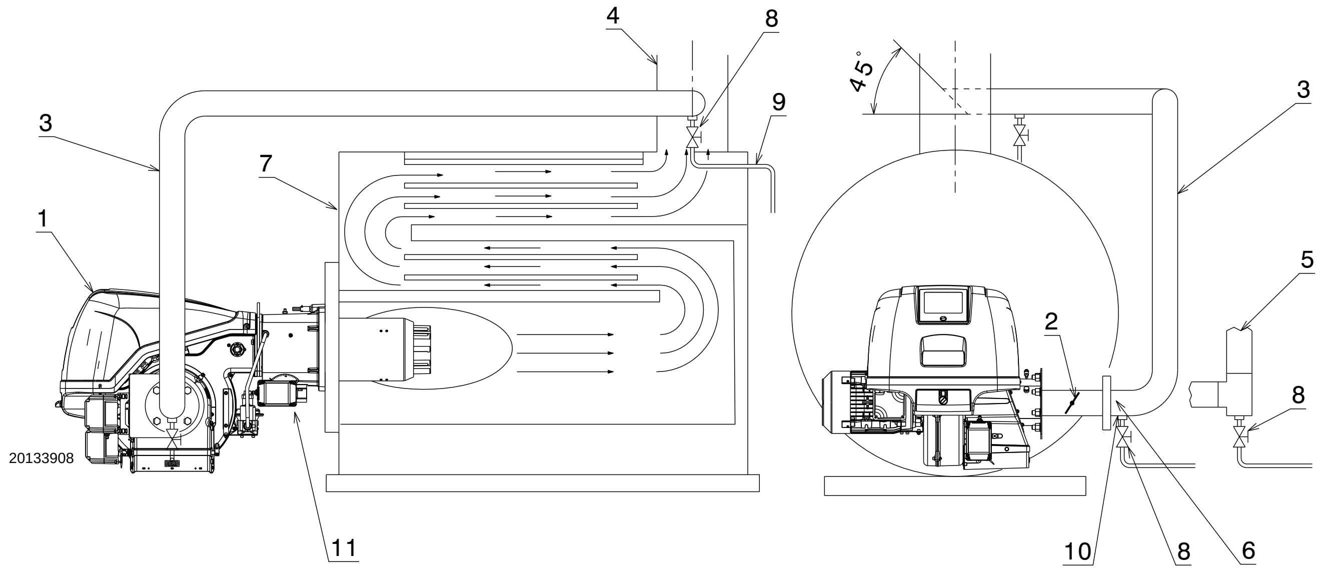


Fig. 16

Key (Fig. 16)

1 Burner
2 Inducted FGR modulating damper
3 Flue gas recirculation pipe
4 Boiler stack
5 Alternate construction using “T”
6 Flue pressure intake upstream of damper 2)
7 Boiler
8 Drain valve (manual ball valve, stainless steel)
9 Drain line
10 Condensate trap
11 Primary gas supply inlet

5.9.1 Flue gas recirculation line sizing

The Tab. K can be helpful to correctly size the FGR pipes taking flue gases from boiler stack base up to the burner intake port.

NOTE:

The typical recirculation percentage is between 10% and 15%.
A low recirculation percentage might cause a high Nox level.
A high recirculation percentage might cause flame instability and a CO level higher than normal.

	Burner output kW	Flue gas pressure at test point 6)(Fig. 16) - mbar
RS 68/E FGR	350	-0.8
	400	-1.1
	450	-1.3
	500	-1.6
	550	-1.8
	600	-2.1
	650	-2.4
	700	-2.6
	750	-2.9
	810	-3.2
RS 120/E FGR	595	-1.8
	650	-2.1
	700	-2.4
	750	-2.7
	800	-3.0
	850	-3.4
	900	-3.7
	950	-4.1
	1000	-4.3
	1100	-4.5
	1150	-4.6

Tab. K

5.9.2 Calculating the percentage of recirculated flue gas

As a general rule, recirculated flue gas quantity must be adjusted so as to recirculate the smallest quantity necessary to obtain the required NOx rate.

Adjustment is carried out through the throttle valve located on FGR pipe. It is necessary to consider that too high a quantity of recirculated flue gas could lead to flame instability and excessively high CO rate.

To calculate the % of recirculated flue gas, use the formula below: % IFGR= (CO_2 R)/(CO_2 f) x 100. Where:
– (CO_2 R) is the percentage of CO_2 measured at the burner coupling
– (CO_2 f) is the percentage of CO_2 measured at the stack

5.10 Burner closing

Once the combustion head adjustment is completed:
- ➤ reassemble the burner on the guides 3) at about 100 mm from the pipe coupling 4) - burner in the position shown in Fig. 13;
- ➤ insert the electrode cable, then slide the burner as far as the pipe coupling - burner in the position shown in Fig. 17;
- ➤ connect the plug of the servomotor 14)(Fig. 13);
- ➤ connect the socket of the maximum gas pressure switch;
- ➤ refit the screws 2) on the guides 3);
- ➤ fix the burner to the pipe coupling with the screws 1).

WARNING

When fitting the burner on the two guides, it is advisable to gently draw out the high voltage cable until it is slightly taut.

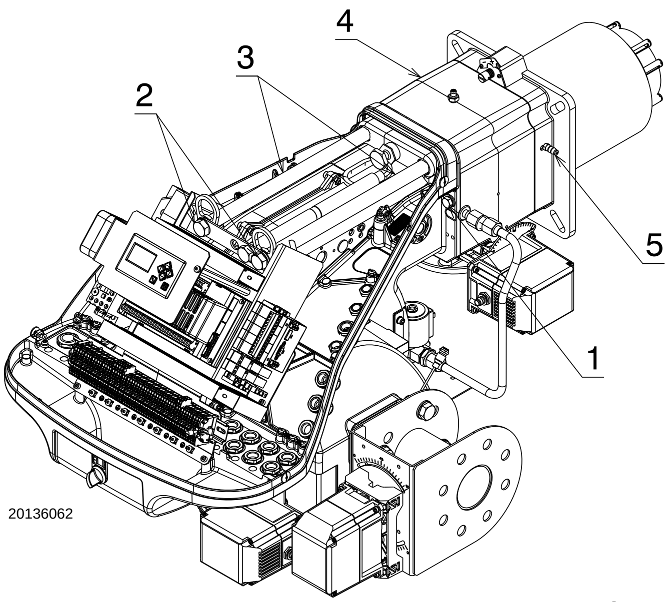


Fig. 17

5.11 Gas feeding

Explosion danger due to fuel leaks in the presence of a flammable source.

Precautions: avoid knocking, attrition, sparks and heat.

Make sure that the fuel interception tap is closed before performing any operation on the burner.

WARNING

The fuel supply line must be installed by qualified personnel, in compliance with current standards and laws.

5.11.1 Gas feeding line

Key (Fig. 18 - Fig. 19 - Fig. 20 - Fig. 21)

1 Gas input pipe
2 Manual valve
3 Vibration damping joint
4 Pressure gauge with pushbutton cock
5 Filter

6A Includes:
- Filter
- working valve
- safety valve
- pressure adjuster

6C Includes
- safety valve
- working valve

6D Includes:
- safety valve
- working valve

7 Minimum gas pressure switch
8 Leak detection device, supplied as an accessory or incorporated, based on the gas train code. In compliance with the EN 676 standard, the leak detection control is compulsory for burners with maximum outputs over 1200 kW.
9 Gasket, for “flanged” versions only
10 Pressure adjuster
11 Train-burner adaptor, supplied separately
P2 Upstream pressure of valves/adjuster
P3 Upstream pressure of the filter
L Gas train supplied separately
L1 The responsibility of the installer

MB

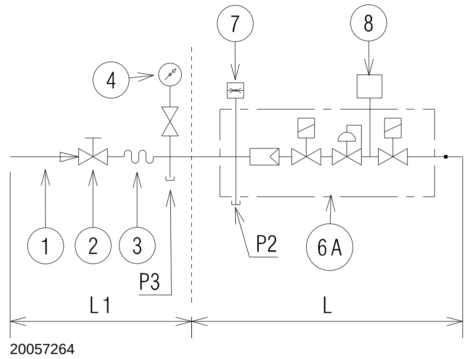


Fig. 18

MBC

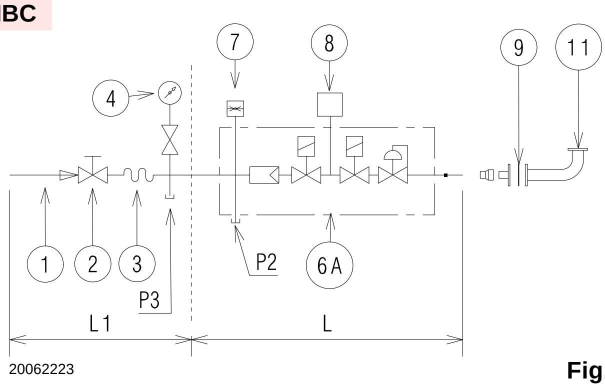


Fig. 19

DMV

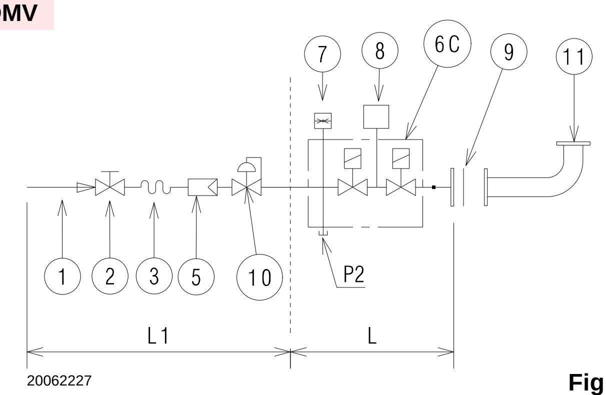


Fig. 20

CB

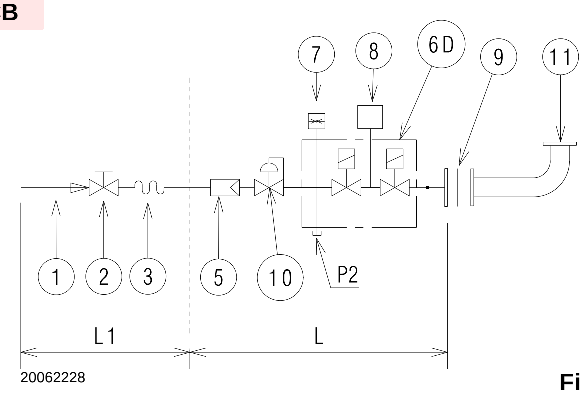


Fig. 21

5.11.5 Gas pressure

Tab. L indicates the pressure drop of the combustion head and the gas butterfly valve depending on the operating output of the burner.

The values shown in Tab. L refer to:
– Natural gas G 20 NCV 9.45 kWh/Sm3 (8.2 Mcal/Sm3)

Column 1

Load loss at combustion head.
Gas pressure measured at the test point 1)(Fig. 24), with:
- combustion chamber at 0 mbar;
- burner working at maximum output;

Column 2
Pressure loss at gas butterfly valve 2)(Fig. 24) with maximum opening: 90°.

To know the approximate output at which the burner is operating at its maximum:
– Subtract the combustion chamber pressure from the gas pressure measured at test point 1)(Fig. 24).
– Find, in the Tab. L relating to the burner concerned, column 1, the pressure value closest to the result you want.
– Read the corresponding output on the left.

Example with natural gas G 20 for RS 68/E FGR:
Maximum output operation

Gas pressure at test point 1)(Fig. 24)	=	14.5 mbar
Pressure in combustion chamber	=	3.0 mbar
14.5 - 3.0	=	11.5 mbar

A maximum output of 810 kW shown in Tab. L corresponds to 11.5 mbar pressure, column 1.

This value serves as a rough guide; the effective output must be measured at the gas meter.

To know the required gas pressure at test point 1)(Fig. 24), set the maximum output required from the burner operation, then:
– find the nearest output value in the Tab. L for the burner in question.
– Read, on the right (column 1) the socket pressure 1)(Fig. 24).
– Add this value to the estimated pressure in the combustion chamber.

Example with natural gas G 20 for RS 68/E FGR:
Required burner maximum output operation: 810 kW

Gas pressure at output of 810 kW	=	11,5 mbar
Pressure in combustion chamber	=	3.0 mbar
11.5 + 3.0	=	14.5 mbar

pressure required at test point 1)(Fig. 24).

	kW	1 Δp (mbar)	2 Δp (mbar)
RS 68/E FGR	350	2.3	0.5
	400	2.8	0.6
	450	3.5	0.6
	500	4.1	0.7
	550	5.0	0.8
	600	5.9	0.8
	650	7.0	0.9
	700	8.4	0.9
	750	9.6	1.1
	810	11.5	1.1
RS 120/E FGR	595	4.8	0.8
	650	5.6	0.9
	700	6.4	0.9
	750	7.2	1.0
	800	8.2	1.1
	850	9.1	1.1
	900	10.1	1.2
	950	11.2	1.3
	1000	12.4	1.4
	1100	14.9	1.6
	1150	15.7	1.7

Tab. L

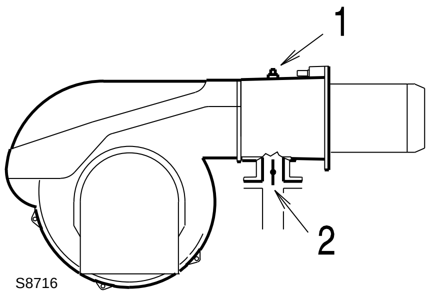


Fig. 24

7 Operating control and display

7.1 UI300 user interface

S9620

Fig. 33

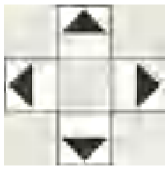
Display

The display shows in pictogram:
- the menu structure
- operating status
- parameters
- error messages

Back key

Jump to previous window

Cursor keys



You navigate in the menu using cursor keys.
You use “left” and “right” keys to move step by step in a selected row.
At the end of the selected row the cursor jumps down to the next row, if possible.
In a multiline menu use “up” and “down” keys to switch to other rows.
To display parameters, switch between various fields.

ENTER keys

Press ENTER to call up a menu on the start screen.
Select a sub-menu in the menu window. Transfer setting values by pressing ENTER key in a parameter window.
Use a flushing, red ENTER key to release a fault interlocker.
If the ENTER key is permanently lit red, a fault with an automatic restart is displayed.

7.2 Menu functions

The menu is divided into five paths:

 INFO

 MANUAL

 SETTINGS

 PASSWORD

 DATA PROCESSING

INFO

Select INFO path for information about the following:
- burner
- faults/fault history
- software version
- display of check sums
- serial number
- actuator positions (current damper position for each channel)
- digital inputs/outputs

MANUAL

Select MANUAL to:
- start and stop burner by hand
- adjust internal burner firing rate

SETTINGS

Select the SETTINGS path for getting information/make changes to:
- password
- burner settings (display and settings)
- actuator elements settings (display)
- air/fuel control system
- deletion of curve sets
- display settings

PASSWORD

Use PASSWORD to:
- for enter a password
- to change the access level

DATA PROCESSING

Use DATA PROCESSING to:
- read out datasets from the BT300
- to transfer datasets to the BT300

7.3 Main menu

1 INFO menu path [selected]
2 Display of fuel type
3 Bar graph of internal firing rate in % (0 - 100)
4 MANUAL menu path
5 SETTINGS menu path
6 Access level 2
7 DATA PROCESSING menu path
8 Window number

Use cursor keys to select a menu and press ENTER to confirm.

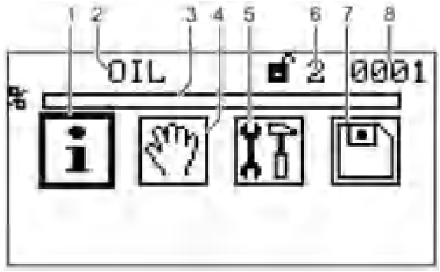


Fig. 34

7.4 INFO menu path

INFO

Use cursor keys to select path and press ENTER to confirm.

