

The burner control unit Quad600 is suitable for the control of pilot burners up to 350 kW and main burners of unlimited capacity, pursuant to EN 746-2. Flame control by means of UV scanner or ionization rod (even shared with ignition) and high temperature flame surveillance bypass option.

Specific output for air valve or fan, following cycle or independently controllable.

Time and cycle are configurable: the same device can be used to control different types of gas and oil burners, meeting all relevant requirements.

A led-bar flame signal indicator and an advanced self-diagnostic system provides the display of either the cycle status, lockouts and failures.

Remote control and supervision of the burner can be implemented through traditional electrical wiring, or through built-in communication line.

Optional TraxGateways are available for conversion of TraxBus to standard fieldbus (like PROFIBUS-DP).



SAFETY INFORMATION

Read and understand this manual before installing, operating, or servicing this unit. This unit must be installed according to this manual and local regulations. The drawings may show units without covers or safety shields to illustrate details. Disconnect power supply and follow all usual safety precautions before carrying out any operation on the device. Be sure to reinstall covers or shields before operating any devices.

The device is not user serviceable, a faulty device must be put out of order and sent back for servicing.

CONTRIVE manufactures products used as components in a wide variety of industrial systems and equipment. The selection and application of products remain the responsibility of the equipment manufacturer or end user.

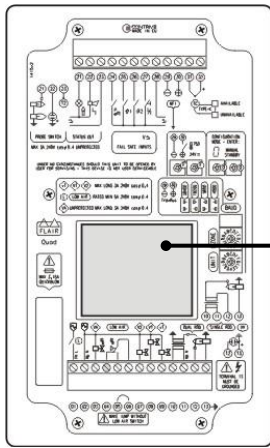
CONTRIVE accepts no responsibility for the way its products are incorporated into the final system design. All systems or equipment designed to incorporate a product manufactured by CONTRIVE must be supplied to the end user with appropriate warnings and instructions as to the safe use and operation of that part.

Any warnings provided by CONTRIVE must be promptly provided to the end user.

CONTRIVE guarantees for two years from the date of manufacture of its product to replace, or, at its option, to repair any product or part thereof (except fuses and with some limitations for tubes and photocells) which is found defective in material or workmanship or which otherwise fails to conform to the description of its sales order. CONTRIVE makes no warranty of merchantability or any other warranty express or implied. CONTRIVE assumes no liability for any personal injury, property damage, losses, or claims arising from misapplication of its products.

CONFORMITY

- | | |
|---|---|
| <ul style="list-style-type: none"> ▪ Gas Equipment Directive (90/396/EEC) ▪ Low Voltage Equipment Directive (73/23/EEC) ▪ Machinery Directive (89/392/EEC) ▪ EMC Directive (89/336/EEC) | <ul style="list-style-type: none"> ▪ EN298 compliant ▪ EN230 compliant ▪ EN746-2 compliant ▪ DVGW type certification No. CE-0085BM0346 ▪ Certified by Gosstandart pursuant to GOST-R |
|---|---|



INTERNAL LABEL

QR CODE

SERIAL NUMBER

DEVICE DATA

CONFIGURATION

QR CODE **CE-0085BM0346**

230V +10-15% 3VA

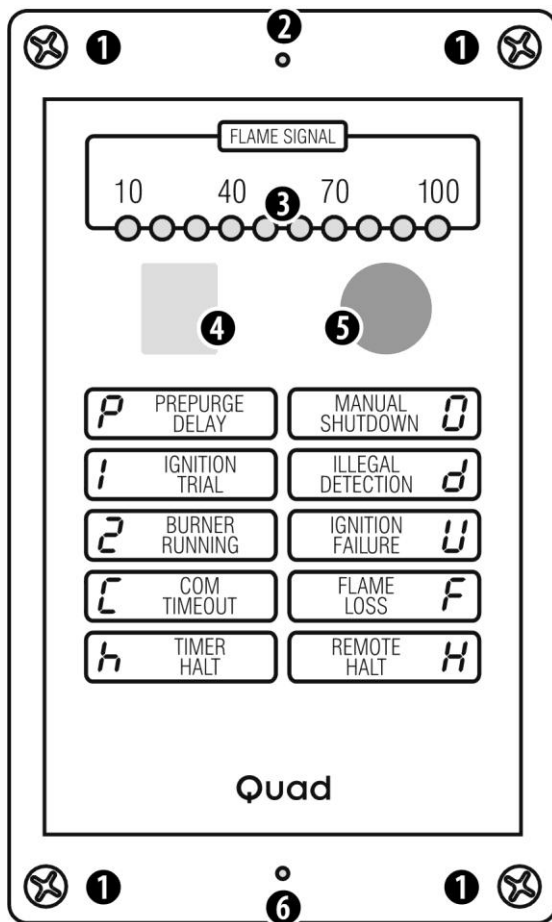
50...60Hz IP65

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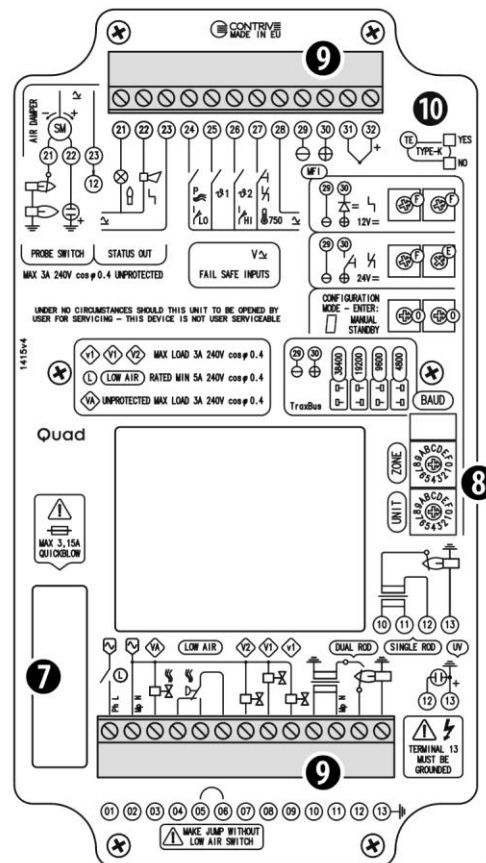
D1234 CONTRIVE

Please perform the following tasks after receiving the product:

- Inspect the unit for damage. If the product appears damaged upon receipt, contact the shipper immediately.
- Verify receipt of the correct power supply voltage option by checking the label.
- If you have received the wrong model or the device does not function properly, contact your supplier.

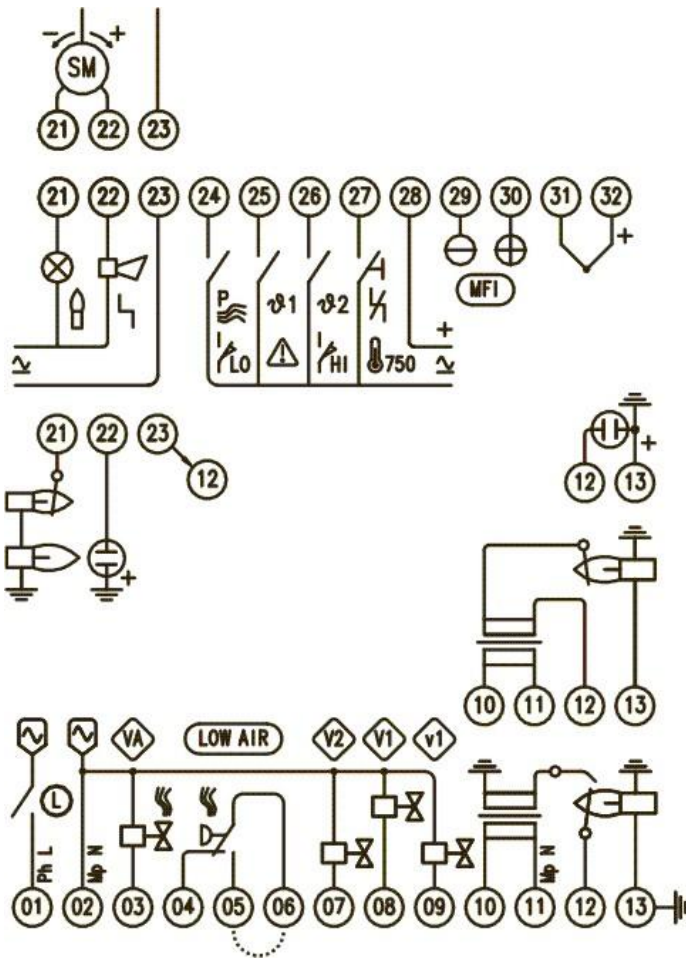


- ### FRONT PANEL
- | | |
|--------------------------|----------|
| FITTING SCREWS | 1 |
| AIRCOM INDICATOR | 2 |
| FLAME SIGNAL BARGRAPH | 3 |
| STATUS DISPLAY | 4 |
| RESET / SHUTOFF BUTTON | 5 |
| HI-TEMP BYPASS INDICATOR | 6 |



- ### INTERNAL
- | | |
|------------------------------|-----------|
| POWER SUPPLY FUSE | 7 |
| MFI & COMMUNICATION SETTINGS | 8 |
| TERMINAL BOARDS | 9 |
| THERMOCOUPLE OPTION | 10 |

WIRING DIAGRAM



01	POWER SUPPLY PHASE
02	POWER SUPPLY NEUTRAL
03	AIR VALVE (FAN) OUTPUT (VA)
04	LOW AIR SWITCH NC
05	LOW AIR SWITCH NO
06	LOW AIR SWITCH COM
07	MAIN GAS VALVE (V2)
08	INTERMITTENT PILOT GAS VALVE (V1)
09	INTERRUPTED PILOT GAS VALVE (v1)
10	IGNITION TRANSFORMER OUTPUT
11	POWER SUPPLY NEUTRAL
12	FLAME DETECTOR INPUT (ROD, UV-)
13	GROUND
21	OUTPUT (BURNER ON, PILOT PROBE, BUTTERFLY CLOSE)
22	OUTPUT (LOCKOUT, MAIN PROBE, BUTTERFLY OPEN)
23	OUTPUT COMMON RETURN
24	INPUT (AIR CONTROL, BUTTERFLY MIN LIMIT SWITCH)
25	INPUT (THERMOSTAT 1, COMMISSIONING BYPASS)
26	INPUT (THERMOSTAT 2, BUTTERFLY MAX LIMIT SWITCH)
27	INPUT (RESET, HI-TEMP BYPASS)
28	INPUT COMMON RETURN [+]
29	MFI NEGATIVE (TRAXBUS, RESET INPUT, LOCKOUT OUTPUT)
30	MFI POSITIVE (TRAXBUS, RESET INPUT, LOCKOUT OUTPUT)
31	TYPE K THERMOCOUPLE NEGATIVE (ALUMEL LEAD)
32	TYPE K THERMOCOUPLE POSITIVE (CHROMEL LEAD)

USE POWER, SIGNAL AND CONTROL CABLE SUITABLE FOR THE TYPE OF OPERATION AND COMPLYING WITH ALL REGULATIONS DO NOT ROUTE CONNECTIONS TOGETHER WITH FREQUENCY CONVERTER CABLES OR CABLES EMITTING STRONG FIELDS PROVIDE RELIABLE CONNECTION TO PE (PROTECTION EARTH) AND BURNER FRAME, RECOMMENDED WIRE GAUGE > 4 mm² ALL ELECTRONIC SYSTEMS MUST BE SUPPLIED BY A DEDICATED TRANSFORMER IN A TN-S EARTHING SYSTEM

USE UNSCREENED HIGH-VOLTAGE CABLE FOR IGNITION AND IONIZATION ROD LINES, LAYING CABLES INDIVIDUALLY, AVOIDING METAL CONDUITS. KEEP HIGH VOLTAGE IGNITION CABLES AS SHORT AS POSSIBLE, AVOIDING LOOPS AND KEEP ALL OTHER CABLES, ESPECIALLY THOSE OF UV OR IONIZATION ROD, AS FAR APART AS POSSIBLE

THE AIR OUTPUT 03 IS SUITABLE TO CONTROL VALVES OR FAN MOTOR WITHIN THE MAX RATED CONTACT CURRENT, ADD AN EXTERNAL CONTACTOR IF NECESSARY. THIS OUTPUT IS NOT PROTECTED BY THE INTERNAL FUSE

THE OUTPUTS AT TERMINALS 22 AND 23 ARE SPST UNPROTECTED DRY CONTACTS, LOAD MUST BE WITHIN THE RATED CURRENT

POWER SUPPLY FUSE

The device and following burner loads are protected by means of an embedded POWER SUPPLY FUSE [7]:

- TERMINAL 07 : MAIN GAS VALVE V2
- TERMINAL 08 : INTERMITTENT PILOT GAS VALVE V1
- TERMINAL 09 : INTERRUPTED PILOT GAS VALVE v1
- TERMINAL 10 : IGNITION TRANSFORMER

This fuse must be replaced only with same type and value component: 3,15 A quickblow (5x20mm).

AIRCOM INDICATOR

When the air output is active the AIRCOM INDICATOR [2] gives a steady blue light. Once a valid command is received through the communication line this indicator will blink red.

This indicator will blink red once at power-on, during self-diagnosis.

Permanently red when the remote control is disabled while in COMMISSIONING mode.

HI-TEMP BYPASS INDICATOR

When the combustion chamber walls are above 750°C and the flame surveillance is excluded, the yellow HI-TEMP BYPASS INDICATOR [6] is active.

STATUS DISPLAY

The STATUS DISPLAY [4] gives, at any time, a clear indication about the working conditions of both the burner and the equipment, making it easier to detect any failure occurring in the system or the device.

CYCLE



MANUAL SHUTDOWN

UNIT HAS BEEN PUT OUT OF SERVICE FROM PUSH BUTTON. PUSH AGAIN TO RESTORE.



TIMER SHUTDOWN

BURNER HAS BEEN TURNED OFF BY OPTIONAL INTERNAL TIMER.



REMOTE SHUTDOWN

BURNER HAS BEEN TURNED OFF BY REMOTE CONTROL THROUGH FIELDBUS.



THERMOSTAT SHUTDOWN

BURNER HAS BEEN TURNED OFF BY LOCAL THERMOSTAT 1 INPUT.



AIR RUN-UP DELAY

OPTIONAL WAITING TIME FOR AIR REACHING RATED FLOW.



BUTTERFLY VALVE OPENING

BUTTERFLY VALVE IS MOVING TO PREPURGE OPEN POSITION.



AIR PRESSURE WAITING

WAITING FOR RATED AIR PRESSURE BEFORE TO CONTINUE WITH PREPURGE.



PREPURGE

PURGE OF COMBUSTION CHAMBER OR MIN TIME FOR ILLEGAL FLAME PROVING.



BUTTERFLY VALVE CLOSING

BUTTERFLY VALVE IS MOVING TO IGNITION CLOSE POSITION.



IGNITION

1ST SAFETY TIME. BURNER IGNITION TRIAL WITH PILOT GAS VALVE OPEN.



PILOT BURNER ON

PILOT GAS VALVE IS OPEN, RUNNING POSITION FOR SINGLE STAGE BURNERS.



MAIN IGNITION

2ND SAFETY TIME. MAIN BURNER IGNITION TRIAL WITH MAIN AND PILOT GAS OPEN.



MAIN BURNER ON

MAIN GAS VALVE IS OPEN, RUNNING POSITION FOR DUAL STAGE BURNERS.



POSTCOMBUSTION

WAITING FOR FLAME QUENCHING AFTER LOCKOUT OR SHUTDOWN REQUEST.



POSTPURGE

PURGE OF COMBUSTION CHAMBER, SHOWN TOGETHER WITH ASSOCIATED CODE.

WARNINGS



SELF-TEST

SELF DIAGNOSIS, EVERY TIME THE UNIT IS POWERED OR THE BURNER IS STARTED.



LIFETIME EXPIRED

MAINTENANCE REQUIRED AFTER 500.000 IGNITIONS. PUSH AGAIN TO START ANYWAY.



CONFIGURATION

UNIT IN CONFIGURATION MODE THROUGH COMMUNICATION LINK.

LOCKOUTS



STANDBY

WAITING FOR RESET WHEN PROGRAMMED FOR STANDBY MODE AT POWER-ON.



ILLEGAL DETECTION

PARASITE FLAME DETECTION DURING PRE-PURGE, POSTPURGE OR POSTCOMBUSTION.



IGNITION FAILURE

NO FLAME DETECTED AT THE END OF IGNITION TRIAL, 1ST SAFETY TIME.



FLAME LOSS

FLAME QUENCHING DURING NORMAL BURNER OPERATION.



COMMUNICATION TIMEOUT

MISSING COMMANDS FROM SUPERVISOR OR EXPANSION BOARD FAILURE.



AIR LOSS

AIR PRESSURE FAILURE DURING PREPURGE OR DURING NORMAL BURNER OPERATION.



HIGH TEMPERATURE LIMIT

TEMPERATURE MEASURED FROM LOCAL THERMOCOUPLE ABOVE SET LIMIT.

RESETABLE FAILURES



IGNITION DEVICE FAILURE

IGNITION DEVICE UNPLUGGED, DEFECTIVE OR NOT WORKING PROPERLY.



GAS VALVE FAILURE

GAS VALVE(S) UNPLUGGED, DEFECTIVE OR NOT WORKING PROPERLY.



PROCESS INPUTS FAILURE

UNRELIABLE OPERATION OF PROCESS INPUTS TERMINALS 24, 25, 26, 27.



OUTPUT RELAYS FAILURE

SHORT CIRCUIT ON OUTPUT RELAY CONTACT LOADS DISCONNECTED BY SAFETY RELAY.



BUTTERFLY VALVE OPENING FAILURE

AIR BUTTERFLY VALVE DOESN'T REACH THE PREPURGE MAX OPENING POSITION (<5 min)



BUTTERFLY VALVE CLOSING FAILURE

AIR BUTTERFLY VALVE DOESN'T REACH THE IGNITION MIN CLOSING POSITION (<5 min)



MISSING GROUND JOINT | SOFT JUMP

POOR SPARK RETURN PATH (I.E.: BAD GROUND CONNECTION TO BURNERS HEAD).



STRONG EMI | CONFIG ERROR

ELECTRO MAGNETIC INTERFERENCE ABOVE ADMISSIBLE LIMIT, CONFIGURATION ERROR.