The display shows a menu overview.

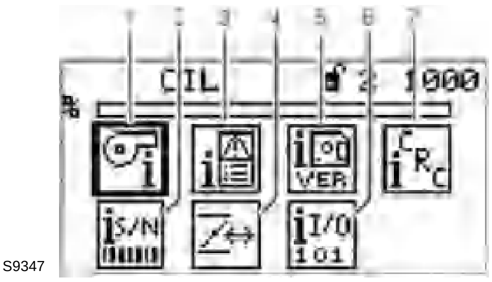


Fig. 35

1 Burner information [selected]
2 Serial number
3 Fault history
4 Configuration of actual value of actuating outputs (display only)
5 Software version
6 Digital inputs/outputs
7 Check sum display

7.4.1 Burner details

Display operating hours

Use cursor keys to select menu and press ENTER to confirm

The display shows the 'System Information' menu window.

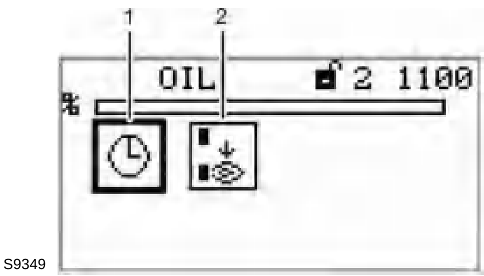


Fig. 36

1 Display operating hours [selected]
2 Number of burner start-ups

Use cursor keys to select menu and press ENTER to confirm.

The display shows the Display operating hours menu window.

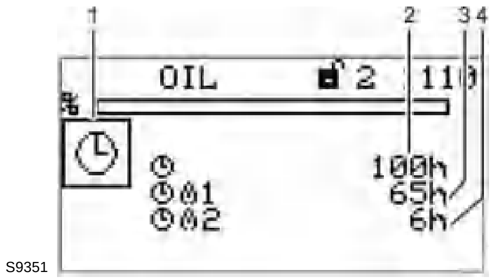


Fig. 37

1 Pictogram operating hours
2 Total number of operating hours (device connected to mains voltage)
3 Number of operating hours, oil operation
4 Number of operating hours, gas operation

Display burner start-ups

Use keys in System Information menu to select menu and press ENTER to confirm.

The display shows the Start-up counter menu window.

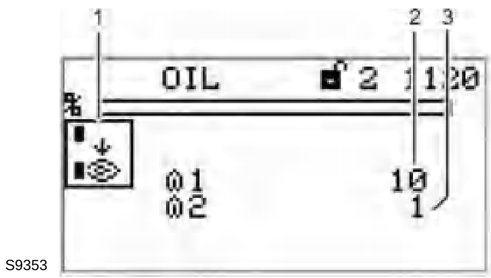


Fig. 38

1 Pictogram burner start-up
2 Number of burner start-ups, oil operation
3 Number of burner start-ups, gas operation

7.4.2 Recall fault history

Display burner faults

Use cursor keys to select menu and press ENTER to confirm.

The display shows Fault history selection menu.

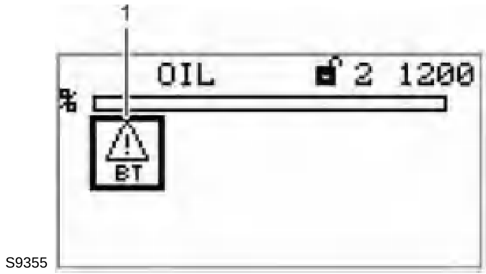


Fig. 39

1 Burner fault pictogram [selected]

Use keys to select menu and press ENTER to confirm.

The display shows Fault history menu.

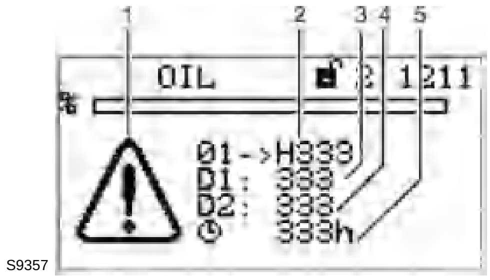


Fig. 40

1 Error code-display pictogram
2 Fault code (Last 10 faults are stored, no. 01 is the latest fault)
3 Diagnostic code 1
4 Diagnostic code 2
5 Number of operating hours when fault has occurred

NOTE:
information concerning fault and diagnostic codes you may find in the list of fault codes.
For fault analysis a fault code and diagnostic code D1 or D2 is required.

Fault unlock

Display faults unlocking

✓ A fault is pending and the ERROR key is flashing.
➤ Press ENTER-Taste. BT300 is not locked anymore.

Changing from fault unlock to main menu

✓ A fault is pending and the ERROR key is flashing
➤ Press BACK key.
ENTER key isn't flashing any more.
The display returns to main menu.
An error number is flashing in the display on top left.

UI300 can be used as usual.

Back to fault unlock

✓ An error number is flashing in the display on top left.
➤ Use BACK key to switch back to main menu.
➤ Press arrow-key left.
ENTER key is flashing again.

BT300 can be unlocked.

NOTE:
If the ENER key has a permanent red light, there is gas shortage.
A countdown to the next start is running.
This countdown can be interrupted by the ENTER key.

7.4.3 Software version

Display software version

Use cursor keys to select menu and press ENTER to confirm.

The display shows the Software version menu.

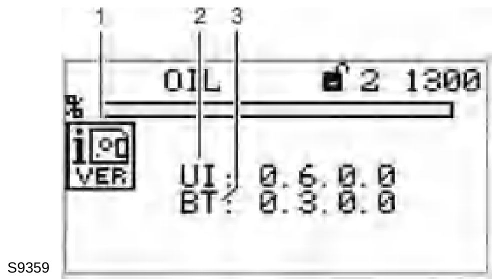


Fig. 41

1 Software version pictogram
2 UI300 software version (User Interface)
3 BT300 software version (BurnerTronic)

7.4.4 Display of check sums

Display check sum

Use cursor keys to select menu and press ENTER to confirm.

The display shows CRC16 check sums menu.

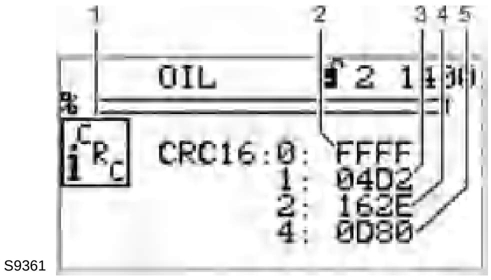


Fig. 42

4 Check sums pictogram
5 Check sum, access level 0
6 Check sum, access level 1
7 Check sum, access level 2
8 Check sum, access level 4

The checksums are generated from the device parameters.

The BT300 calculated per one Checksum for the parameter access level 0, 1, 2 or 4 representation is hexadecimal.

Using the checksum is determined whether the value of one or more parameters, which was lying in the corresponding access level changed.

7.4.5 Serial number

Display serial number

Use cursor keys to select menu and press ENTER to confirm.

The display shows the Serial number menu.

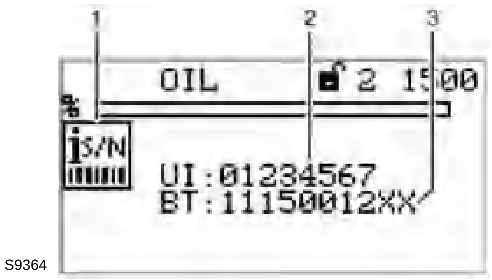


Fig. 43

1 Serial number pictogram
2 User Interface serial number
3 BurnerTronic serial number

7.4.6 Positions of actuators

Display positions of actuators

Use cursor keys to select menu and press ENTER to confirm.

The display shows the Actuators menu.

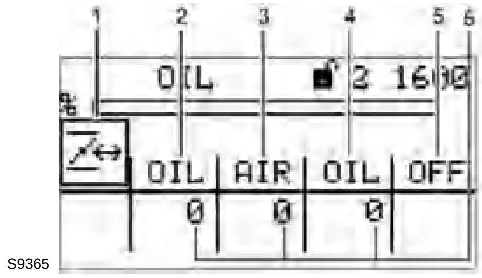


Fig. 44

1 Actuator pictogram
2 Actuator channel 1 (oil)
3 Actuator channel 2 (air)
4 Actuator channel 3 (oil)
5 Optional channel (OFF; control of frequency converter)
6 Actuator's actual position

NOTE:
the assignment of channels is depending on configuration settings.

7.4.7 Check digital inputs/outputs

Check digital inputs

Use cursor keys to select menu and press ENTER to confirm.

The display shows the Digital inputs/outputs menu.

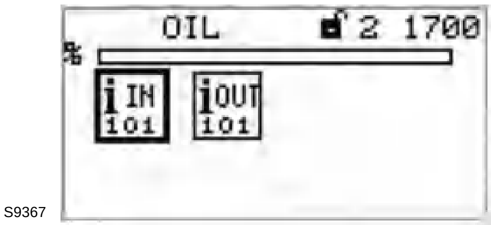


Fig. 45

1 Digital inputs pictogram [selected]
2 Digital outputs pictogram

Select menu and press ENTER to confirm.

The display shows the 1st page of inputs.

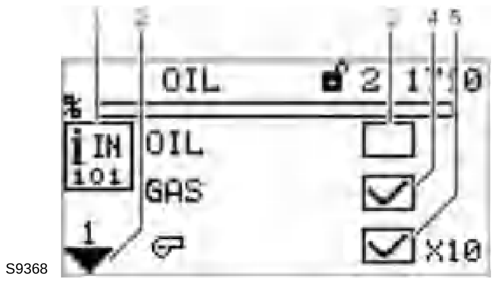


Fig. 46

1 Digital inputs pictogram
2 Jump to next page
3 Fuel selection oil [no]
4 Fuel selection gas [yes]
5 Burner start [yes] - terminal X10

Call up 2nd page of inputs

Use cursor keys to select the next page and press ENTER to confirm.

The display shows the 2nd page of inputs.

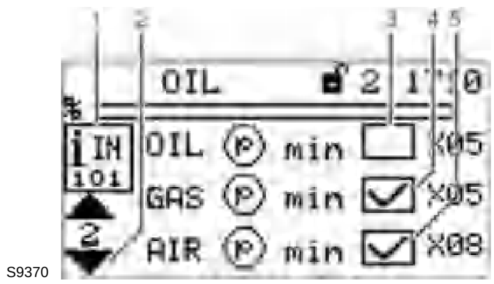


Fig. 47

1 Digital inputs pictogram
2 Jump to next page
3 Oil pressure min present [no] - terminal X05
4 Gas pressure min present [yes] - terminal X05
5 Air pressure min present [yes] - terminal X08

Call up 3rd page of inputs

Use the cursor keys to select the next page and press ENTER to confirm.

The display shows the 3rd page of inputs.

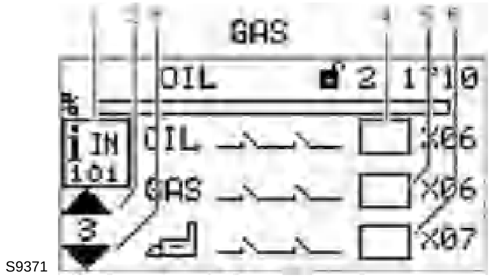


Fig. 48

1 Digital inputs pictogram
2 Jump to previous page
3 Jump to next page
4 Safety interlock chain oil closed [no] - terminal X06
5 Safety interlock chain gas closed [no]
6 Safety interlock chain boiler closed [no]

NOTE:
The BT320/330 supports either oil or gas operation, but cannot be switched.
Therefore no separate signals for the oil or gas safety interlock chain are generated.
The signal on terminal X06 is thus generally known as burner's safety interlock chain.

Call up 4th page of inputs

Use cursor keys to select next page and press ENTER to confirm.

The display shows the 4th page of inputs.

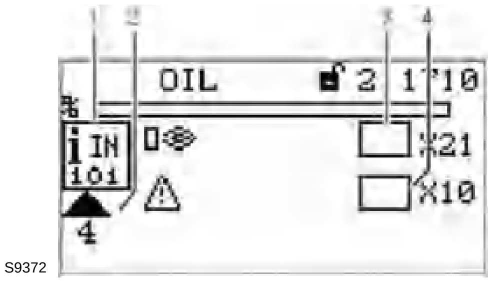


Fig. 49

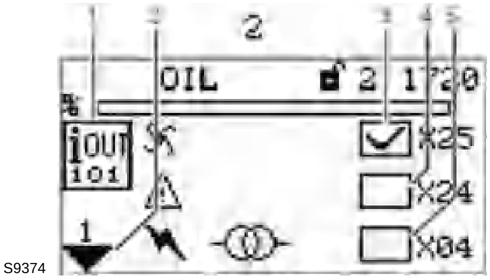
1 Digital inputs pictogram
2 Jump to previous page
3 Flame signal present [no] - terminal X21
4 Fault release [no] - terminal X10

7.4.8 Digital outputs

Check digital outputs

Use the cursor keys to select the menu and press ENTER to confirm.

The display shows page 1 digital outputs menu.



S9374

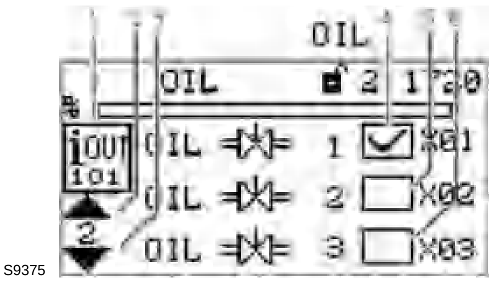
Fig. 50

1 Digital outputs pictogram
2 Jump to next page
3 Fan [on] - terminal X25
4 Error [off] - terminal X24 (adjustable with P 809)
5 Ignition transformer [off] - terminal X04

Call up 2nd page of outputs

Use the cursor keys to select the next page and press ENTER to confirm.

The display shows page 2 digital outputs menu.



S9375

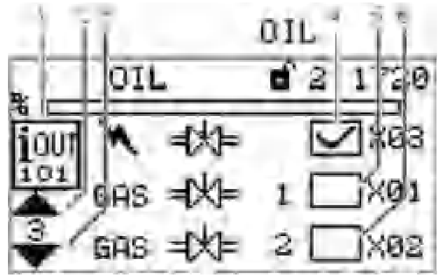
Fig. 51

1 Digital outputs pictogram
2 Jump to previous page
3 Jump to next page
4 Oil valve 1 [on] - terminal X01
5 Oil valve 2 [off] - terminal X02
6 Oil valve 3 [off] - terminal X03

Call up 3rd page of outputs

Use the cursor keys to select the next page and press ENTER to confirm.

The display shows page 3 digital outputs menu.



S9376

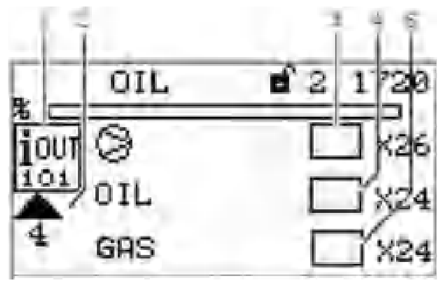
Fig. 52

1 Digital outputs pictogram
2 Jump to previous page
3 Jump to next page
4 Ignition valve [on] - terminal X03
5 Gas valve 1 [off] - terminal X01
6 Gas valve 2 [off] - terminal X02

Call up 4th page of outputs

Use the cursor keys to select the next page and press ENTER to confirm.

The display shows page 4 digital outputs menu.



S9377

Fig. 53

1 Digital outputs pictogram
2 Jump to previous page
3 Oil pump [off] - terminal X26
4 Fuel selection oil [off] - terminal X24 (adjustable with P 809)
5 Fuel selection gas [off] - terminal X24 (adjustable with P 809)

7.5 MANUAL menu path

MANUAL

Select MANUAL path to carry out actions as follows:
- Switching burner ON and OFF
- Presetting of burner firing rate

Display MANUAL menu

Use cursor keys to select path and press ENTER to confirm.