TIMEBASE FAILURE

MISMATCH BETWEEN 1ST AND 2ND INTERNAL TIMEBASE GENERATORS.



SYSTEM WATCHDOG

MICROPROCESSOR ISN'T OPERATING PROPERLY.



SUPERVISOR ILLEGAL COMMAND

SUPERVISOR SENT AN ILLEGAL COMMAND (i.e.: RESET WHILE SYSTEM IS RUNNING).



BUTTERFLY VALVE LIMIT SWITCHES

BOTH MIN AND MAX POSITION LIMIT SWITCHES ARE CLOSED AT THE SAME TIME.

NON RESETABLE FAILURES



PUSH BUTTON FAILURE

PUSH BUTTON FOUND CLOSED AT SELF TEST. FAILURE OR AVOID PUSHING DURING TEST.



SYSTEM ERROR

PROGRAM ERRORS, CORRUPTION IN FIRMWARE MEMORY.



MASTER SAFETY RELAY FAILURE

SHORT CIRCUIT ON SAFETY RELAY CONTACT. OUTPUT RELAYS WILL DISCONNECT LOADS.

ALTERNATING PILOT BURNER AND CONTROLLED MAIN BURNER

Main burner can be controlled ON/OFF by means of thermostat input or remote fieldbus command. The pilot burner at terminal 09 is switched off automatically after the main burner has started up.

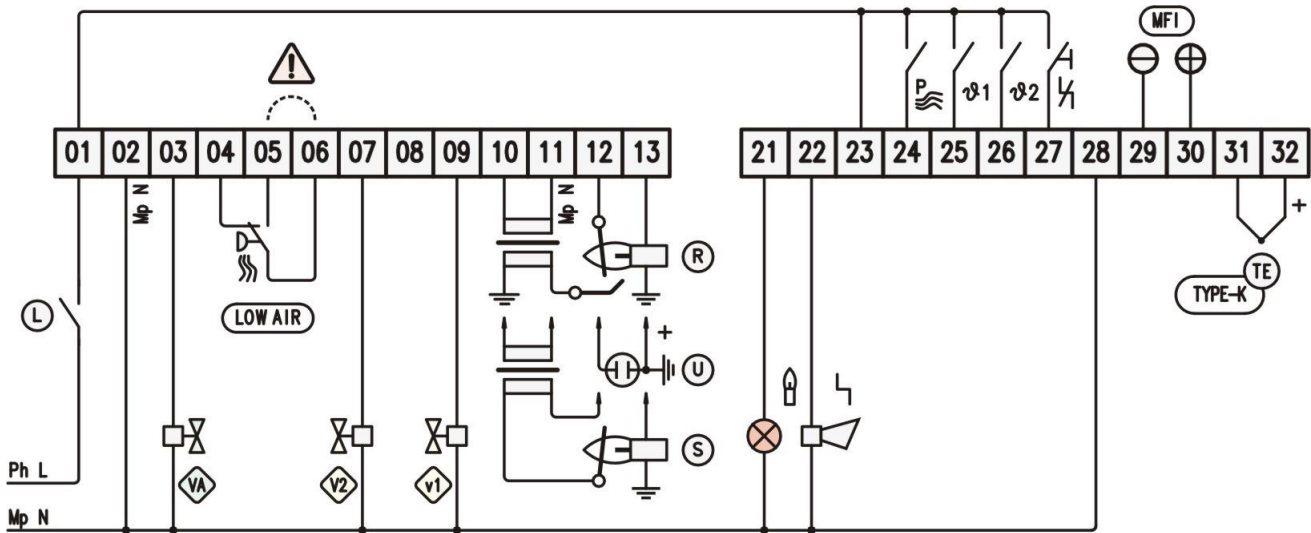
Where a single flame detector cannot detect both interrupted pilot and main burner, two independent sensor can be connected at the same input terminals.

The pilot burner at terminal 09 switches on again when the main burner is switched off. Parameter F505, pilot re-ignition safety time (both burners on) is configurable 1...25".

The air output operation is configurable during the whole cycle, providing also cooling and purging processes.

UV sensor or ionization rod can be used for flame detection of both pilot and main burner.

Using special transformers it's possible to share a single rod for ignition and flame detection.



(L)	EXTERNAL LIMITS
(LOW AIR)	LOW AIR PRESSURE SWITCH
(VA)	AIR VALVE
(v1)	INTERRUPTED PILOT GAS VALVE
(v2)	MAIN GAS VALVE
(TE)	THERMOCOUPLE
(R)	DUAL ROD CIRCUIT
(U)	UV SENSOR
(S)	SINGLE ROD CIRCUIT

(P)	AIR CONTROL INPUT
(θ1)	ON/OFF THERMOSTAT INPUT
(θ2)	MAIN THERMOSTAT INPUT
(A)	RESET INPUT
(burner on)	BURNER ON
(burner lockout)	BURNER LOCKOUT
(MFI)	MULTI FUNCTION INTERFACE



MAKE JUMPER WITHOUT
AIR PRESSURE SWITCH

Configuring parameters F806 and F807, outputs at terminal 21 and 22 can be used to report burner status when the unit is controlled through an electric interface, together with air valve control input, remote reset input and thermostat inputs.

Disable air monitoring and make a wire jumper between terminal 05 and terminal 06 when low air pressure or flow switch is not installed.

Local temperature can be measured with a type K thermocouple connected to optional input at terminals 31 and 32. Measured temperature can be returned to supervisor through the fieldbus and used for optional high temperature shutdown and high temperature flame surveillance bypass safety confirmation.

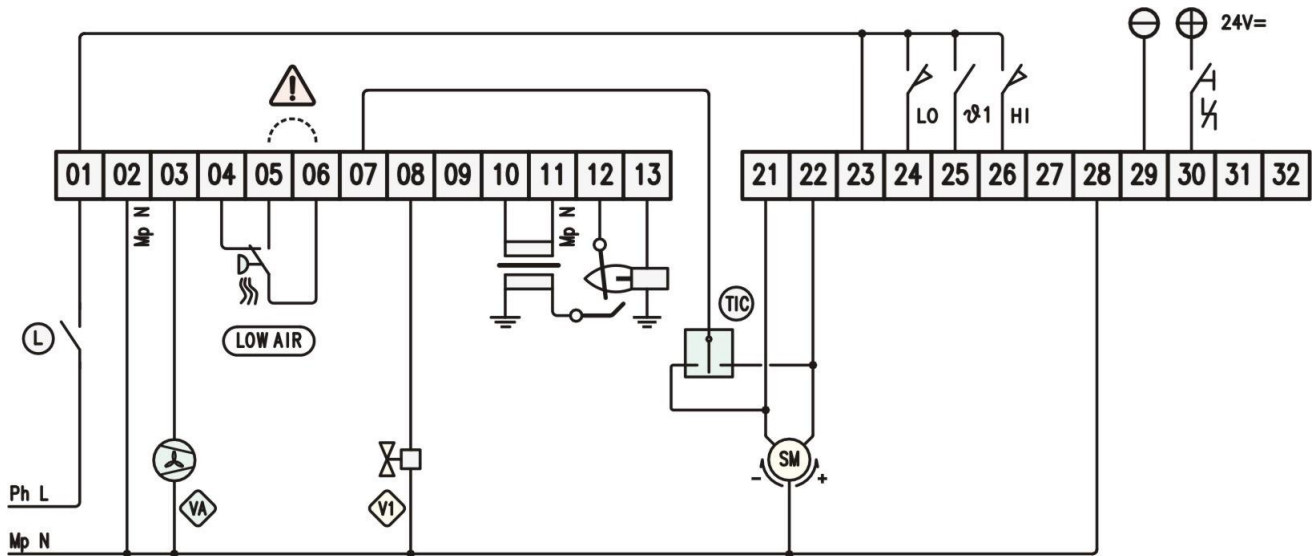
DIRECT IGNITION MODULATED SINGLE STAGE PACKAGE BURNER

Quad600 moves the butterfly valve to HI fire position (limit switch at terminal 26) before to start prepurge and to LO fire position (limit switch at terminal 24) before to start ignition trial.

The external temperature controller [TIC] is enabled once the burner is running, after pilot proving set by means of parameter F502, using the output at terminal 07 (main gas valve).

The burner could be turned on/off by means of Thermostat 1 contact at terminal 25.

MFI at terminals 29 and 30 could be configured for complete remote control through fieldbus or could be used for electrical remote reset (dipswitches setting: FE).



(L)	EXTERNAL LIMITS
LOW AIR	LOW AIR PRESSURE SWITCH
VA	AIR VALVE
V1	GAS VALVE
FAN	FAN
TE	THERMOCOUPLE

θ1	ON/OFF THERMOSTAT INPUT
LO	MIN BUTTERFLY LIMIT SWITCH
K	RESET INPUT
HI	MAX BUTTERFLY LIMIT SWITCH
SM	BUTTERFLY VALVE SERVO MOTOR
TIC	POWER CONTROLLER



MAKE JUMPER WITHOUT
AIR PRESSURE SWITCH

MODULATING TWO STAGE BURNER WITH HI-TEMP FLAME SURVEILLANCE BYPASS

Quad600 moves the butterfly valve to HI fire position (limit switch at terminal 26) before to start prepurge and to LO fire position (limit switch at terminal 24) before to start ignition trial.

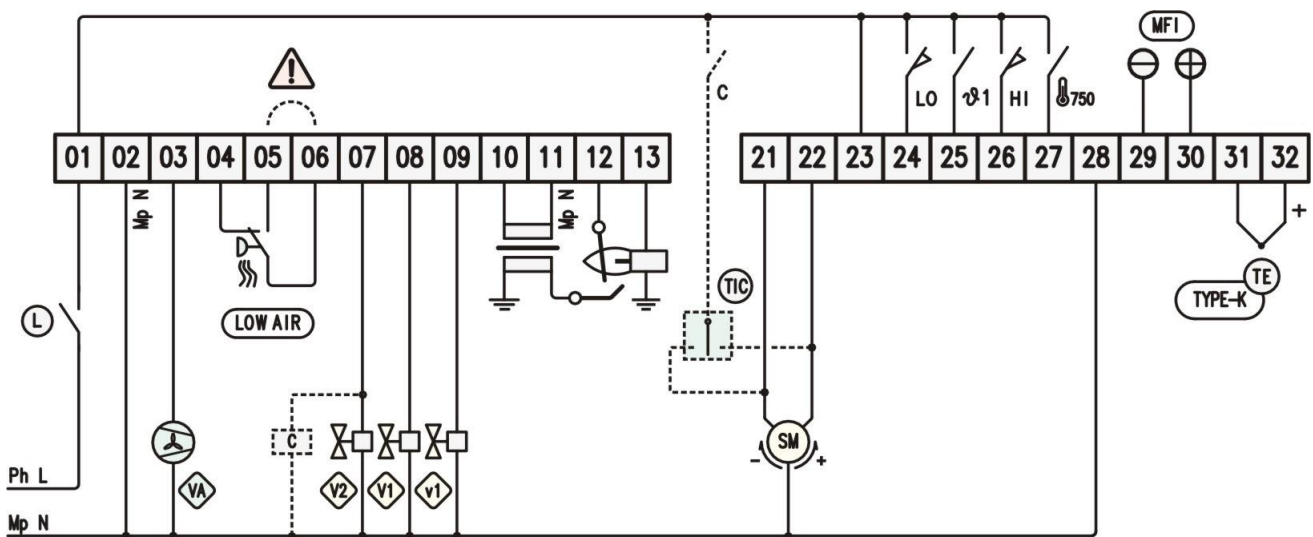
An optional external temperature controller [TIC] is enabled once the burner is running, after pilot proving set by means of parameter F502, using an aux relay [C] powered from the main gas valve output at terminal 07.

Instead of wired temperature controller, positioning information for the butterfly valve could be sent from fieldbus. Travel time of the butterfly valve is evaluated during prepurge in order to determine the position without having to use a feedback from a potentiometer.

A specific remote overdrive command allows the butterfly valve to move for specified time beyond LO fire, reaching a completely close position.

When the burner is operating in combustion chamber having walls above 750°C it's possible to bypass the flame surveillance by means of specific contact at input terminal 27 (redundant safety control as per DIN 3440 or internal thermocouple confirmation must be considered). Instead of wired bypass contact, bypass request could be issued through safe fieldbus commands.

Remote reset is available through fieldbus command or, when the communication is disabled (FE or FF), a remote reset contact (FE) or a remote lockout indicator (FF) could be wired to terminals 29 and 30.



(L)	EXTERNAL LIMITS
(LOW AIR)	LOW AIR PRESSURE SWITCH
(VA)	AIR VALVE
(V1)	GAS VALVE (SINGLE STAGE)
(v1)	INTERRUPTED PILOT GAS VALVE
(V2)	MAIN GAS VALVE
(VA)	FAN
(TE)	THERMOCOUPLE

(750)	HI TEMP BYPASS INPUT
(θ1)	ON/OFF THERMOSTAT INPUT
(LO)	MIN BUTTERFLY LIMIT SWITCH
(MFI)	MULTI FUNCTION INTERFACE
(HI)	MAX BUTTERFLY LIMIT SWITCH
(SM)	BUTTERFLY VALVE SERVO MOTOR
(TIC)	POWER CONTROLLER



MAKE JUMPER WITHOUT
AIR PRESSURE SWITCH

PARAMETERS

HARDWARE

Q001	POWER SUPPLY VOLTAGE	230 Vac	230
		115 Vac	115
Q002	ENCLOSURE	LIGHT ALUMINIUM	N
		STANDARD ALUMINIUM	A
		LOW PROFILE ALUMINIUM	B
		POLYCARBONATE	P
F003	PROCESS INPUTS VOLTAGE	230 Vac/dc	2
		115 Vac/dc	1
		48 Vac/dc	8
		24 Vac/dc	4
F004	THERMOCOUPLE / HI-TEMP	UNAVAILABLE	-
		AVAILABLE	.

BEHAVIOUR AT POWER ON – LOCKOUT

Q101	START-UP MODE	AUTOSTART	A
		STANDBY	S
F102	AIR OUTPUT	ALWAYS OFF	N
		ALWAYS ON	Y
		CONTROLLED FROM P INPUT	I
		CONTROLLED FROM BUS	B

BEHAVIOUR DURING MANUAL SHUTDOWN

F201	AIR OUTPUT	ALWAYS OFF	N
		ALWAYS ON	Y
		CONTROLLED FROM P INPUT	I
		CONTROLLED FROM BUS	B

BEHAVIOUR DURING SHUTDOWN

F202	MINIMUM BURNER PAUSE TIME	0" ...	00
		DEFAULT 0" ... 250"	FA
F203	AIR OUTPUT	ALWAYS OFF	N
		ALWAYS ON	Y
		CONTROLLED FROM P INPUT	I
		CONTROLLED FROM BUS	B

BEHAVIOUR DURING PREPURGE

F301	AIR RUN-UP TIME	0" ...	00
		DEFAULT 0" ... 250"	FA
F302	AIR OUTPUT	ALWAYS OFF	N
		ALWAYS ON	Y
		CONTROLLED FROM P INPUT	I
		CONTROLLED FROM BUS	B
F303	AIR MONITORING	YES	A
		NO	-
F304	LOCKOUT DELAY ON AIR LOSS	1" ...	01
		DEFAULT 1" ... 250"	FA
Q305	PREPURGE TIME	1" ...	001
		DEFAULT 1" ... 250"	250

BEHAVIOUR DURING IGNITION

Q401	PRE-IGNITION TIME	0,5"	
Q402	PILOT STARTUP SAFETY TIME	2" ...	02
		DEFAULT 3" ... 25"	25
F403	PILOT BURNER STARTUP ATTEMPTS	1	1
		2	2
		3	3
		4	4

BEHAVIOUR DURING OPERATION

F501	AIR MONITORING	YES	A
		NO	-
F502	PILOT BURNER PROVING TIME	1" ...	1
		DEFAULT 3" ... 25"	P
F503	MAIN STARTUP SAFETY TIME	1" ...	1
		DEFAULT 3" ... 5"	5
F504	MAIN BURNER PROVING TIME	1" ...	1
		DEFAULT 3" ... 25"	P
F505	PILOT RE-IGNITION TIME	1" ...	1
		DEFAULT 1" ... 25"	P
F506	MINIMUM COMBUSTION TIME	0" ...	0
		DEFAULT 0" ... 25"	P
Q507	OPERATING SAFETY TIME	1" ...	01
		DEFAULT 1" ... 12"	12
Q508	ALLOWED POST-COMBUSTION TIME	< 20"	
Q509	AUTO-SHUTOFF TIME	00:05 ...	01
		20:50 ...	FA
Q510	AUTO-SHUTOFF MODE	OFF	-
		MANUAL	M
		AUTOMATIC	A
F511	AIR OUTPUT	FOLLOWS PILOT	P
		FOLLOWS MAIN	M
		FOLLOWS BOTH PILOT & MAIN	2
		CONTROLLED FROM P INPUT	I
Q512	FLAME LOSS	CONTROLLED FROM BUS	B
		LOCKOUT	L
		RECYCLE	C
		RESPARK	K
F513	AIR LOSS	LOCKOUT	L
		RECYCLE	C

BEHAVIOUR DURING POSTPURGE

F601	AIR OUTPUT	ALWAYS OFF	N
		ALWAYS ON	Y
		CONTROLLED FROM P INPUT	I
		CONTROLLED FROM BUS	B
Q602	POSTPURGE TIME	1" ...	001
		DEFAULT 1" ... 250"	250

PARAMETERS

COMMUNICATION SETTINGS

Q701	ZONE (SEGMENT) DIPSWITCHES	00 FE
Q702	UNIT (NODE) DIPSWITCHES	00 FE
Q703	BAUD RATE DIPSWITCHES	4800 9600 19200 38400
Q704	TIMEOUT	DISABLED 00'04" ... 16'36" AUTOMATIC 200" @ 4800 152" @ 9600 100" @ 19200 52" @ 38400