The display shows the manual operation menu.

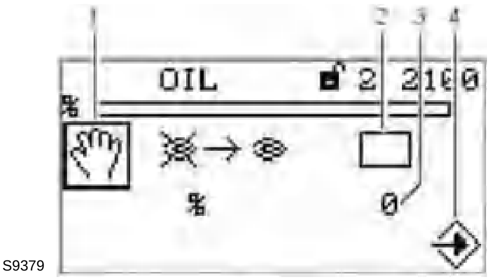


Fig. 54

1. Pictogram manual operation
2. Start burner manually [off]
3. Adjust burner firing rate
4. Pictogram confirm settings

The “Burner ON” control loop does not need to be switched on to start the burner from this menu. The user interface assumes control in this menu.

If there is no “Burner ON” signal from other sources (terminal X10.2) software switches off the burner when you exit the menu.

WARNING

If you carry out a manual start-up via display BT300 no longer responds to “Burner ON” signal input at connector X10.2.

Therefore that limiters, monitors and other similar safety functions must not be operated with this input!

NOTE:
leaving of window will terminate manual burner operation!

Adjust burner firing rate

Use cursor keys to select adjustment of burner firing rate in % and press ENTER to confirm.

Change burner firing rate with the cursor keys and press ENTER to confirm.

NOTE:
changes of burner firing rate are possible only while burner is running.
If you want to adjust burner firing rate remember to start-up the burner first.

7.5.1 Fault indication

Display burner faults

Use cursor keys to select menu and press ENTER to confirm.

The display shows fault history selection menu.

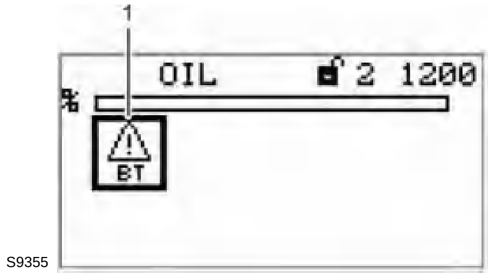


Fig. 55

1 Burner fault pictogram [selected]

Use keys to select menu and press ENTER to confirm.

The display shows fault history menu.

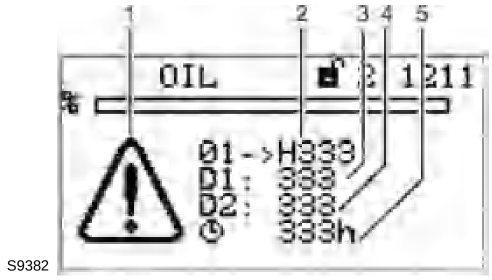


Fig. 56

1. Error code-display pictogram
2. Fault code (Last 10 faults are stored, no. 01 is the latest fault)
3. Diagnostic code 1
4. Diagnostic code 2
5. Number of operating hours when fault has occurred

NOTE:
information concerning fault and diagnostic codes you may find in the list of fault codes.
For fault analysis a fault code and diagnostic code D1 or D2 is required.

Fault unlock

Display unlocking faults

✓ A fault is pending and the ERROR key is flashing.
➤ Press ENTER-Taste.
BT300 is not locked anymore.

Changing from fault unlock to main menu

✓ A fault is pending and the ERROR key is flashing
➤ Press BACK key.
ENTER key isn't flashing any more. The display returns to main menu.
An error number is flashing in the display on top left.

UI300 can be used as usual.

Back to fault unlock

✓ An error number is flashing in the display on top left.

➤ Use BACK key to switch back to main menu.

➤ Press arrow-key left.
ENTER key is flashing again.

BT300 can be unlocked.

NOTE:
if the ENTER key has a permanent red light, there is gas shortage. A countdown to the next start is running.
This countdown can be interrupted by the ENTER key.

7.6 SETTINGS menu path

SETTINGS

Display SETTINGS menu

cursor keys to select menu and press ENTER to confirm.

The display shows the menu overview.

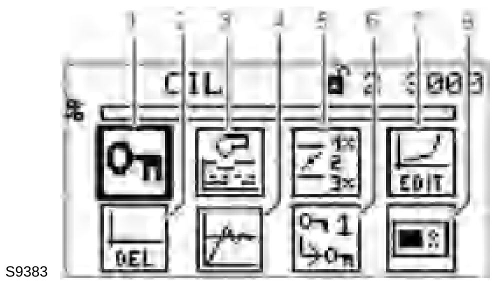


Fig. 57

1 Password pictogram (selected)
2 Delete curves
3 Display program settings
4 Firing rate controller settings
5 Configuration of read-out actuator outputs
6 Password settings
7 Curve settings
8 Display settings

7.6.1 Program sequence

Configure program sequence

Use cursor keys to select menu and press ENTER to confirm.

The display shows the program sequence overview.

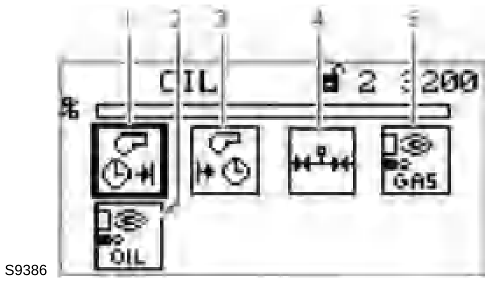


Fig. 58

1 Duration of pre-purge [selected]
2 Pilot burner oil operation
3 Duration of post-purge
4 Valve leakage test
5 Pilot burner gas operation

NOTE:
Apply value only if the values for UI300 and BT300 are identical! The parameter value must be confirmed by pressing

Set pre-purge period

Use cursor keys to select menu and press ENTER to confirm.

The display shows the pre-purge period menu.

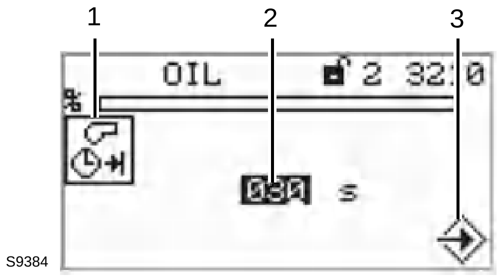


Fig. 59

1 Pre-purge period pictogram
2 Setting pre-purge time
3 Accept value by pressing ENTER

NOTE:
pre-purge starts as soon as damper reaches pre-purge position and - if you use a VSM - the last but one point of fuel/air ratio curve is passed.
The second to last channel's position must be lower than the position of the last curve point.

Use cursor keys to select the number you want to change.

Change the numerical value with cursor keys .

Confirm the entry with ENTER .

The countdown starts.

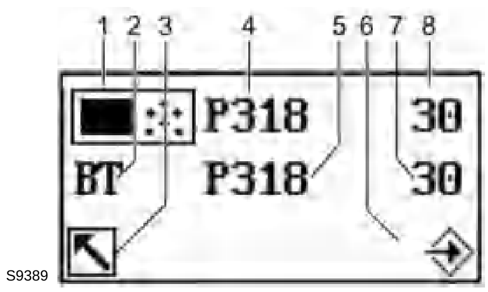


Fig. 60

1 UI300 pictogram
2 BT300 pictogram
3 Cancel (backwards)
4 Parameter number UI300
5 Parameter number UI300
6 Transfer by pressing ENTER (flashing)
7 Value for UI300
8 Value for BT300

ENTER within the countdown (8s)!

Accept or discard the entry.

NOTE:
the following sequence of events for confirming or discarding the entry is exactly the same for all parameter entries. Therefore this process is not illustrated again in following explanations of parameter settings.
You will simply find this text: 'Accept or discard the entry!'

You will simply find this text: **Accept or discard the entry!**

– Confirm the change

Press ENTER in time to confirm.

The value is accepted.

The display shows the following page.

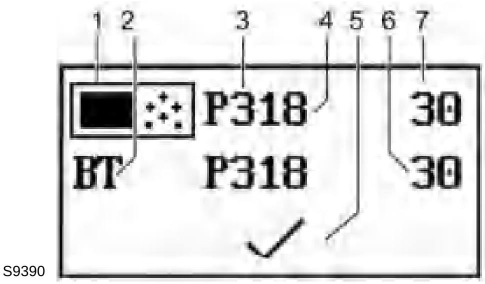


Fig. 61

1 Pictogram UI300
2 Pictogram BT300
3 Parameter number UI300
4 Parameter number BT300
5 Pictogram discard parameters
6 Value BT300
7 Value UI300

The parameter change is transferred to the burner control system!

WARNING

If both values are identical you apply the value by pressing ENTER.

In case of a discrepancy of values terminate the storage process.

– Cancel parameter changes:

Select the Back key

The change made to the parameter is not accepted. The following page appears.

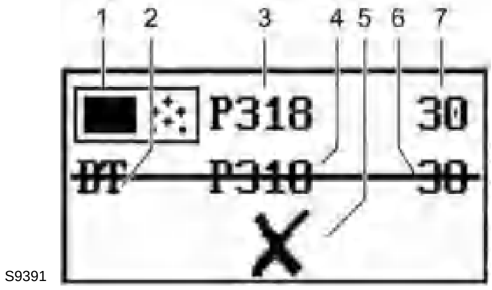


Fig. 62

1 Pictogram UI300
2 Pictogram BT300
3 Parameter number UI300
4 Parameter number BT300
5 Pictogram apply parameters
6 Value BT300
7 Value UI300

Set duration of post-purge

Use cursor keys to select menu and press ENTER to confirm.

The display shows the post-purge period menu.

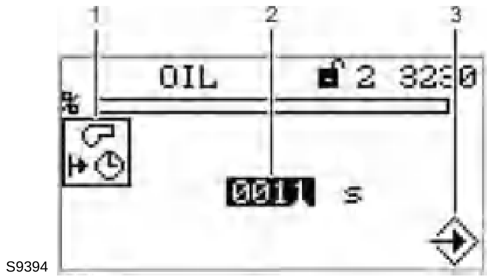


Fig. 63

1 Post-purge period pictogram
2 Setting post-purge time
3 Press ENTER to accept setting

Use cursor keys to select number you wish to change.

Change the numerical value with cursor keys .

Confirm entry with ENTER .

Accept or discard the entry!

Leakage test functions

Use cursor keys to select menu and press ENTER to confirm.

The display shows the valve leakage test menu.

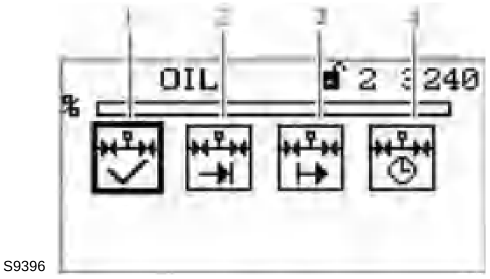


Fig. 64

Leakage test ON/OFF
4 Leakage test before ignition
5 Leakage test after ignition
6 Leakage test period

NOTE:
you require access level 2 to make settings in this function!

Accept or discard the entry!

Activate valve leakage test prior to ignition

Use cursor keys to select menu and press ENTER to confirm.

Change the functional state ON/OFF using cursor keys and press ENTER .

The display shows the valve leakage test menu before ignition.

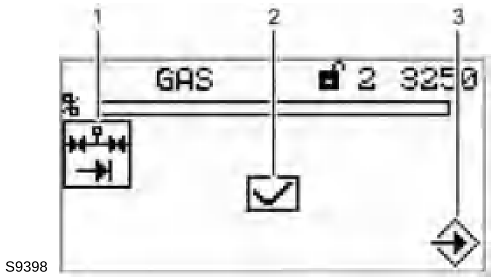


Fig. 65

1 Valve leakage test before ignition picto- gram
2 Display valve leakage test (ON)
3 Press ENTER to accept settings

The valve leakage test is set!

NOTE:
You require access level 2 to make settings in this function

Accept or discard the entry!

Activate valve leakage test after flame OFF

Use cursor keys to select menu and press ENTER to confirm.

Change the functional state ON/OFF using cursor keys and press ENTER .

The display valve leakage test is shown after flame OFF menu.

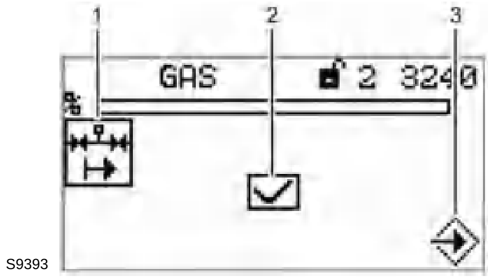


Fig. 66

1 Valve leakage test after flame OFF picto- gram
2 Display valve leakage test (ON)
3 Press ENTER to accept settings

The valve leakage test is set!

NOTE:
you require access level 2 to make settings in this function!

Accept or discard the entry!

Valve leakage test period

Use cursor keys to select menu and press ENTER to confirm.

The display shows the valve leakage test period menu.

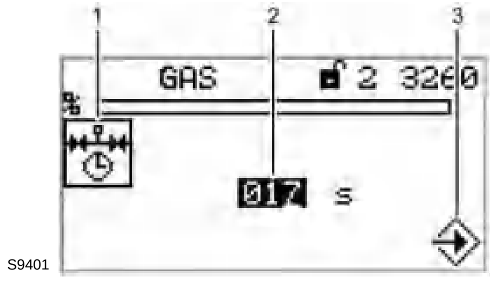


Fig. 67

1 Valve leakage test period pictogram
2 Set valve leakage test period
3 Press ENTER to accept settings

Use cursor keys to select the number you wish to change.

Change the numerical value with cursor keys .

Press ENTER to confirm.

Accept or discard the entry!

Activate pilot burner in gas operation

Use cursor keys to select menu and press ENTER to confirm.

Change functional state ON/OFF using cursor keys and press ENTER to confirm.

The display shows the menu: 'pilot burner in gas operation'.

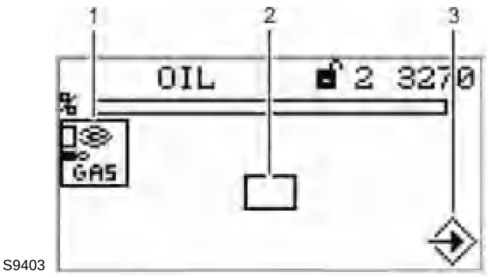


Fig. 68

1 Pilot burner in gas operation pictogram
2 Activate the pilot burner in gas operation
3 Press ENTER to accept settings

NOTE:
you require access level 2 to make settings in this function!

Accept or discard the entry!

Set pilot burner in oil operation

Use cursor keys to select menu and press ENTER to confirm.

Change functional state ON/OFF using the cursor keys and press ENTER to confirm.

The display shows the menu: pilot burner in oil operation.

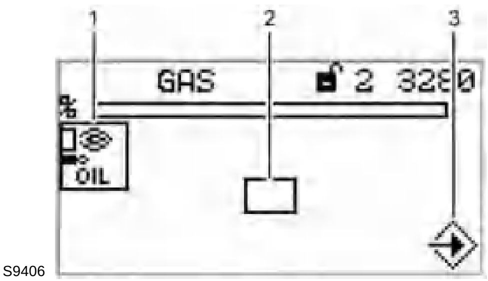


Fig. 69

1 Pilot burner in oil operation pictogram
2 Activate pilot burner in oil operation
3 Press ENTER to accept settings

NOTE:
you require access level 2 to make settings in this function!

Accept or discard the entry!

Configuration of actuating outputs

Use cursor keys to select menu and press ENTER to confirm.

The display shows the configuration of actuating outputs menu.

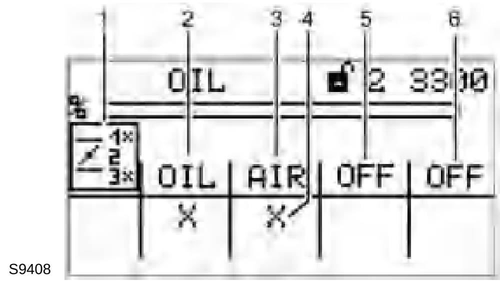


Fig. 70

1 Actuator position pictogram
2 Display channel 1, oil
3 Display channel 2, air
4 Channel active
5 Display channel 3, off
6 Optional channel, off

Curve setting of actuators

Use cursor keys to select menu and press ENTER to confirm.