SELECT ' FF ' TO DISABLE COMMUNICATION
AND ENABLE MFI LOCKOUT OUTPUT

SELECT ' FE ' TO DISABLE COMMUNICATION
AND ENABLE MFI RESET INPUT

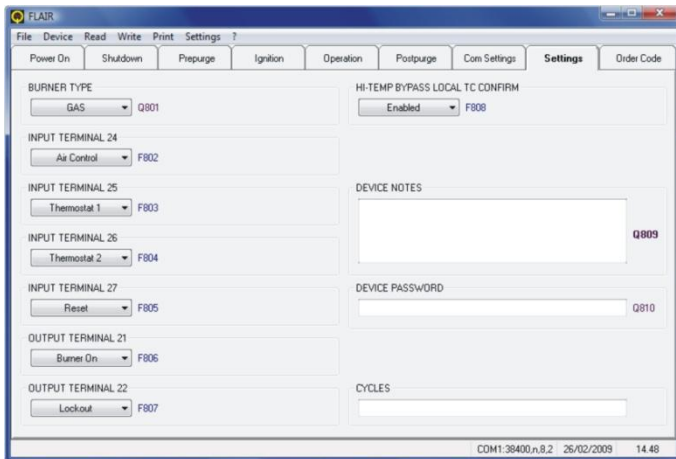
SELECT ' 00 ' TO ENTER CONFIGURATION MODE
ALL SETTINGS, INCLUDING DIPSWITCHES, WILL TAKE PLACE LEAVING
THE MANUAL SHUTDOWN MODE OR AT FURTHER POWER-ON

LOCKOUT DUE TO COMMUNICATION TIMEOUT CAN OCCUR ONLY
DURING NORMAL CYCLE, WHEN COMMUNICATION IS ENABLED

GENERAL SETTINGS

Q801	BURNER TYPE	GAS OIL	G O
F802	INPUT TERMINAL 24	AIR CONTROL BUTTERFLY MAX SWITCH	P H
F803	INPUT TERMINAL 25	DISABLED THERMOSTAT 1 COMMISSIONING COM BYPASS	- T C
F804	INPUT TERMINAL 26	DISABLED THERMOSTAT 2 BUTTERFLY MIN SWITCH	- T L
F805	INPUT TERMINAL 27	RESET HI-TEMP BYPASS	R B
F806	OUTPUT TERMINAL 21	BURNER ON PILOT PROBE BUTTERFLY CLOSE	B P C
F807	OUTPUT TERMINAL 22	LOCKOUT MAIN PROBE BUTTERFLY OPEN	L M O
F808	HI-TEMP BYPASS TC CONFIRM	DISABLED ENABLED	- T
F809	DEVICE NOTES		
F810	DEVICE PASSWORD		

CONFIGURATION



The device is fully configurable thru the communication line, using the free software tool *QPro* and an interface adapter like *TraxInterface³* or *TraxGateway*.

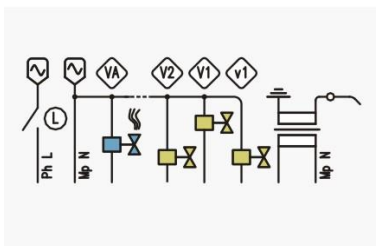


The unit must be in manual shutdown to enter configuration environment: display shows an horizontal dash while linked. Some parameters are password protected. and can be modified by authorized users or by factory.

COMMISSIONING

Commissioning mode can be forced from input 25, Quad600 must be in MANUAL SHUTDOWN.

Quad600 reverts anyway to normal mode after 10 minutes. Remote control and air damper management are disabled while in commissioning mode.



Q001 – POWER SUPPLY VOLTAGE

Power supply must be wired at terminal 01 and 02, for burner control unit and loads (air and gas valves and ignition transformer), both protected by the embedded fuse.

Optional safety interlock limits could be wired on the main supply phase.

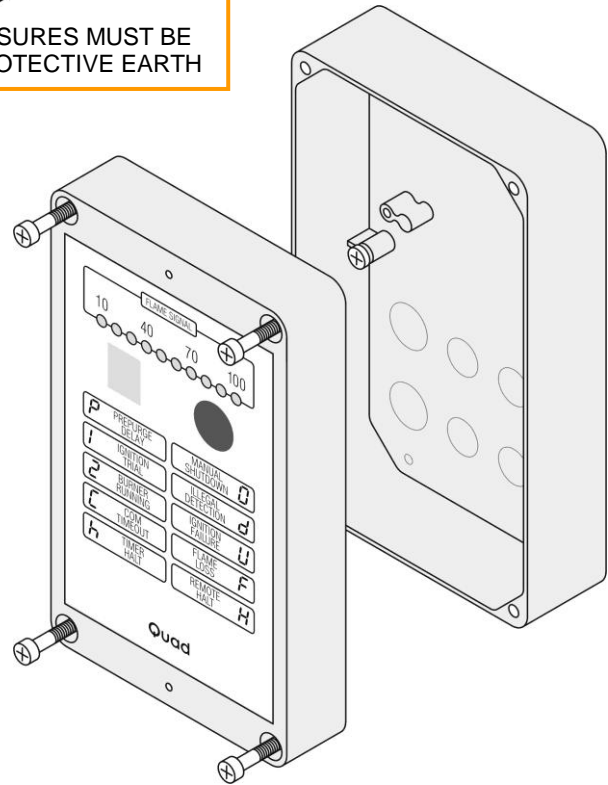
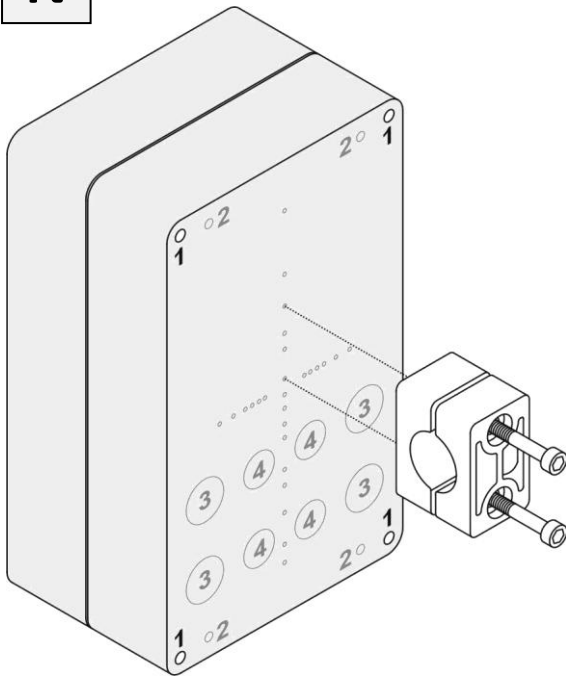
Q002 – ENCLOSURE

Quad600 is available in 4 different enclosure options. Standard version is N, all other types are available on request. According to European Standard EN60529 a minimum protection degree IP40 must be guaranteed, raised to IP54 for open air application.



ALUMINIUM ENCLOSURES MUST BE CONNECTED TO PROTECTIVE EARTH

N



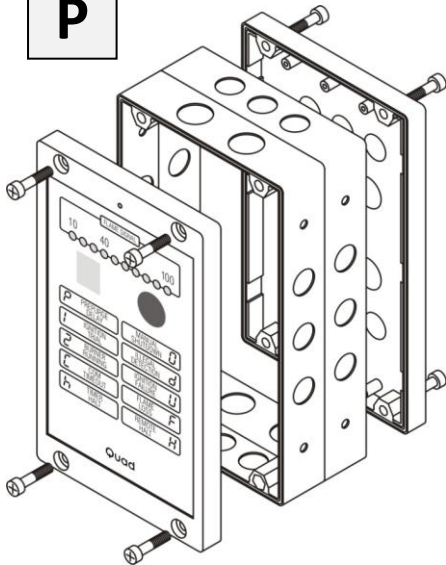
1	EXTERNAL FITTING HOLES (4) 4.2 mm SELF TAPPING OR M5 THREAD FORMING SCREW	106 x 186 mm
2	BREAKABLE FITTING HOLES (4) 4,0 mm DIAMETER	77 x 182 mm
3	BREAKABLE HOLES FOR WIRING (4) SUITABLE FOR PG11 CABLE GLAND	Ø 19,0 mm
4	BREAKABLE HOLES FOR WIRING (4) SUITABLE FOR PG9 CABLE GLANDS	Ø 15,5 mm

CAST ALLUMINIUM ALLOY EN AB 46100	IP65
OVERALL DIMENSION: 200 x 120 x 71 mm	WEIGHT: 1180 g
ELECTROSTATIC POLYESTER POWDER COATING COLOR: GRAY	