NOTE:
pressing key and holding it longer than 2 s in this menu will cause a fault shut-down.

The display shows the curve setting menu.

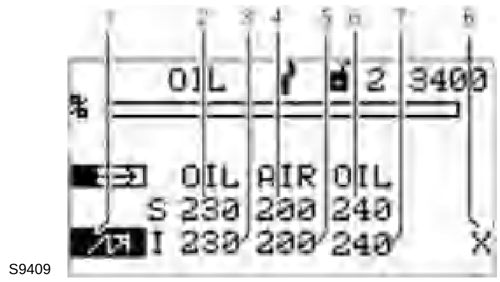


Fig. 71

1 Ignition position firing rate point
2 set-point channel 1, oil
3 Actual value channel 1, oil
4 set-point channel 2, air
5 Actual value channel 2, air
6 set-point channel 3, oil
7 Actual value channel 3, oil
8 Curve data for this firing rate point already existing

Use cursor keys to set firing rate point and press ENTER to confirm.

Set-point channel 1 is chosen (displayed inversely).

Use cursor keys to set channels' actuator position.

Use cursor keys to switch to next channel.

Use cursor keys to set actuators' position in the selected firing rate point.

NOTE:
Actuators move according to changes immediately to the set position.
If you want to change channel 4 the fan motor must be running.

Accept or discard the entry!

The display switches to the firing rate selection menu.

Use BACK key to switch to menu settings after having completed curve settings.

NOTE:
the following firing rate points are available: ignition point , 200, 250, 300, 400, 500, 600, 700, 800, 900, 999.

Set your firing rate points as described above and press ENTER to confirm .

NOTE:
if you press key while setting firing rate points your value changes will be discarded.

Set multi-stage oil operation - 1st stage

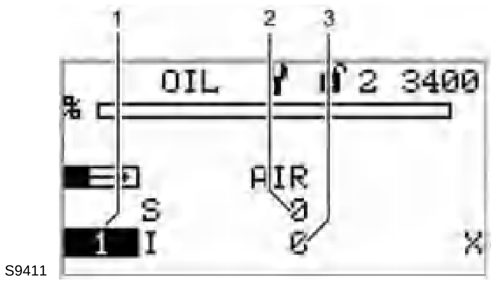


Fig. 72

1 Display 1st stage
2 Set-point, air damper position
3 Actual value, air damper position

Select the first stage and press ENTER .
The actuators move to the pre-set positions.
The set-point position of the first activated actuator is displayed inversely.

Use cursor keys to set the position of the selected actuator.

Use cursor keys to switch to a different actuator.

Press ENTER .

The positions of all actuators of the selected firing rate point are saved.

You can select the next firing rate point.

NOTE:
if you press the key while changing the firing rate point your changes will be discarded.

NOTE:
During multi-stage operation, the following points are available:

Ignition point :
1 (first stage)
1 ⟶ 2 (valve switch-on point, second stage)
1 ⟵ 2 (valve switch-off point, second stage)
2 (second level)
2 ⟶ 3 (valve switch-on point, third stage)
2 ⟵ 3 (valve switch-off point, third stage),
3 (third stage)

NOTE:
pre-purge starts as soon as the damper reaches pre-purge position and - if you use a VSM - the last but one point of the fuel/air ratio curve is passed.

The points are approached from above by using the overshoot-function. If you use the over- shoot-function in operation, you must program all points from above. Only if you do so, the required position will match the actual position.

The channels' position in the last but one curve point must be lower than at the last curve point.

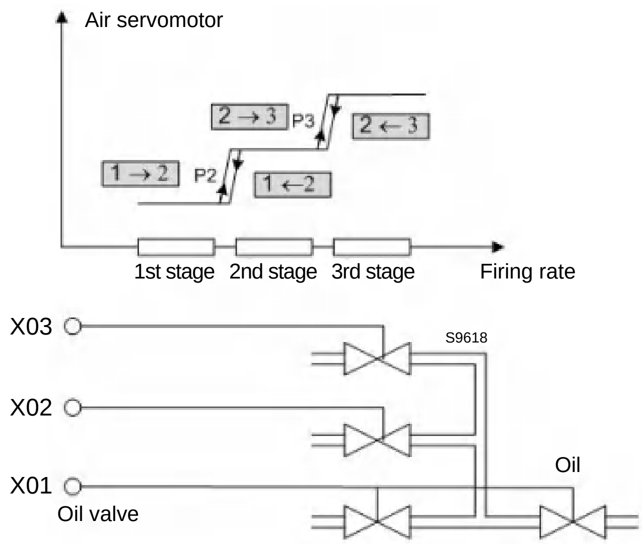


Fig. 73

Set staged oil operation - transition from 1st to 2nd stage

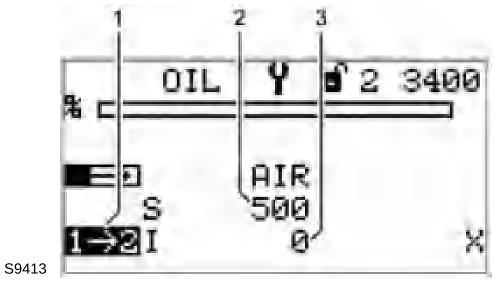


Fig. 74

1 Display valve switch-on point, 2nd stage
2 set-point, air damper position
3 Actual value, air damper position

Select the set-point for the air damper position and press ENTER to confirm.

The actuators move to these positions.
The set-point position for the active actuator is displayed inversely.

Use the cursor keys to set the position of the selected actuator.

Use the cursor keys to switch to a different actuator.

Press ENTER .

Positions for all actuators of the selected firing rate point are saved.
You can select the next firing rate point.

NOTE:
set the other firing rate stages according to this procedure!

Delete firing rate curves

In 'Settings' menu path use cursor keys to select menu and press ENTER to confirm.

The display shows the Deleting curves menu.

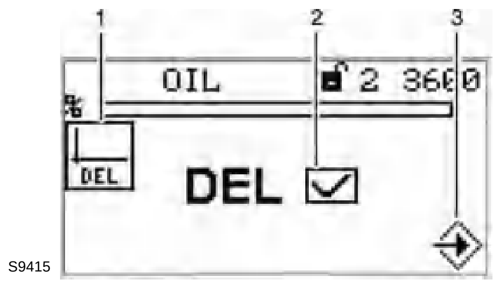


Fig. 75

1 Delete curves pictogram
2 Delete curves selected
3 Confirm deleting of curves

The display shows the confirmation prompt.

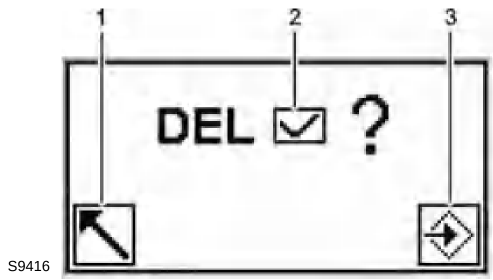


Fig. 76

1 Back to previous menu
2 Deleting values [selected]
3 Proceed with deleting values

Press ENTER .

The curve values will be deleted.
The display shows the values deleted menu.

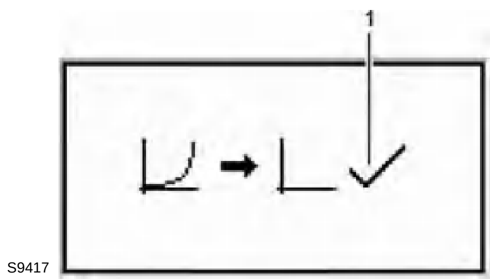


Fig. 77

1 Values deleted

UI300 display settings

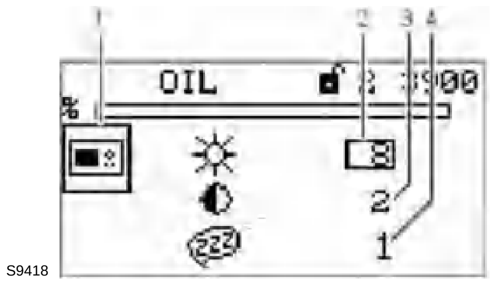


Fig. 78

1 UI300 pictogram
2 Brightness
3 Contrast
4 Delay for screen saver

NOTE:
value = 0 cannot be entered for the screen saver delay!

7.7 PASSWORD menu path

PASSWORD

Display menu password entry

Use cursor keys to select menu and press ENTER to confirm.

The display shows the password entry menu.

S9419

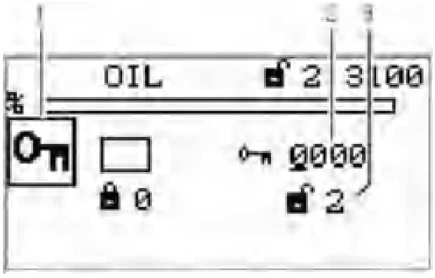


Fig. 79

1 Password pictogram (selected)
2 ENTER password
3 Access level 2 displayed with access authorisation

Use the cursor keys to select password field you wish to change.

Change the number with cursor keys .

Confirm password with ENTER .

7.8 DATASET PROCESSING menu path

DATASET PROCESSING

Save dataset from BT300

Use cursor keys to select path and press ENTER to confirm.

The display shows the data processing menu.

S9420

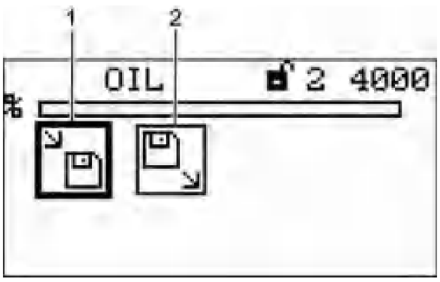


Fig. 80

1 Pictogram save dataset from BT300
2 Pictogram write dataset to BT300

Use cursor keys to select Icon and press ENTER to confirm.

The display shows the Save dataset menu.

S9422

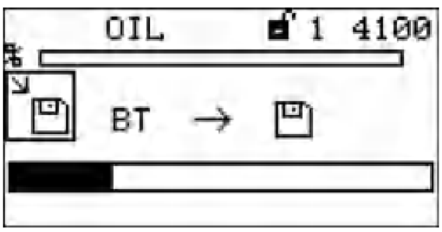


Fig. 81

After the dataset is saved, the display shows the checksum.

S9423

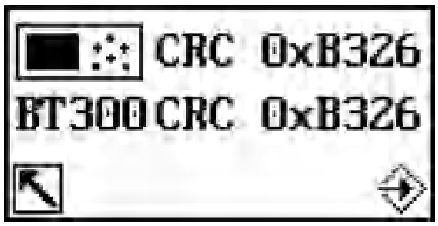


Fig. 82

Write dataset to BT300

Use cursor keys to select path and press ENTER to confirm.

The display shows the Data processing menu.

S9424

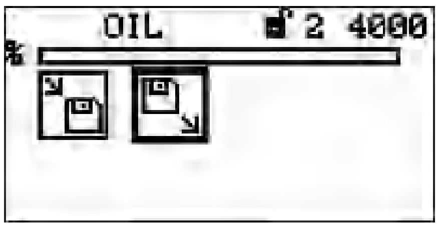


Fig. 83

Use cursor keys to select Icon and press ENTER to confirm.

The display shows the Save dataset to BT300 menu.

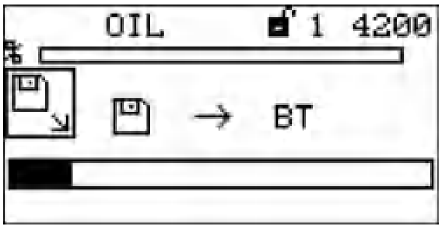
S9426


Fig. 84

After the dataset is saved, the display shows the checksum.

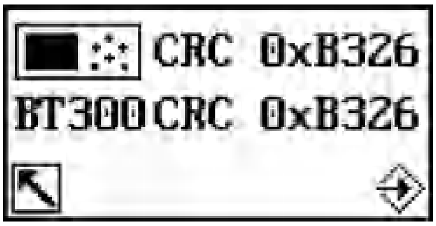
S9423


Fig. 85

7.9 Other displays

No connection between UI300 and BT300

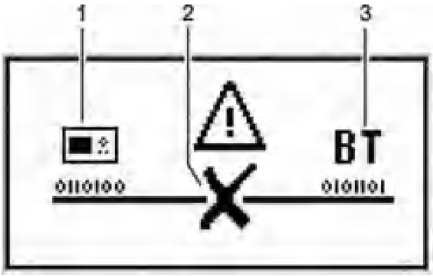
S9427


Fig. 86

1 UI300 User Interface pictogram
2 No connection symbol
3 BT300 burner control

Display shown e.g. when using LSB remote software and communication between BT300 and UI300 is temporarily unavailable.

Termination

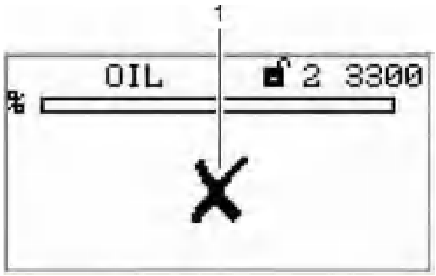
S9428


Fig. 87

1 Communication error pictogram connection unavailable

8 Options

8.1 Firing-rate controller module LCM100

The LCM100 adds the function of a firing rate controller to the BurnerTronic. Additional components of the module are:

– an integrated power supply for external 24 V consumers (sensors, additional BurnerTronic expansion modules)
– a LSB interface for connecting additional LSB devices
– a 4 ... 20 mA monitor output, for internal firing rate
– digital pulse counter inputs for calculating fuel consumption
– a PT100/1000 input for measuring flue gas temperature
– socket for connection of BT300 service software

The firing rate controller offers the option of controlling temperature (PT100 or PT1000) or steam pressure (4 ... 20 mA pressure sensor). The LCM100 also offers the option of a set-point shift depending on outside temperature (control by tmospheric condition). If the control by atmospheric condition function is not in use, 2 programmed set-points can be controlled using of a digital 24 V input.

LCM100 insulates the LSB from BT300's mains potential.

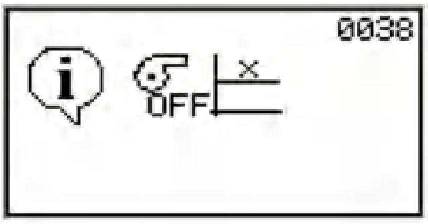
You can set the configuration of connected flame-sensors with DIP switches.

The burner firing-rate controller function can be disabled, if required. In that case the regular firing rate input can be controlled either by a 4 ... 20 mA, 0 ... 10 V or a three-point step (TPS) input.

NOTE:
for a precise adjustment, please consider parameters 43 - 60. For more information regarding these parameters, please refer to document 'Commissioning Supplement Parameter List' (DLT1204).
While using a manual regular firing rate input, you must activate the firing rate controller (set P 40 to value 1 or 2).

8.1.1 Range Limits

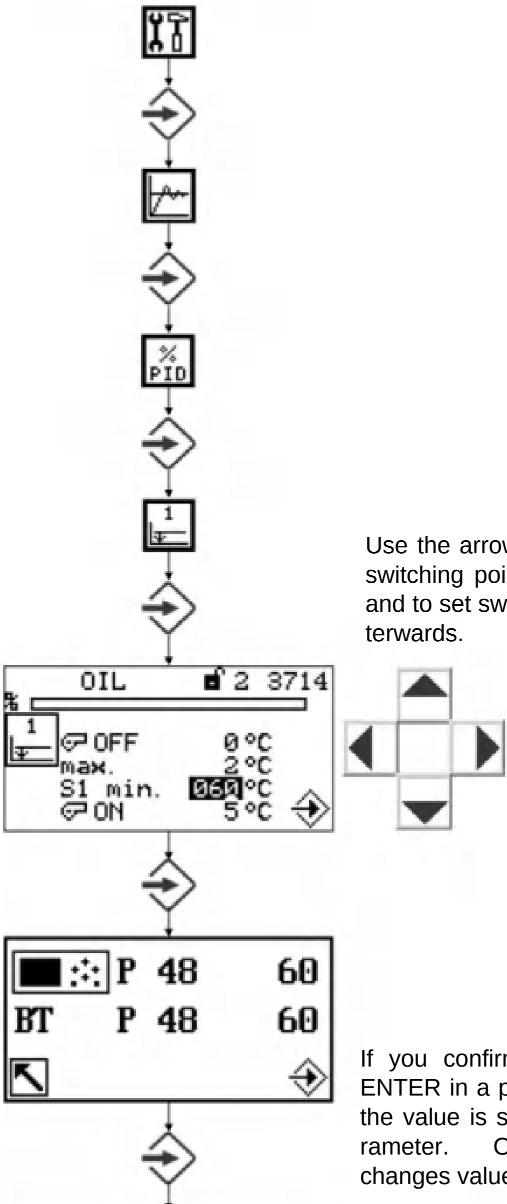
You must set limit values in the parameters, switching the burner on and off. After a burner shut-down while actual temperature has not reached the switch-on threshold yet, a display will inform you that firing rate controller is refusing a start-up.



S9576

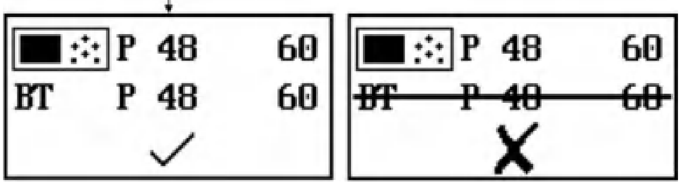
Fig. 88

8.1.2 Enter set-point of firing-rate controller



Use the arrow keys to select switching point (ON or OFF) and to set switch-ing point afterwards.

If you confirm settings with ENTER in a pre-set time slot, the value is stored in the parameter. Otherwise the changes value is discarded



S9577

Fig. 89

8.1.10 Control mode

The firing rate controller is attempting to adjust actual value to set-point value.

A direct correlation is assumed between internal firing rate and boiler temperature, i.e. the higher the internal firing rate, the faster boiler the rise of temperature.

If curves are programmed in a different way the firing rate controller will not operate. Four parameters define the control characteristics:

- **Adjustment time**
  Adjustment time defines the intervals of deviation is checked and a new adjustment is determined.
- **P term**
  The proportional term affects directly on deviation defined as difference between set-point value and actual value.
  P > → higher step response
- **I term**
  The integral term is calculated from present deviation and previous deviation to set-point value
  I > → faster approximation to set-point → danger of overshooting!
- **D term**
  The difference term is calculated from variation of actual values. This may result in accelerating, respectively retarding effects.

In practice adjustments of PID-controller is orientated by given controlled system. Out of characteristics of the controlled system data can be deduced, i.e. by experimental determination.

– P share, I share, D share are added up and serve as adjustments to the firing rate default of the fuel/air ratio control.
– As long as the actual value is below set-point, P term and I term are positive, that is to say both of these terms will increase the firing rate default.
– In such a case only D term has a negative value (assuming that boiler temperature is rising). Use D term carefully because it leads to a higher burden for the actuating elements.
– In order to avoid excessive overshoot during burner start-up adjust parameters to achieve a suitably large D term.
– If despite a large set-point deviation the burner is not run at full or base firing rate you should increase the P term.
– The longer you select the adjustment time the calmer the fuel/air ratio control. However, this also increases the actual values' deviation from set-point value and leads to slower adjustment.

	Hot water installations		Steam boiler installations
P term	120	280	600
I term	60	360	300
D term	20	50	25
Adjustment time	15	2	20

Tab. N

Adjustment of the values according to the controlled system is highly recommended.

8.1.11 Aides for setting

Characteristic	Control process	Control mode	Start-up procedure
P term higher	Decrease of attenuation	Stronger reaction with overshoot	Faster start-up with overshoot
P term smaller	Increase of attenuation	Less reaction, less tendency to oscillate	Slower startup

Tab. O

Controller operation with P-term too high

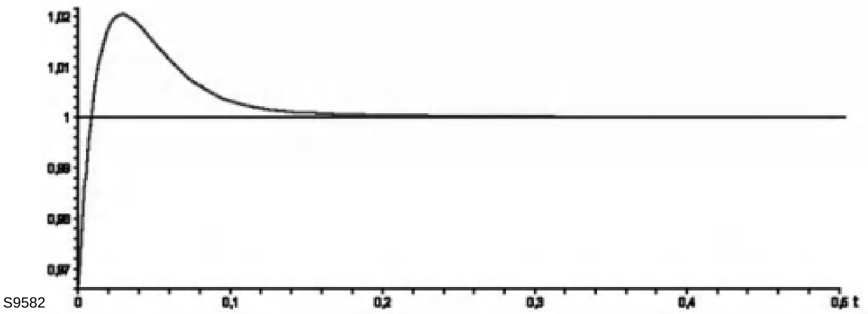


Fig. 94

Characteristic	Control process	Control mode	Start-up procedure
I term higher	Decrease of attenuation	Stronger reaction with tendency to oscillate	Faster start-up with tendency to oscillate
I term smaller	Increase of attenuation	Less reaction, less tendency to oscillate	Slower start-up

Tab. P

Controller operation with I-term too high

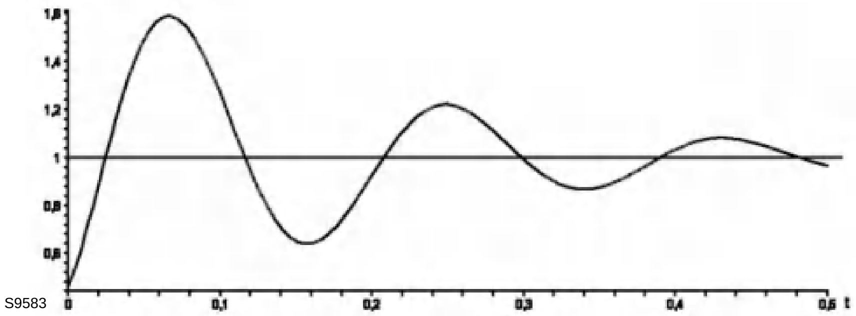


Fig. 95

Characteristic	Control process	Control mode	Start-up procedure
D term higher	Decrease of attenuation	Stronger reaction	Slower start-up, earlier decrease of power
D term smaller	Increase of attenuation	Less reaction	Faster start-up, decrease of power later

Tab. Q

Controller operation with D-term too high

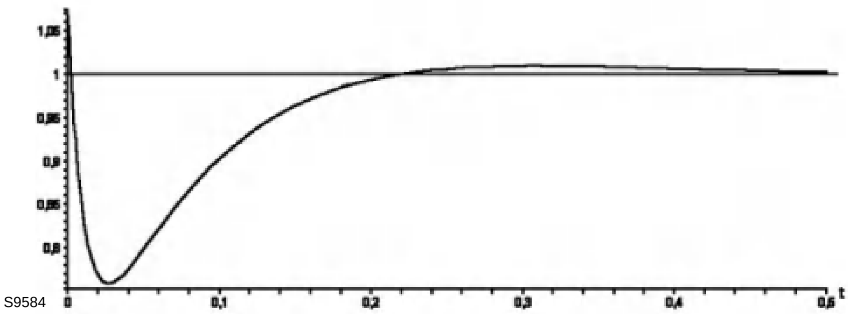


Fig. 96

8.1.12 External/manual firing-rate presetting (terminals 16 - 19)

In order that LCM100 interprets the inputs as external firing rate presetting, LCM must be activated by P 0040. Therefore set P0040 to value 1 or 2.

With this setting UI300 still displays set-point value and actual value of LCM100.With software version 3.4.0.0(UI300) and 1.2.0.0 (LCM100) or higher P 0040 may be set to value 3. set-point value and actual value are not displayed in UI300.

Short-circuit terminal 22 with terminal 23 and terminal 24.

Select the type of firing rate presetting.

NOTE:
With software version 1.1.0.0 or higher the LCM switches automatically to DPS input if P 0065 = 2 (4 ... 20 mA) and input current <2,1 mA.
An input current of more than 3 mA ends this switch over.

Scaling:
0V/4 mA = 0 digit internal firing rate
10 V/20 mA = 999 digit internal firing rate

Connection external/manual regular firing rate input (terminal 16 - 19)

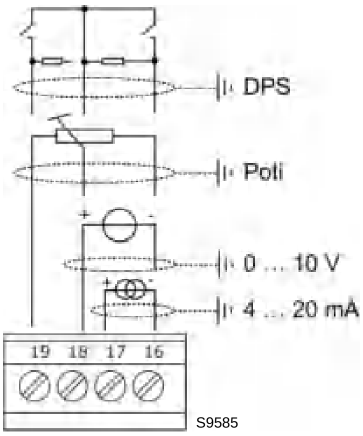


Fig. 97

NOTE:
if 0 ... 10 v input is used for the presetting of the firing rate the sensor must be able to fuse the input of the lcm100 with 100 ma to 0.

8.1.13 DIP switch

You can configure settings of LCM100 by DIP switches.

Functions of DIP switches

You can activate or deactivate CAN terminating resistor by DIP switch 1.

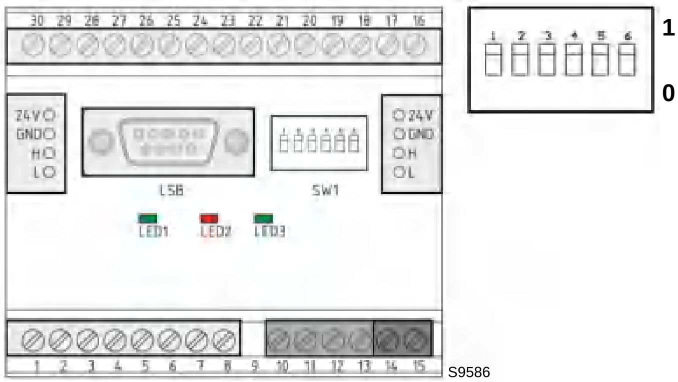


Fig. 98

DIP switch 1

0	CAN terminal resistance inactive
1	CAN terminal resistance active

Tab. R

You can set LSB Family by DIP switches 2 - 3.

DIP switch 2	DIP switch 3	LSB Family
0	0	1
0	1	2
1	0	3
1	1	4

Tab. S

You can set sensor inputs by DIP switches 4 - 6.

Switch			Input
DIP 4	DIP 5	DIP 6	
0	-	-	PT100 boiler temperature sensor
1	-	-	PT1000 boiler temperature sensor
-	0	-	PT100 ambient temperature sensor
-	1	-	PT1000 ambient temperature sensor
-	-	0	PT100 flue gas temperature sensor
-	-	1	PT1000 flue gas temperature sensor

Tab. T

8.1.14 LED

The LCM100 has 3 LEDs which should be connected as mentioned below:

LED	Colour	Relevance
ERR (LED 1)	Red	During normal operation this LED is switched off. It will light up under following conditions: – initialisation not yet accomplished or aborted (e.g. HW could not be initialised). – cannot receive any messages for at least 3 seconds
CAN (LED 2)	Green	**OFF:** CAN Controller in Bus OFF. No communication possible **Blinking:** CAN Controller discovered a temporary fault. After fixing the problem, LED would still blink for some time **ON:** CAN is ready to operate
PWR (LED 3)	Green	**ON:** module is working normally = fully initialised and without any fault

Tab. U

10 Faults - Probable causes - Solutions

If faults arise in ignition or operations, the burner performs a "safety stop", which is signalled by the red burner lockout LED.

The display of the operator panel visualises the lockout code.

When the burner starts up again, the red LED goes out.

WARNING

In the event of a burner lockout, more than two consecutive burner reset operations could cause damage to the installation. On the third lockout, contact the Aftersales Service.

DANGER

If further lockouts or burner faults occur, interventions must only be made by qualified, authorised personnel (as indicated in this manual, and in compliance with the laws and regulations currently in force).

10.1 List of fault codes

Fault code	TRD P301=0 P328>0	EN67 P301=2 P328>0	Description	D1	D2
0	0	0	Unknown fault (internal error)		
1	0	3	Flame fault		
2	0	0	Parasitic light detected		
3	0	3	General flame failure during ignition		
4	1	1	Flame blow-off during operation		
5	0	3	Flame signal does not appear during the first safety time		
6	0	3	Flame signal extinguishes during stabilization time		
7	0	3	Flame signal does not appear during first safety time		
8	0	0	Flame signal does not appear at the end of the second safety time		
9	0	0	Flame signal does not appear during the first safety time		
10	0	0	Flame signal does not appear at the end of the first safety time		
11	0	0	Monitoring for parasitic light does not last the required 5 seconds		
13	1	0	Flame signal appears during ignition (pilot burner)		
103	0	0	Miscellaneous data invalid		
105	Unlimited	0	Curve data are invalid or not available	Curve set / Fuel number	
106	0	0	Difference in parameter value between HP and UP.	Parameter No.	
			Possible cause of error: You have uploaded a normal data set (unprotected) and an error occurred during the data transfer. The dataset was not save correctly.		
107	0	0	Configuration is not valid; contact the Aftersales Service		
120	1	1	Different operation modes on both controllers		
121	0	0	Correction is out of range.	Channel	
141	0	0	Variation of speed feedback is to big.	Channel	
			Parameter set is based on an old, invalid factory setting. Update the factory setting of the BT300.		
151	Unlimited	3	Recirculation damper is still OPEN 240 s after recirculation release is OFF.	Channel	
170	0	0	Short circuit of LDR flame detector		
191	1	1	First monitoring band exceeded for too long: channel	Channel	
201	1	1	First monitoring band fall short for too long: channel	Channel	
211	0	0	Second monitoring band exceeded for too long: channel	Channel	

Fault code	TRD P301=0 P328>0	EN67 P301=2 P328>0	Description	D1	D2
221	0	0	Second monitoring band fall short for too long: channel	Channel	
231	Unlimited	3	Fuel/air ratio control is blocked: channel	Channel	
241	0	0	Actuator does not move, i.e. no position feedback.	Channel	Direction: P 2 = backward, forward
			If this indication is shown, the monitoring of fault 271 is damaged.		
251	0	0	Actuator cannot find reference position	Channel	
			Direction: 0 backward 1 forward Check the flap's smooth-running to reference position.		
261	Unlimited	3	Actuator returns invalid position (difference to target position too large)	Channel	
271	Unlimited	3	Actuator feedback remains constantly for too long, even when actuator has moved	Channel	
281	1	1	Feedback signal of at least 1 actuator is incorrect	Channel	
			To identify the actuator's direction of rotation two pulse form signals, offset 90 degrees, are returned by the actuator. If fault 281 occurs, these signals are not identified correctly. Cause of error: – back lash – actuator 0,8 Nm: external torque clockwise >0.2 Nm – actuator 9 Nm: external torque clockwise >1 Nm		
291	Optional	3	Actuator does not reach the final position, because of mixed- up detection.	Channel	
			Actuators are mixed up while reconnecting. The test for recognising this fault is described in the manual of the BT300 - print no. DLT1201. At least one actuator does not reach it's test position: – 2 actuators are mixed up – another problem inhibits the actuator to reach it's test position		
320	1	1	Open broken wire at firing rate input		
321	1	1	Open broken wire at feedback channel: channel	Channel	
351	1	1	Invalid fuel change while burner is running		
352	Optional	3	Invalid combination of fuel signals (no signals)		
353	Optional	3	Invalid combination of fuel signals (several signals)		
360	0	0	Air deficiency causes a fault shut-down by O_2 trim.		
362	0	0	Fault shut-down due to a missing burner maintenance		
363	1	1	Smallest valid O_2 value decided		
371	0	0	Output for internal firing rate is defective		
372	0	0	Difference of the burner firing rate values between main processor and watchdog processor is too large		
381	0	0	Deviation between main processor and watchdog controller is too large	Correction channel	
391	0	0	Curve set has changed during programming		
393	0	0	Emergency shut-down activated		
394	0	0	Burner ON/OFF signal from the user interface turned off unexpectedly		
451	1	1	Being operating mode for ignition not all channels are in ignition position	Channel	