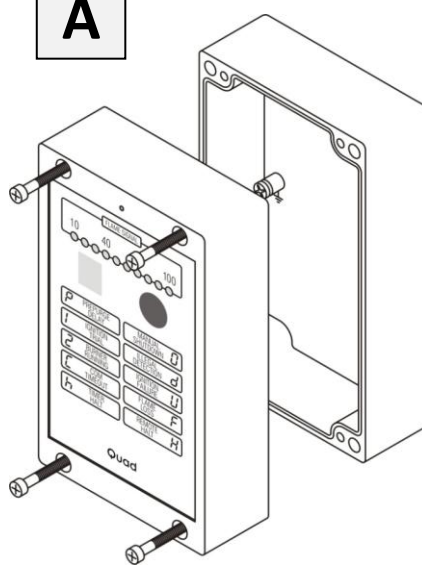
OPTIONAL FITTING CLAMPS FOR PIPES

VERTICAL MOUNTING	OUTSIDE DIAMETER 6 ... 76 mm
HORIZONTAL MOUNTING	OUTSIDE DIAMETER 6 ... 63 mm

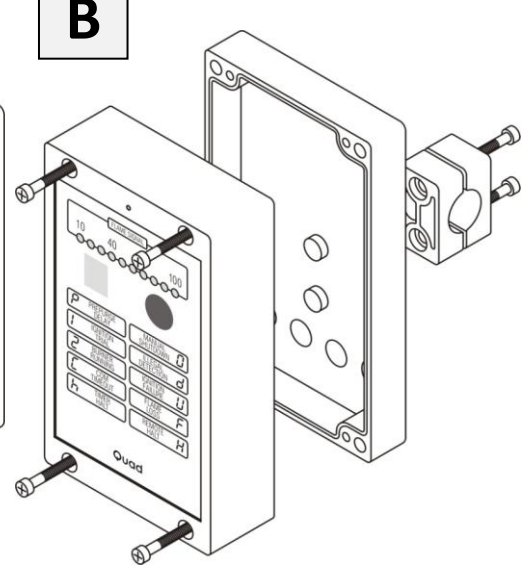
P



A



B

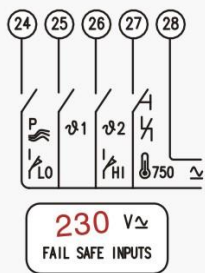


POLYCARBONATE UL-V0
200 x 120 x 96 mm | 800 g

CAST ALUMINIUM ALLOY
200 x 120 x 92 mm | 1560 g

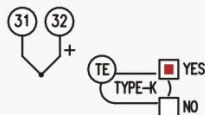
CAST ALUMINIUM ALLOY
200 x 120 x 71 mm | 1350 g

F003 – PROCESS INPUT VOLTAGE



Inputs coming from external control circuit are independent from device and burner power supply, allowing an isolated interface. Different voltage options are available, both alternating or direct current. Inputs are referred to a common return at terminal 28 and are continuously verified against possible failures, to guarantee a reliable operation. The symbols shown near the terminal board are related to possible associated function, to be configured by means of parameters F802, F803, F804 and F805.

F004 – THERMOCOUPLE / HI-TEMP



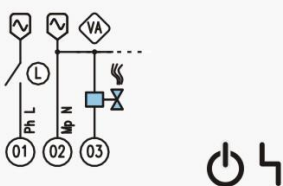
When this option is available, a type K (chromel-alumel) thermocouple could be connected at terminal 31 and 32 and the high temperature flame surveillance bypass will be possible.

Q101 – START-UP MODE



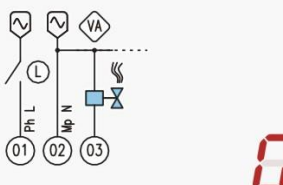
At power-on, once the self-test has been successfully completed, the unit waits in STANDBY mode until a reset operation is performed from local push button or through a fieldbus remote command. Setting AUTOSTART mode, the cycle starts automatically, unless the units has been turned off while in lockout.

F102 – AIR OUTPUT DURING POWER-ON & LOCKOUT



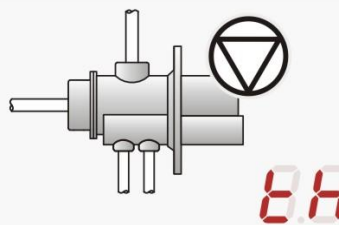
To suit different processes it's possible to change the behavior of the air valve (or fan) output during power on and lockout. It could be kept always closed, always open, controlled by means of P input at terminal 24 or through fieldbus command.

F201 – AIR OUTPUT DURING MANUAL SHUTDOWN



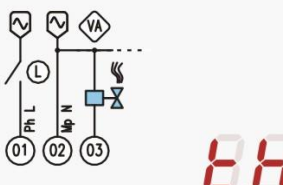
To suit different applications it's possible to change the behavior of the air valve (or fan) output during manual shutdown. It could be kept always closed, always open, controlled by means of P input at terminal 24 or through fieldbus command.

F202 – MINIMUM BURNER PAUSE TIME

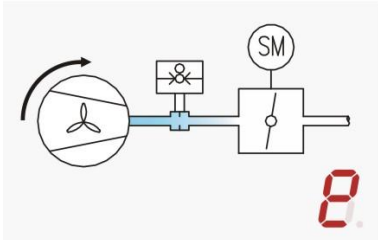


An immediate restart of the burner after a normal shutdown is prevented by the pause time. The pause time starts when the burner is switched off. Any start-up will be ignored until the minimum burner pause time has elapsed.

F203 – AIR OUTPUT DURING SHUTDOWN

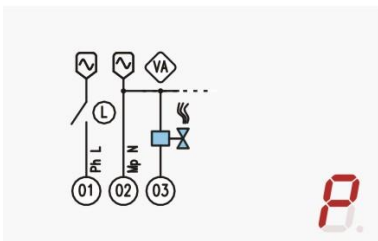


To suit different applications it's possible to change the behavior of the air valve (or fan) output during normal shutdown (V1 or fieldbus command request). It could be kept always closed, always open, controlled by means of P input at terminal 24 or through fieldbus command.



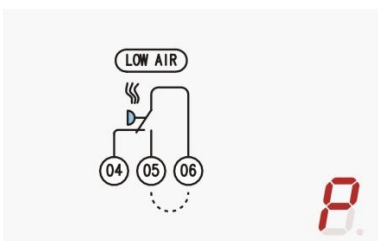
F301 – AIR RUN-UP TIME

This parameter defines the time between the activation of the air valve (or fan) output and the beginning of prepurge in order to wait for the rated air flow, compensating a slow opening valve or the fan initial starting phase, that will be made with the butterfly valve closed, reducing the fan motor load. This delay is not introduced if the air output is already on because it has been activated before.



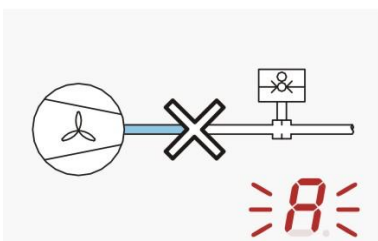
F302 – AIR OUTPUT DURING PREPURGE

To suit different applications it's possible to change the behavior of the air valve (or fan) output during prepurge (or waiting time). It could be kept always closed, always open, controlled by means of P input at terminal 24 or through fieldbus command.



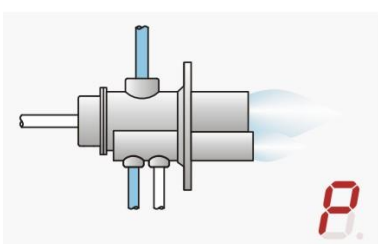
F303 – AIR MONITORING DURING PREPURGE

Enable this option when a pressure switch is monitoring the air pressure during prepurge. Although an air pressure switch is connected, this option may be disabled to suit specific applications. When the air pressure switch is not installed a jumper must be wired between terminal 05 and 06.



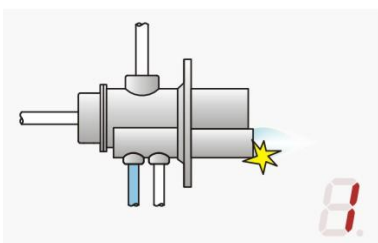
F304 – LOCKOUT DELAY ON AIR LOSS DURING PREPURGE

This parameter defines the max tolerated time of missing air when the air flow is monitored by a pressure switch. If the air pressure is restored before the end of this time no lockout occurs, but the prepurge time will be extended to compensate the missing air period.



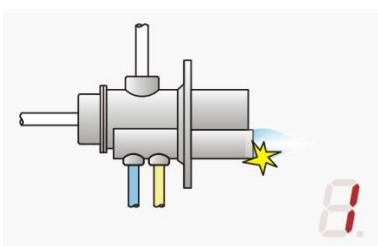
Q305 – PREPURGE TIME

Set prepurge time in forced draught burners according to EN 676 requirements. During this time air valve output is on and optional butterfly valve is open, an illegal flame test is carried out. Prepurge could be managed also through P input or fieldbus control.



Q401 – PRE-IGNITION TIME

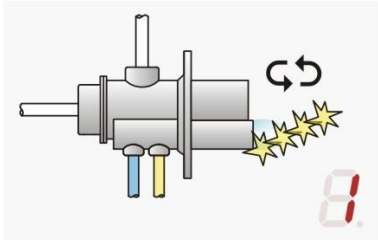
The ignition transformer is turned on 500 ms before the pilot gas valve to check the correct operation before to open the gas. This is a fixed time and cannot be changed.



Q402 – PILOT STARTUP SAFETY TIME

Set the correct time following EN 746-2 (or other relevant) requirements:

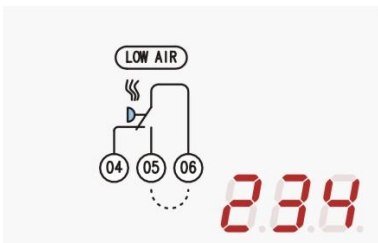
Natural draught burners	≤ 70 kW → 10"	> 70 kW → 5"
IGNITION POWER ≤ 33% NOMINAL POWER WITH MAXIMUM OF 350 KW		
Forced draught burners	≤ 350 kW → 5"	>350kW → 3"
IGNITION POWER ≤ 10% NOMINAL POWER WITH MAXIMUM OF 350 KW		



F403 – PILOT BURNER STARTUP ATTEMPTS

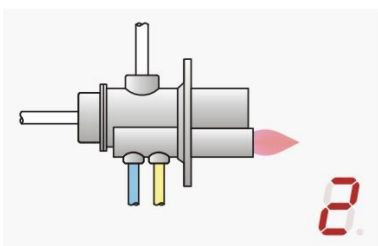
In accordance with EN746-2 and EN 676, if the flame is not detected at the end of pilot startup safety time, it's possible to make up to 4 startup attempts (including the first one), when the safety of the application is not impaired, repeating the cycle from the beginning.