Fault code	TRD P301=0 P328>0	EN67 P301=2 P328>0	Description	D1	D2
600	0	0	Program monitoring time (FAT) exceeded	Indication number	
601	0	0	Failure during leakage test: gas pressure still active		
602	0	0	Failure during leakage test: no gas pressure detected		
603	0	0	Manual venting of the gas line required		
606	0	0	CPI/POC signal in unexpected state		
608	1 *1)	1 *1)	Invalid drop of the boiler safety interlock chain		
609	1 *1)	1 *1)	Invalid drop of the gas safety interlock chain		
610	Optional *1)	3 *1)	Invalid drop of the oil safety interlock chain		
611	Optional	3	Gas pressure too low		
613	0	0	Air pressure signal is missing		
617	1	1	Flame signal extinguishes during operation		
624	Optional	3	Oil pressure too low		
711	0	0	Invalid change of the operation mode		
713	0	0	Invalid signal combination in operating mode BURNER OFF		
714	0	0	Invalid signal combination in operating mode BURNER READY		
715	0	0	Invalid signal combination in operating mode PRE-PURGE		
716	0	0	Invalid signal combination in operating mode IGNITION POSITION		
717	0	0	Invalid signal combination in operating mode IGNITION		
719	0	0	Fuel valves are open for too long without a flame		
720	0	0	Ignition transformer activated too long		
721	0	0	Ignition valve openes for too long		
722	0	0	Fuel valves open in maintenance mode		
723	0	0	Ignition process needs too much time		
724	0	0	Gas valve open with fuel oil		
725	0	0	Oil valves are open while gas is selected		
727	0	0	Main gas 1 opens unexpectedly		
728	0	0	All three gas valves open for too long		
729	0	0	Ignition process lasts for too long (without pilot burner)		
730	0	0	Maintenance mode without pilot burner		
731	0	0	Ignition valve opens without pilot burner		
732	0	0	Invalid signal combination at input terminals during operation		
734	0	0	Pre-ventilation period not respected		
739	0	0	Leakage test: main gas valve 2 opens for too long		
740	0	0	Leakage test: main gas valve 1 leaky		
741	0	0	Leakage test: main gas valve 1 opens for too long		
742	0	0	Leakage test: main gas valve 2 leaky		
743	0	0	Flame monitoring: flame burns for too long after shutdown		
745	0	0	Program monitoring time exceeded		
746	0	0	Solenoid valve cannot be switched off		
747	0	0	Leakage test: Venting into the burner is not allowed		
759	0	0	BT300 leaves SETTING mode automatically after 24 hours		

Fault code	TRD P301=0 P328>0	EN67 P301=2 P328>0	Description	D1	D2
763	0	0	Different curve selection on main processor and watchdog processor		
764	1	1	CO-controller - internal curve set failure	Curve set	
800	0	0	Parameter defective	Parameter No.	
801	0	0	Channel control mode is inconsistent between main processor and watchdog processor (fatal error, no automatic restart possible)	Channel	
802	1	1	Integration of a channel into the fuel/air ratio control takes too long (only one automatic restart possible)	Channel	
803	0	0	Channel is out of 1st monitoring band for too long	Channel	
804	0	0	Channel mode of the fuel/air ratio control does not match to the activation type	Channel	
805	0	0	Directly controlled channel runs to an invalid position, i.e. a channel that is not deactivated or controlled by fuel/air ratio control	Channel + set point position	
806	0	0	Implausible channel set point of the main controller	Channel + set point position + actual value + programming tolerance	
807	1	1	Time out of LSB message (message no. = parameter)		
			Possible cause of error: – connection between VSM/LCM GND and protective earth PE – acknowledgment of speed change too fast / fault of VSM – error at LSB (red LED flashes or is permanently ON)		
889	0	0	The gap between two remote fault releases is too short		
			EN 14459 allows only 4 remote fault resets every 15 min. Fault release is monitored by remote control software, LAMTEC SYSTEM BUS and field bus. Exceeding the number of fault releases causes the fault shot-down H889 and further remote fault releases are ignored. After a delay time another remote fault release is possible. The fault shut-down H889 also occurs, if fault release is sent without any reason. A reset by terminal is always possible. How to reset this fault: – wait for 15 minutes until you try to reset the fault again – cut off the power supply from BT300 for a moment, reconnect it and reset the fault subsequently.		
921	0	0	Relay driver self-test: output oil valve defect		
922	0	0	Relay driver self-test: output ignition transformer defect		
923	0	0	Relay driver self-test: output gas valve 1 defect		
924	0	0	Relay driver self-test: output gas valve 2 defect		
925	0	0	Relay driver self-test: output ignition transformer defect		
928	0	0	Relay driver self-test: output terminal 41 for oil pump defective		
929	0	0	Relay driver self-test: output fan defect		
985	0	0	VSM diagnosis error		
			Possible cause of error: BurnerTronic expects a VSM module but the exchange of diagnosis data with the module fails		
986	0	0	Dynamic range test recognizes an invalid feedback	Channel	Actual value

Fault code	TRD P301=0 P328>0	EN67 P301=2 P328>0	Description	D1	D2
987	0	0	Change-over during staged operation takes too much time		
988	0	0	Fuel selection relay in the DFM is defective or inconsistent feed-back from DFM		
989	0	0	Plausibility test of actuator feedback in programmed curve failed		
990	Optional *1)	3	Power failure		
996	0	0	Secure parameter writing could not be finished. Device is blocked		
999			Contact the Aftersales Service		

Tab. X

*1) The system will be restarted not before the condition of the fault is eliminated (i.e. the dropped safety interlock chain (SIC) or the low voltage).

A Appendix - Accessories

Output power regulator kit for modulating operation

With the modulating operation, the burner continually adapts the power to the heat request, ensuring a high level of stability for the parameter controlled: temperature or pressure.

Parameter to be checked		Probe	
	Adjustment field	Type	Code
Temperature	- 100 ÷ 500° C	PT 100	3010110
Pressure	0 ÷ 2.5 bar	4 ÷ 20 mA	3010213
	0 ÷ 16 bar	4 ÷ 20 mA	3010214
	0 ÷ 25 bar	4 ÷ 20 mA	3090873

Gas flange DN80 kit

Burner	Code
RS 68-120/E FGR	3010439

Software interface kit

Burner	Code
RS 68-120/E FGR	20130843

O2 - CO control kit

Burner	Code
RS 68-120/E FGR	20101753

O2 - CO control kit high efficiency

Burner	Code
RS 68-120/E FGR	20125127

Extended head kit

Burner	Code
RS 68-120/E FGR	3010177

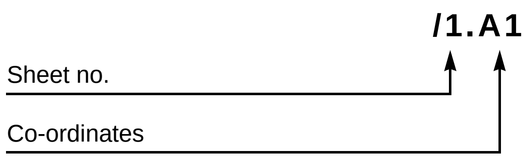
Gas trains in compliance with EN 676

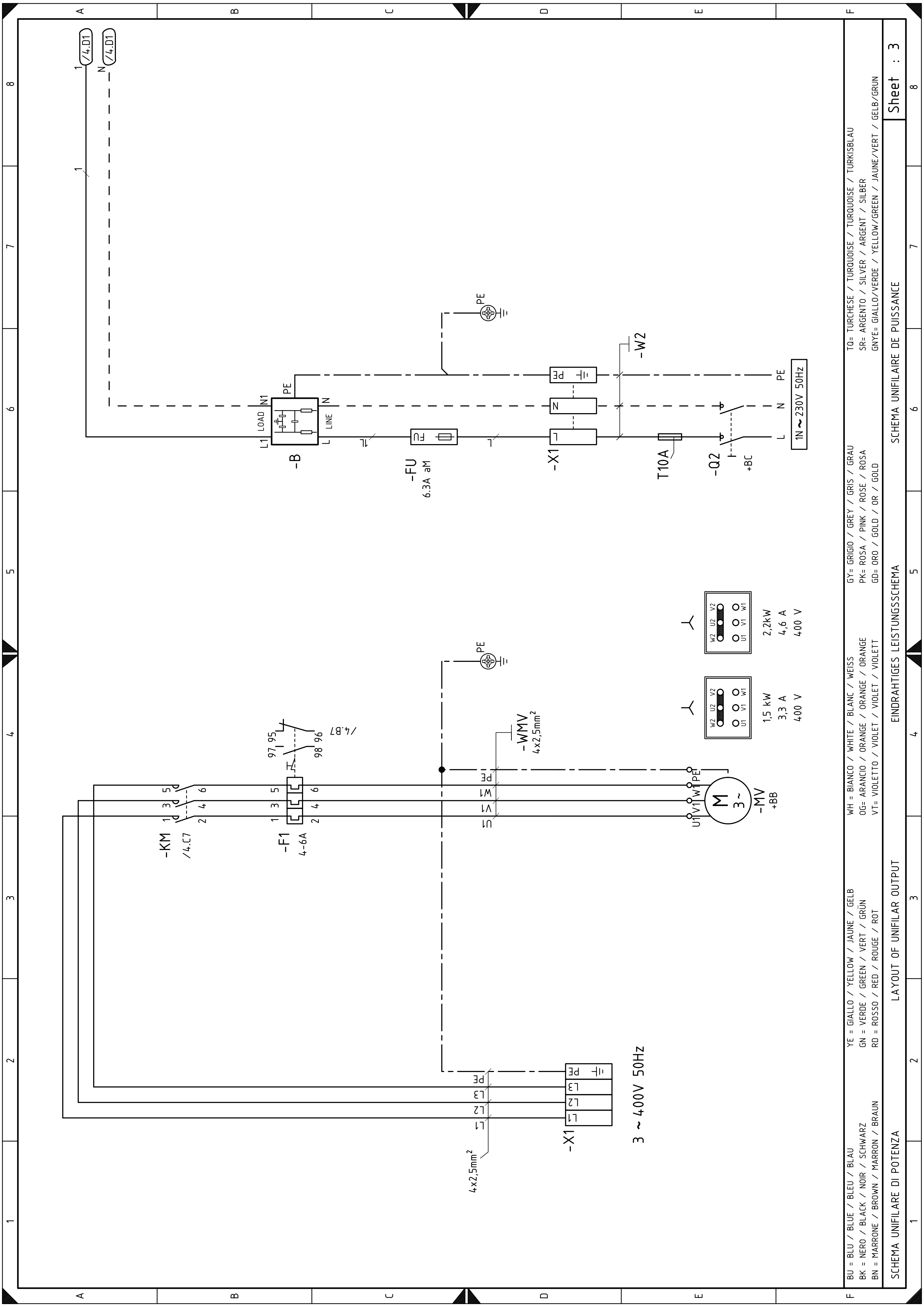
Please refer to manual.

B Appendix - Electrical panel layout

1 Index of layouts

2 Indication of references




SCHEMA UNIFILARE DI POTENZA
LAYOUT OF UNIFILAR OUTPUT
EINDRAHTIGES LEISTUNGSSCHEMA
SCHEMA UNIFILAIRE DE PUISSANCE
Sheet : 3
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
GN = VERDE / GREEN / VERT / GRÜN
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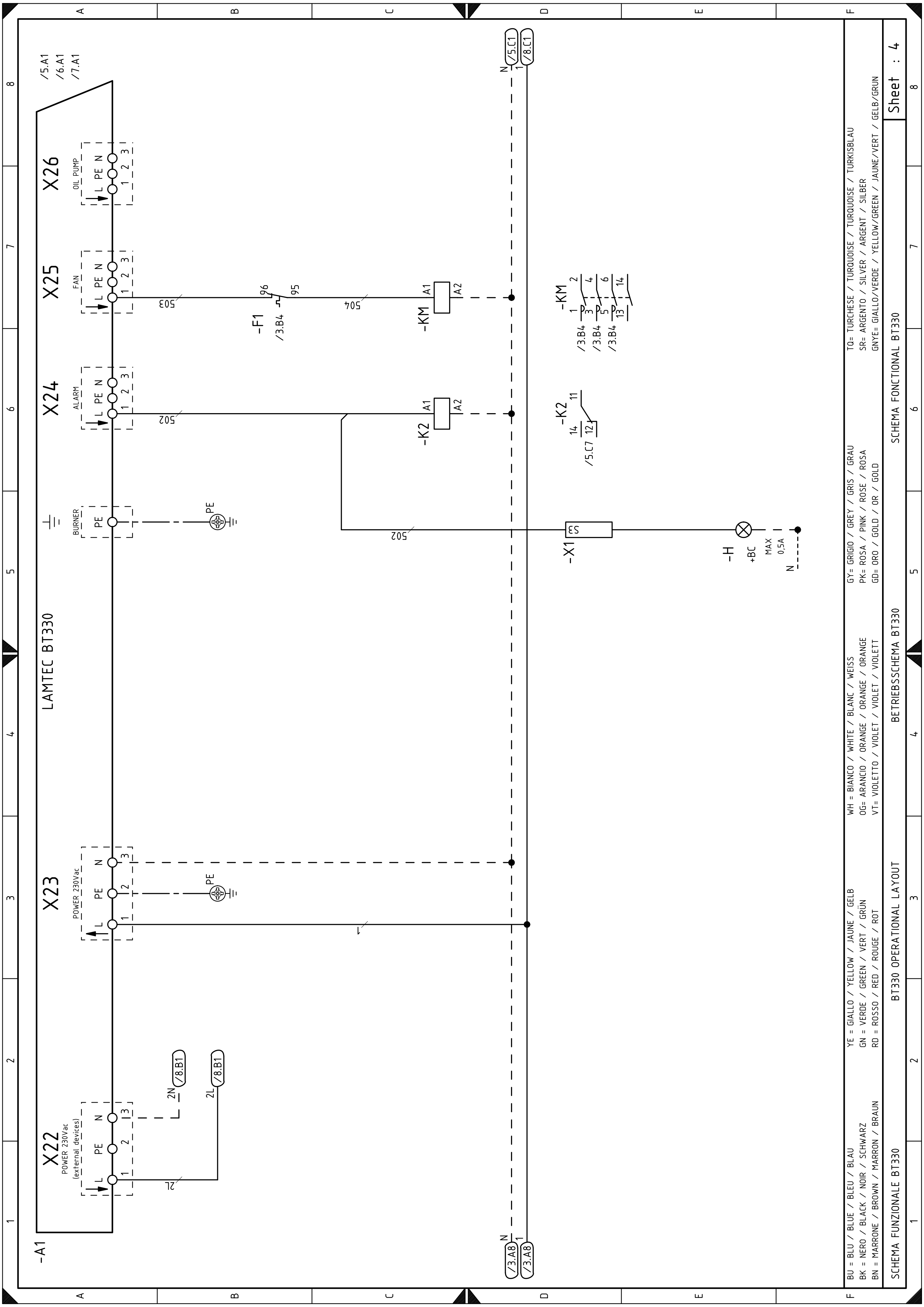
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
3 ~ 400V 50Hz
-X1
4x2,5mm²
-KM
/4.C7
-F1
4-6A
97 95
98 96
/4.B7
-WMV
4x2,5mm²
-MV
+BB
M
3~
1,5 kW
3,3 A
400 V
2,2kW
4,6 A
400 V
1N ~ 230V 50Hz
-Q2
+BC
T10A
-FU
6.3A aM
-B
LOAD
LINE
-W2
PE
/4.D1

20133400


LAMTEC BT330
X22
POWER 230Vac (external devices)
X23
POWER 230Vac
BURNER
X24
ALARM
X25
FAN
X26
OIL PUMP
-A1
-F1
-KM
-K2
-X1
-H
MAX 0,5A
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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TQ= TURCHESE / TURQUOISE / TURQUOISE / TURKISBLAU
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
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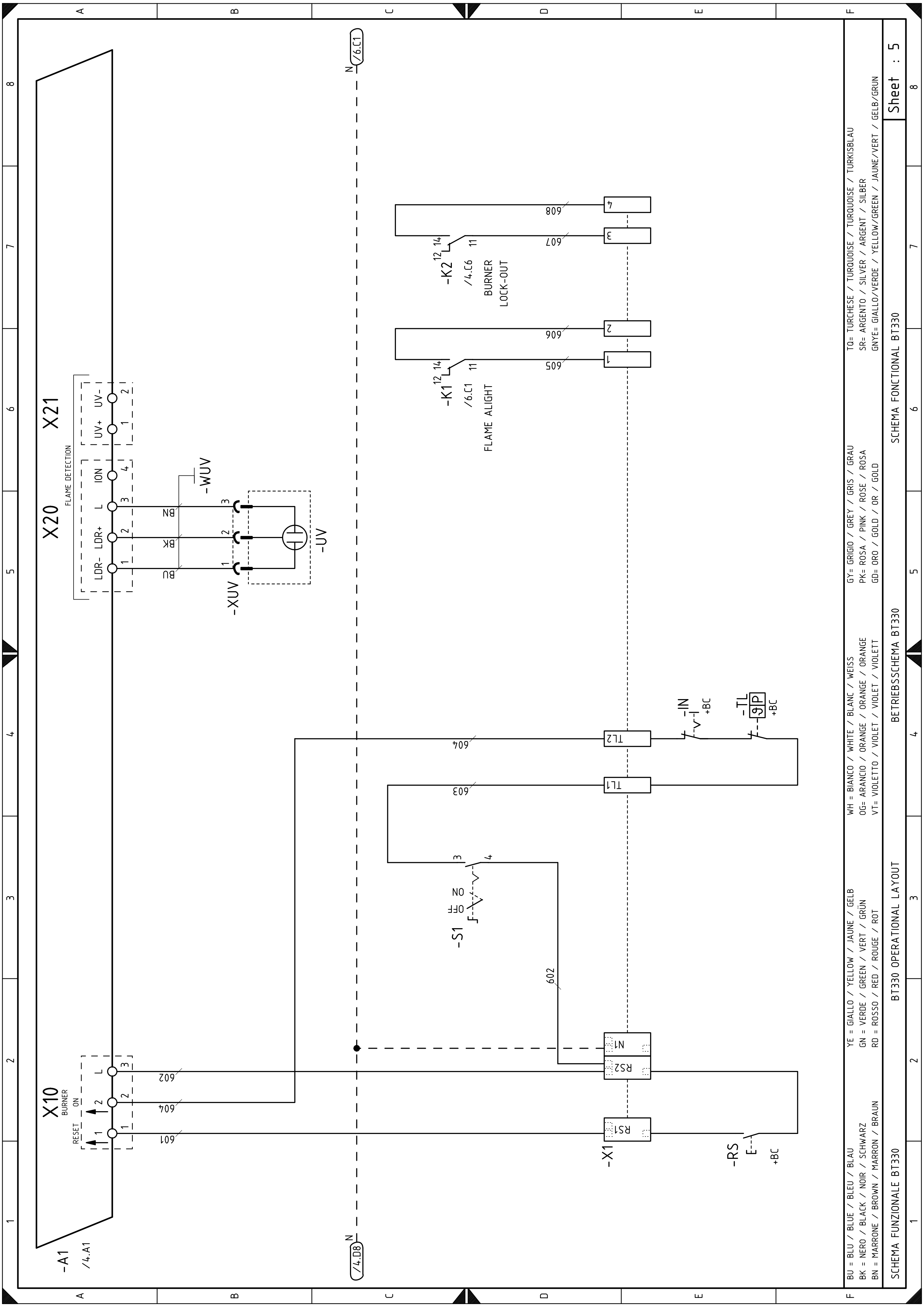
BT330 OPERATIONAL LAYOUT
BETRIEBSSCHEMA BT330
SCHEMA FONCTIONAL BT330
Sheet : 4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BT330 OPERATIONAL LAYOUT
BETRIEBSSCHEMA BT330
SCHEMA FONCTIONAL BT330
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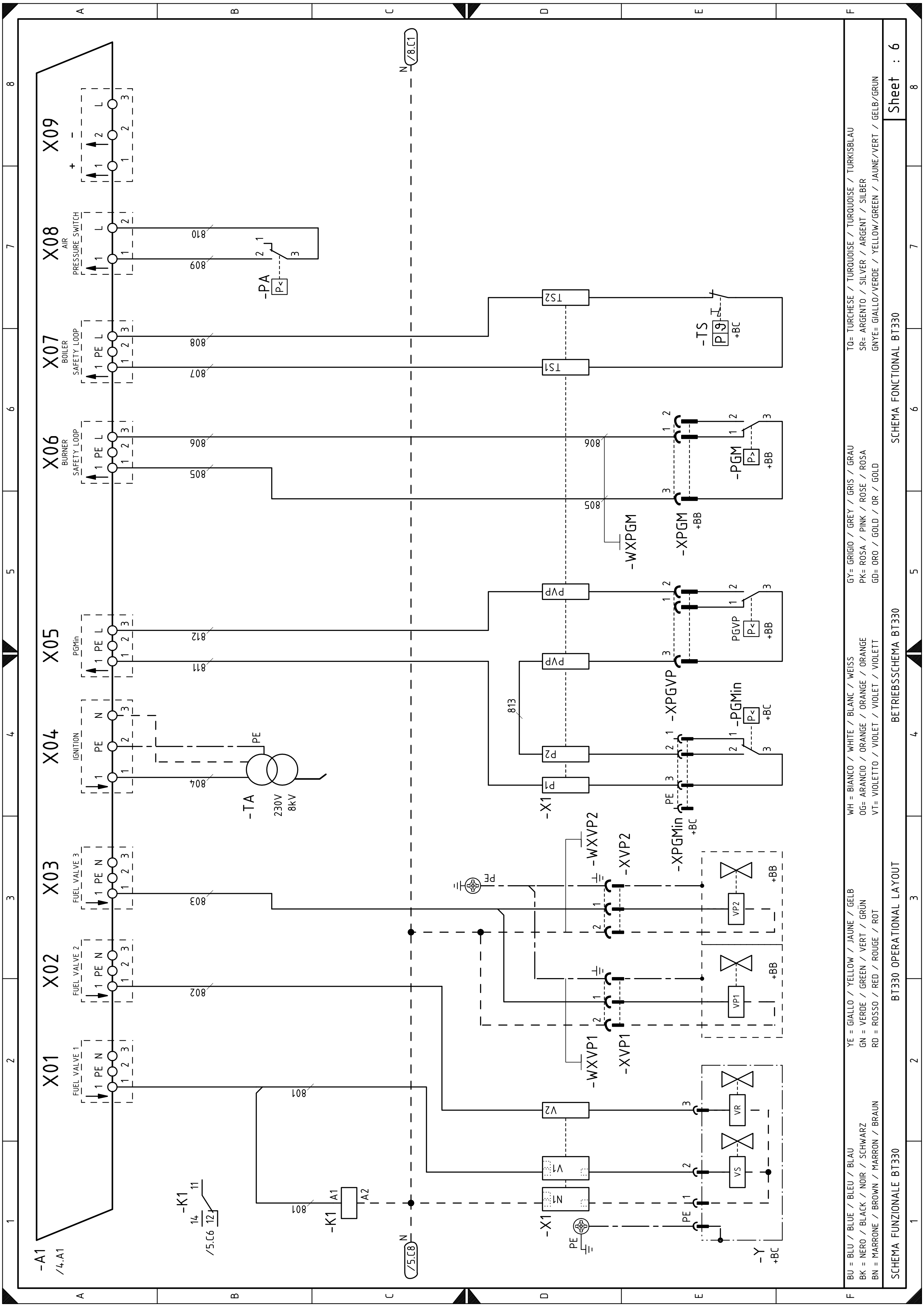
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRÜN
-A1
/4.A1
X10
BURNER
RESET
ON
X20
X21
FLAME DETECTION
LDR-
LDR+
L
ION
UV+
UV-
-XUV
-WUV
-UV
BU
BK
BN
-K1
/6.C1
FLAME ALIGHT
-K2
/4.C6
BURNER
LOCK-OUT
-S1
OFF
ON
-X1
-RS
-IN
-TL
+BC
RS1
RS2
N1
TL1
TL2
601
602
603
604
605
606
607
608
N
/6.C1
/4.D8

20133400


X01
X02
X03
X04
X05
X06
X07
X08
X09
FUEL VALVE 1
FUEL VALVE 2
FUEL VALVE 3
IGNITION
PGMin
BURNER SAFETY LOOP
BOILER SAFETY LOOP
AIR PRESSURE SWITCH
-A1
-K1
-TA
230V
8kV
-PA
-TS
-PGM
PGVP
-PGMin
-XPGM
-WXPGM
-XPGVP
-XPGMin
-X1
-XVP1
-XVP2
-WXVP1
-WXVP2
-Y
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
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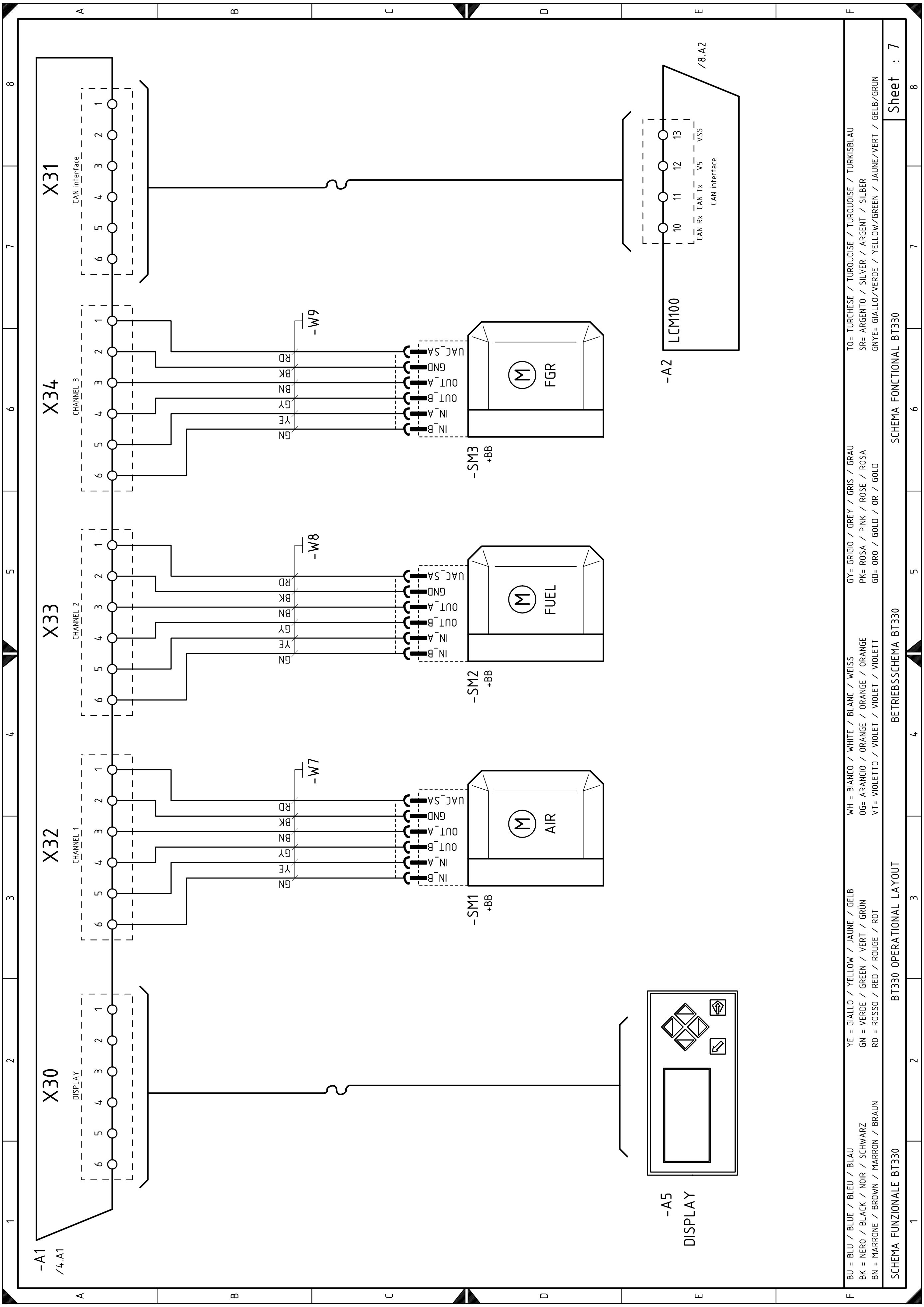
BT330 OPERATIONAL LAYOUT
BETRIEBSSCHEMA BT330
SCHEMA FONCTIONAL BT330
Sheet : 6


-A1
/4.A1
X31
CAN interface
X34
CHANNEL_3
X33
CHANNEL_2
X32
CHANNEL_1
X30
DISPLAY
-W9
-W8
-W7
RD
BK
BN
GY
YE
GN
UAC_SA
GND
OUT_A
OUT_B
IN_A
IN_B
FGR
FUEL
AIR
-SM3 +BB
-SM2 +BB
-SM1 +BB
LCM100
-A2
/8.A2
CAN Rx
CAN Tx
V5
VSS
CAN interface
-A5
DISPLAY
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
BN = MARRONE / BROWN / MARRON / BRAUN
YE = GIALLO / YELLOW / JAUNE / GELB
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GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRÜN
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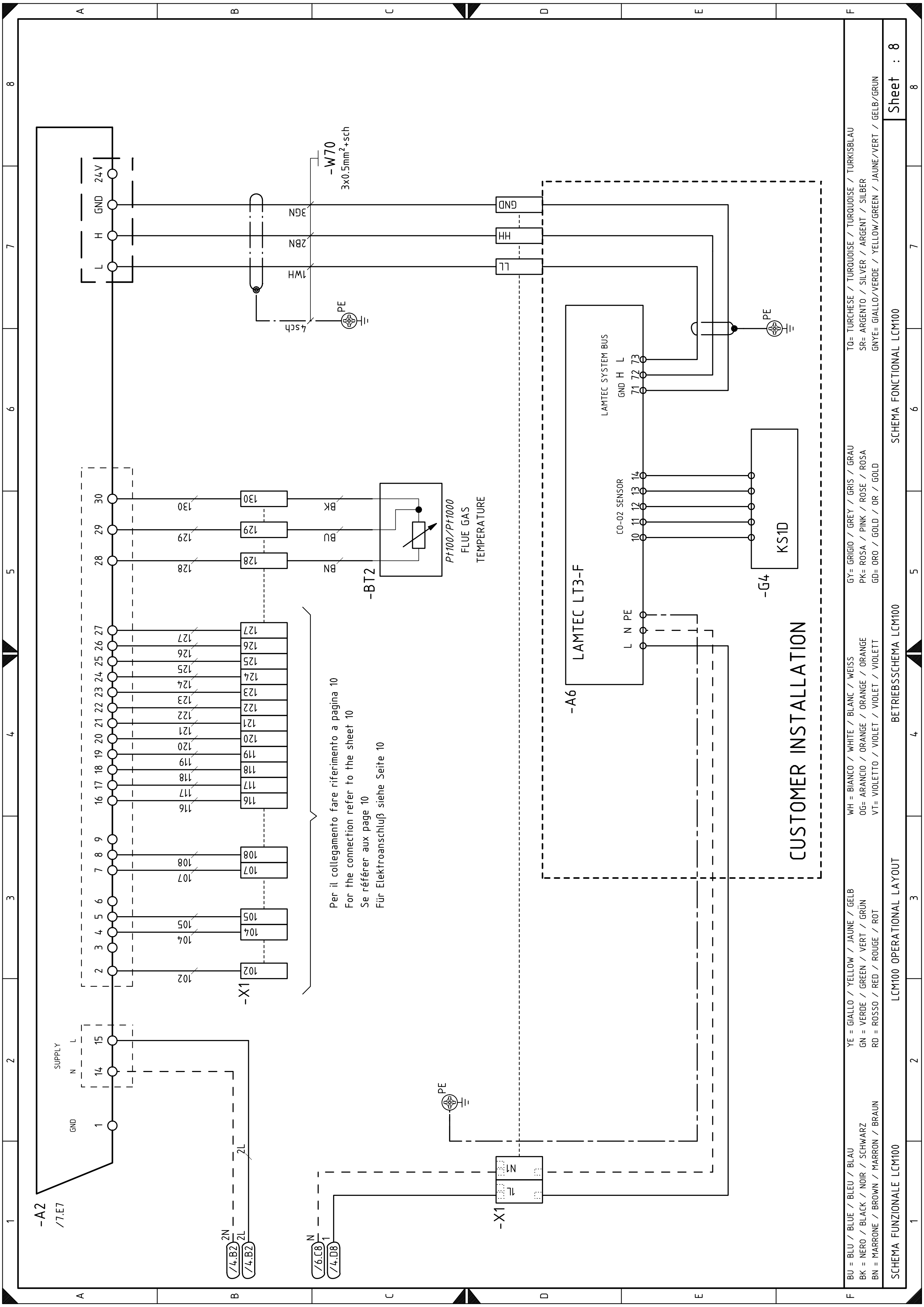
BT330 OPERATIONAL LAYOUT
BETRIEBSSCHEMA BT330
SCHEMA FONCTIONAL BT330
Sheet : 7