A lockout will occur if no flame has formed within programmed attempts.



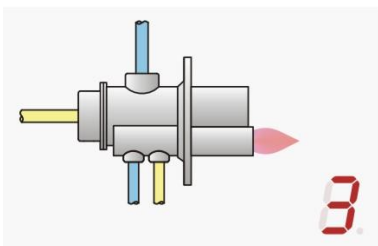
F501 – AIR MONITORING DURING OPERATION

Enable this option when a pressure switch is monitoring the air pressure during burner operation (flame on). Although an air pressure switch is connected, this option may be disabled to suit specific applications. When the air pressure switch is not installed a jumper must be wired between terminal 05 and 06.



F502 – PILOT BURNER PROVING TIME

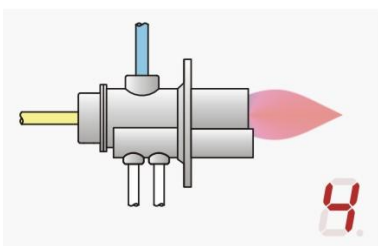
This time elapses before the unit begins the optional next program step so as to give the pilot burner flame enough time to stabilize (i.e.: the main burner could be turned on only at the end of this proving time).



F503 – MAIN STARTUP SAFETY TIME

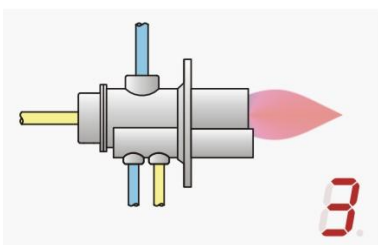
The setting of safety time is to be determined on the basis of burner capacity and relevant application standard (e.g. EN 746-2, EN 676, NFPA 85 or NFPA 86).

Two switched flame sensors must be installed. V2 is opened as the safety time starts, one second before the end of the safety time v1 is closed (V1 remains open). Lockout occurs if no flame signal is detected at the end of safety time.



F504 – MAIN BURNER PROVING TIME

This time elapses before the unit begins the optional next program step so as to give the main burner flame enough time to stabilize. (i.e.: the pilot burner could be turned on only at the end of this proving time).

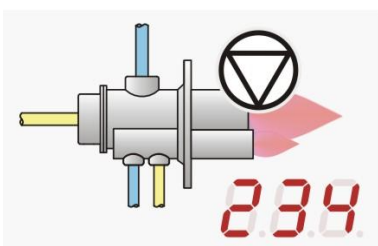


F505 – PILOT RE-IGNITION TIME

The setting of safety time is to be determined on the basis of burner capacity and relevant application standard (e.g. EN 746-2, EN 676, NFPA 85 or NFPA 86).

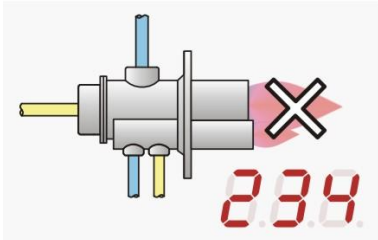
Two switched flame sensors must be installed. v1 is opened as the re-ignition time starts, one second before the end of this time V2 is closed.

Lockout occurs if no flame signal is detected at the end of re-ignition time.



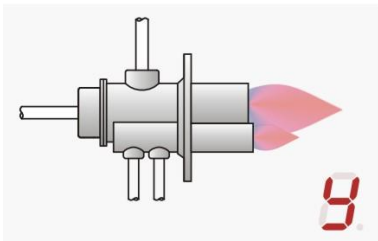
F506 – MINIMUM COMBUSTION TIME

An immediate shutdown of the burner, once ignited, is prevented by the minimum combustion time. This time starts once pilot burner has been successfully ignited (after pilot safety time). Any shutdown from local thermostat v1 or remote fieldbus command will be ignored until this minimum combustion time has elapsed.



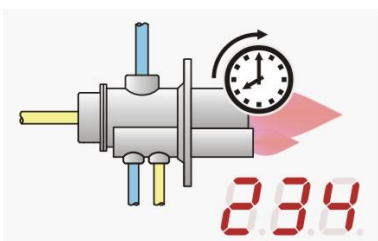
Q507 – OPERATING SAFETY TIME

If the flame fails during operation, gas valves are switched off within this safety time that must be in accordance with relevant application standards (default for EN 298 is 1" and must not exceed 3" including valves closing time for EN 746-2).



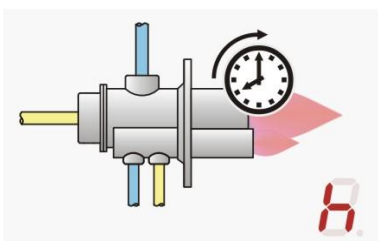
Q508 – ALLOWED POST-COMBUSTION TIME

The flame signal is allowed for 20" once gas valves has been closed. Lockout occurs if the flame is detected after the post-combustion time.



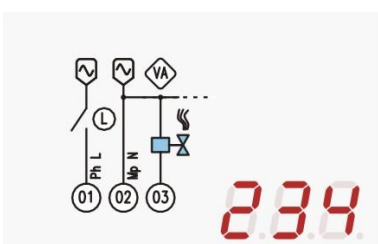
Q509 – AUTO SHUT-OFF TIME

An automatic shutoff is performed after the specified time since burner on.



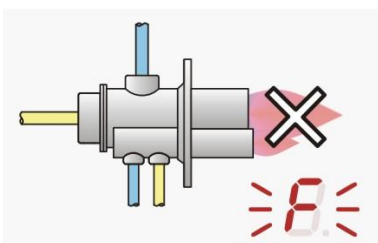
Q510 – AUTO SHUT-OFF MODE

Behavior after an automatic shut-off. In AUTOMATIC mode a complete burner restart cycle is deployed, performing the test of the whole system, as per Standard requirements, within 24 hours of continuous operation. In MANUAL mode the burner waits for reset but, if the thermostat 1 is enabled, the burner will follow the specific input request.



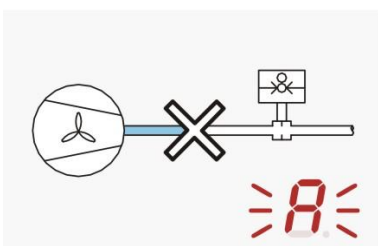
F511 – AIR OUTPUT DURING OPERATION

To suit different applications it's possible to change the behavior of the air valve (or fan) output during burner operation. It could follow the pilot and/or main gas valves, kept always closed, always open, controlled by means of P input at terminal 24 or through fieldbus command.



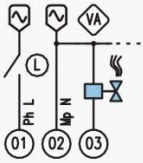
Q512 – FLAME LOSS

Determines the behavior at flame loss during normal burner operation. For burners with occasionally unstable flame signal a single recycle (including prepurge) or direct respark can be attempted. The setting is to be determined on the basis of burner capacity and relevant application standard. Since respark is allowed only for small burners, butterfly isn't closed before respark.



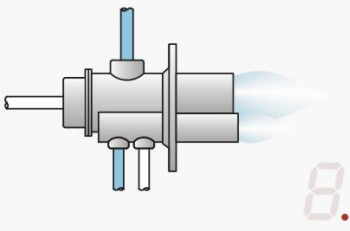
F513 – AIR LOSS DURING OPERATION

Determines the behavior at air loss during normal burner operation. For burners with occasionally unstable air pressure a single recycle (including prepurge) can be attempted. The setting is to be determined on the basis of burner capacity and relevant application standard.



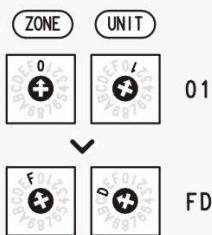
F601 – AIR OUTPUT DURING POSTPURGE

To suit different applications it's possible to change the behavior of the air valve (or fan) output during postpurge (or waiting time). It could be kept always closed, always open, controlled by means of P input at terminal 24 or through fieldbus command.



Q602 – POSTPURGE TIME

Follow EN 676 requirements to set correct postpurge time in forced draught burners. During this time air valve output is on and optional butterfly valve is open, an illegal flame test is carried out. Postpurge could be managed also through P input or fieldbus control.

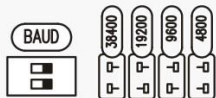


Q701 – ZONE (SEGMENT)

Communication identifier: group or zone belonging the burner control read from current dipswitch setting. Set FE or FF to disable communication (timeout).

Q702 – UNIT (NODE)

Communication identifier: burner control unit within a given area, group or zone read from current dipswitch setting. Valid range from 01 to FD (max 252 devices).

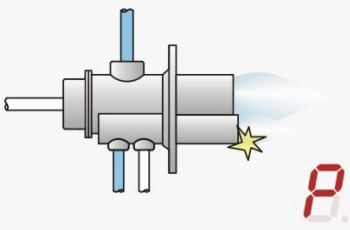


Q703 – BAUD RATE

Communication baud rate read from current dipswitch setting.