-A2
/7.E7
SUPPLY
GND
24V
GND
H
L
-W70
3x0.5mm²+sch
3GN
2BN
1WH
4sch
PE
GND
HH
LL
LAMTEC SYSTEM BUS
GND H L
71 72 73
CO-O2 SENSOR
10 11 12 13 14
KS1D
-G4
LAMTEC LT3-F
L N PE
-A6
CUSTOMER INSTALLATION
Pt100/Pt1000
FLUE GAS
TEMPERATURE
-BT2
BK
BU
BN
-X1
Per il collegamento fare riferimento a pagina 10
For the connection refer to the sheet 10
Se référer aux page 10
Für Elektroanschluß siehe Seite 10
2N
2L
/4.B2
/6.C8
/4.D8
1N
1L
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
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YE = GIALLO / YELLOW / JAUNE / GELB
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LCM100 OPERATIONAL LAYOUT
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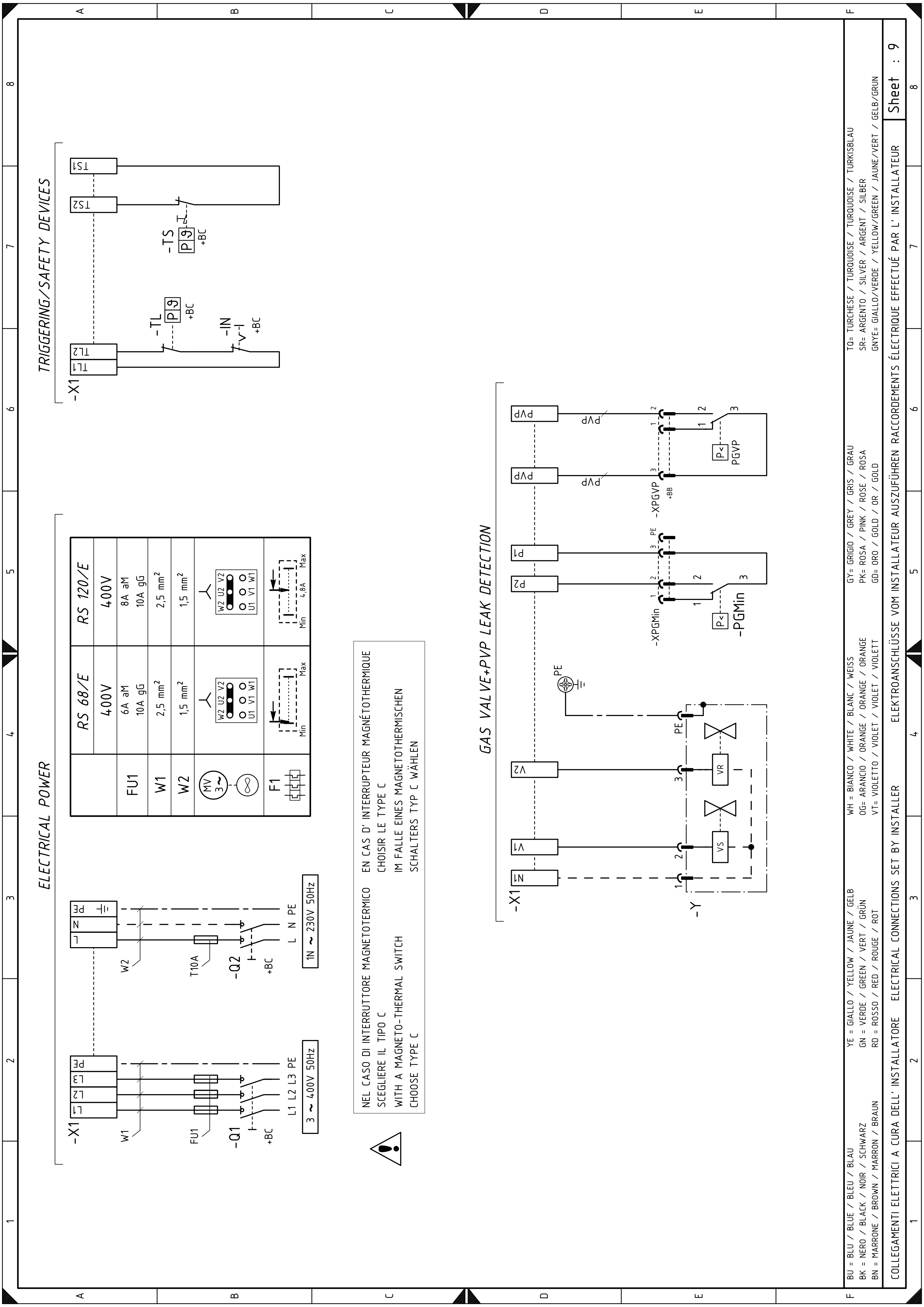
SCHEMA FONCTIONAL LCM100
Sheet : 8


TRIGGERING/SAFETY DEVICES
-X1
TL1 TL2 TS2 TS1
-TL P9 +BC
-IN +BC
-TS P9 +BC
ELECTRICAL POWER
L1 L2 L3 PE
L N PE
W1 FU1 -Q1 +BC
W2 T10A -Q2 +BC
L1 L2 L3 PE 3 ~ 400V 50Hz
L N PE 1N ~ 230V 50Hz
RS 68/E
RS 120/E
400V
FU1 6A aM 10A gG
FU1 8A aM 10A gG
W1 2,5 mm²
W2 1,5 mm²
MV 3~
U1 V1 W1
W2 U2 V2
F1
Min Max
4,8A
NEL CASO DI INTERRUTTORE MAGNETOTERMICO SCEGLIERE IL TIPO C
WITH A MAGNETO-THERMAL SWITCH CHOOSE TYPE C
EN CAS D' INTERRUPTEUR MAGNÉTOTHERMIQUE CHOISIR LE TYPE C
IM FALLE EINES MAGNETOTHERMISCHEN SCHALTERS TYP C WÄHLEN
GAS VALVE+PVP LEAK DETECTION
-X1
N1 V1 V2 P2 P1 PVP PVP
PE
-Y VS VR
-XPGMin -PGMin
-XPGVP +BB PGVP
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
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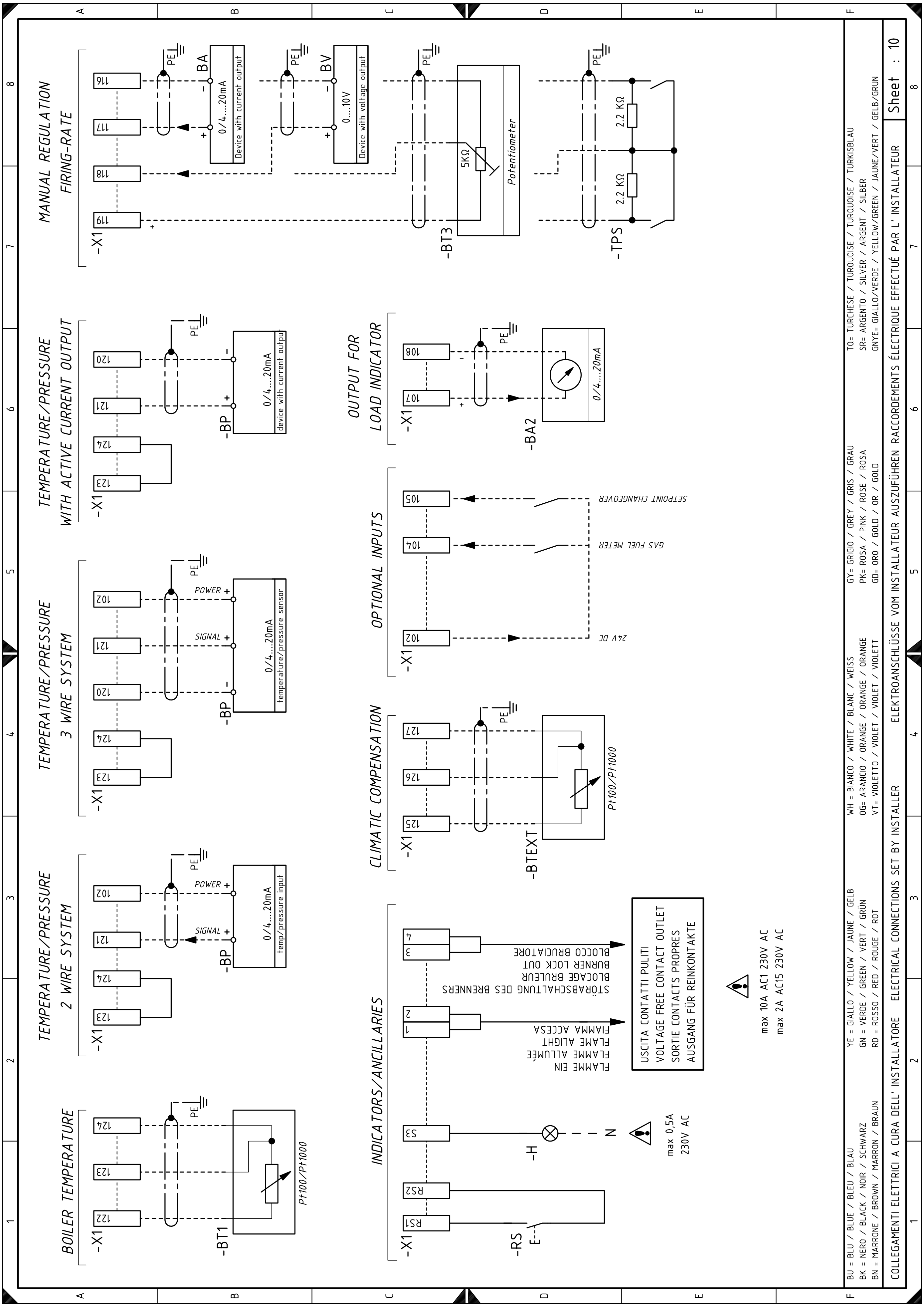
SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRUN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE ELECTRICAL CONNECTIONS SET BY INSTALLER ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 9


MANUAL REGULATION FIRING-RATE
-X1
119
118
117
116
BA
0/4....20mA
Device with current output
BV
0....10V
Device with voltage output
-BT3
5KΩ
Potentiometer
-TPS
2,2 KΩ
2,2 KΩ
TEMPERATURE/PRESSURE WITH ACTIVE CURRENT OUTPUT
-BP
0/4....20mA
device with current output
OUTPUT FOR LOAD INDICATOR
-BA2
0/4....20mA
OPTIONAL INPUTS
SETPOINT CHANGEOVER
GAS FUEL METER
24V DC
TEMPERATURE/PRESSURE 3 WIRE SYSTEM
POWER +
SIGNAL +
0/4....20mA
temperature/pressure sensor
CLIMATIC COMPENSATION
-BTEXT
Pt100/Pt1000
TEMPERATURE/PRESSURE 2 WIRE SYSTEM
temp/pressure input
INDICATORS/ANCILLARIES
BLOCCO BRUCIATORE
BURNER LOCK OUT
BLOCAGE BRULEUR
STÖRABSCHALTUNG DES BRENNERS
FIAMMA ACCESA
FLAME ALIGHT
FLAMME ALLUMÉE
FLAMME EIN
USCITA CONTATTI PULITI
VOLTAGE FREE CONTACT OUTLET
SORTIE CONTACTS PROPRES
AUSGANG FÜR REINKONTAKTE
max 10A AC1 230V AC
max 2A AC15 230V AC
-RS
-H
max 0,5A
230V AC
BOILER TEMPERATURE
-BT1
Pt100/Pt1000
BU = BLU / BLUE / BLEU / BLAU
BK = NERO / BLACK / NOIR / SCHWARZ
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SR= ARGENTO / SILVER / ARGENT / SILBER
GNYE= GIALLO/VERDE / YELLOW/GREEN / JAUNE/VERT / GELB/GRÜN
COLLEGAMENTI ELETTRICI A CURA DELL' INSTALLATORE ELECTRICAL CONNECTIONS SET BY INSTALLER ELEKTROANSCHLÜSSE VOM INSTALLATEUR AUSZUFÜHREN RACCORDEMENTS ÉLECTRIQUE EFFECTUÉ PAR L' INSTALLATEUR
Sheet : 10

Wiring layout key

+BB	Burner components
+BC	Boiler components
A1	Control box for the air/fuel ratio
A2	LCM 100 module
A5	Operator panel
A6	O2 - CO control module
B	Filter to protect against radio disturbance
BA	Input in current DC 4...20 mA
BA2	Load indicator
BP	Pressure probe
BT1	Boiler temperature probe
BT2	flue gas temperature probe
BT3	Output potentiometer
BT4	Probe Pt100, 3 wires
BTEXT	External probe for climatic compensation of the set-point
BV	Input in voltage DC 0...10V
FU	Fuse auxiliary circuits
F1	Fan motor thermal relay
G4	O2 - CO probe
H	Remote lockout signal
IN	Manual burner arrest switch
K1	Clean contacts output relay burner switched on
K2	Clean contacts output relay burner lockout
KM	Fan motor contact maker
MV	Fan motor
PA	Air pressure switch
PE	Burner earth
PGM	Maximum gas pressure switch
PGMin	Minimum gas pressure switch
PGVP	Gas pressure switch for valve leak detection control device
Q1	Three-phase disconnecting switch
Q2	Single phase disconnecting switch
RS	Remote burner reset button
S1	On/off selector
SM1	Air servomotor
SM2	Gas servomotor
SM3	Flue gas recirculation servomotor
TA	Ignition transformer
TL	Limit thermostat/pressure switch
TPS	Output three point step
TR	Adjustment thermostat/pressure switch
TS	Safety thermostat/pressure switch
UV	UV flame sensor
VP1	Gas pilot valves
VP2	Gas pilot valves
X1	Burner terminal strip
XPGM	Maximum gas pressure switch connector
XPGMin	Minimum gas pressure switch connector
XPGVP	Gas pressure switch connector for valve leak detection control device
XUV	Flame sensor connector
XVP1	Pilot gas valve connector
XVP2	Pilot gas valve connector
Y	Gas adjustment valve + gas safety valve

RIELLO S.p.A.
I-37045 Legnago (VR)
Tel.: +39.0442.630111
http:// www.riello.it
http:// www.riello.com