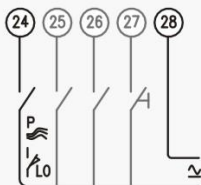
Q704 – COMMUNICATION TIMEOUT

Remote host must send a valid message within the specified time interval to prevent lockout, could be disabled or left in automatic mode (related to baud rate).



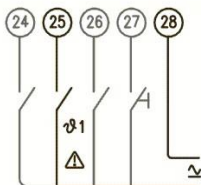
Q801 – BURNER TYPE

Selecting OIL type burner the ignition device will be activated also during the prepurge to allow the detection of oil leakage that will be ignited, leading to an illegal flame detection. Application and settings must be made in accordance to EN 230 (or other relevant standard) requirements.



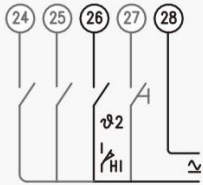
F802 – INPUT TERMINAL 24

Input at terminal 24 could be used for the control of air valve (or fan) in all states where the control through P input has been enabled. Optionally this input could be wired to low position limit switch of butterfly air valve (enabling this purpose all other related settings F804, F806 and F807 will be forced to butterfly air valve selection).



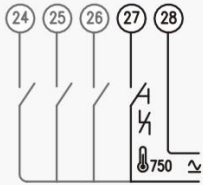
F803 – INPUT TERMINAL 25

A thermostat contact wired at terminal 25 can be used to shut-down or start the burner, disable this input when the burner is controlled by means of power supply or through fieldbus commands. Optionally this input could be used to enter commissioning mode.



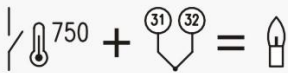
F804 – INPUT TERMINAL 26

Input at terminal 26 could be used to control the main burner while the burner ignition trial has been successfully completed, disable to run main burner unconditionally. Optionally this input could be wired to high position limit switch of butterfly air valve (enabling this purpose all other related settings F802, F806 and F807 will be forced to butterfly air valve selection).



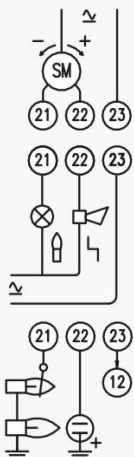
F805 – INPUT TERMINAL 27

Input at terminal 27 could be used to reset the burner from lockouts by means of remote push button. Optionally this input could be used for high temperature flame surveillance bypass by means of redundant control or enabling parameter Q808 to use local thermocouple safety confirmation.



F808 – HI-TEMP BYPASS TC CONFIRM

Instead of using redundant control on high temperature flame surveillance bypass, the local thermocouple can operate as a second channel confirmation. When this option is enabled, the bypass will be activated only when the local thermocouple input confirms that the temperature is above 750°C.



F806 – OUTPUT TERMINAL 21

Output at terminal 21 is normally used to provide a burner on signal to external control logic. Controlling dual stage burners using permanent pilot, this output could be used to switch the pilot burner flame detector. This output could be used also to close the butterfly air valve (enabling this purpose all other related settings F802, F804 and F807 will be forced to butterfly air valve selection).

F807 – OUTPUT TERMINAL 22

Output at terminal 22 is normally used to provide a burner lockout signal to external control logic. Controlling dual stage burners using permanent pilot, this output could be used to switch the main burner flame detector. This output could be used also to open the butterfly air valve (enabling this purpose all other related settings F802, F804 and F806 will be forced to butterfly air valve selection).

MFI – MULTI FUNCTION INTERFACE

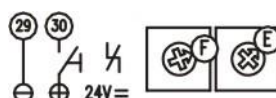
Multi Function Interface at terminals 29 and 30 is configurable for different purposes by means of dipswitches [8].

COMMUNICATION



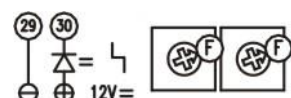
Selecting any address in the range 01...FD, MFI will be configured to operate as TraxBus communication interface. Once the communication is enabled a valid command must be received within timeout to prevent lockout.

RESET INPUT



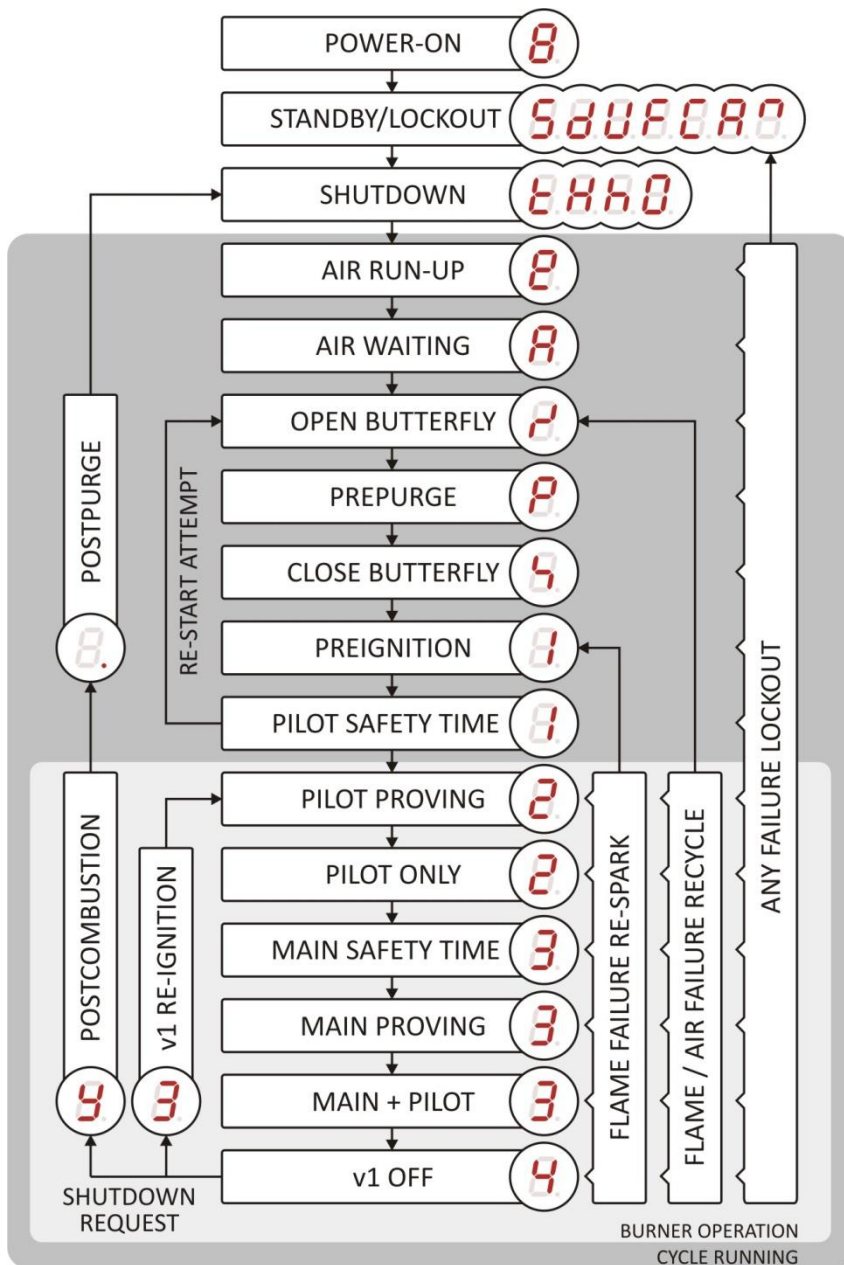
Selecting address FE, MFI will be set as reset input by means of remote push button powered at 24Vdc. This option will be useful to restore remote reset feature when input at terminal 27 is configured for flame surveillance bypass above 750°C.

LOCKOUT OUTPUT



Selecting address FF, MFI will be set as lockout output suitable to direct drive a LED from 12 Vdc at 35 mA. Simple burner lockout counter can be made wiring several outputs in parallel to a current meter (digital or analog).

PROGRAM SEQUENCE



A **SELF TEST** IS PERFORMED IN LESS THAN 1", ONCE SUCCESSFULLY COMPLETED THE BURNER IS READY TO START.

IF THE UNIT HAS BEEN TURNED OFF WHILE IN **LOCKOUT** OR PARAMETER Q101 HAS BEEN SET TO **STANDBY**, IT WILL BE NECESSARY TO RESET THE UNIT BY MEANS OF LOCAL PUSH BUTTON, REMOTE INPUT OR FIELD BUS COMMAND.

THE BURNER REMAINS IN **SHUTDOWN** UNTIL THE THERMOSTAT 1 IS CLOSED (IF ENABLED) OR A REMOTE RUN COMMAND IS RECEIVED FROM FIELD BUS.

A **FLAME SIMULATION** CHECK IS CONDUCTED DURING WAITING OR PREPURGE TIME.

AFTER THE PRESET **WAITING OR PREPURGE** TIME HAS ELAPSED, THE IGNITION DEVICE IS ACTIVATED AND VERIFIED, THEN THE PILOT VALVE (BOTH OUTPUTS V1/v1) IS OPEN.

PILOT PROVING PERIOD STARTS IF THE FLAME IS DETECTED WITHIN THE **SAFETY TIME**.

IF NO FLAME IS DETECTED DURING THE SAFETY TIME A FAULT LOCKOUT OCCURS. DEPENDING ON PARAMETER F403 THE UNIT COULD CARRY OUT UP TO 3 FURTHER **START-UP ATTEMPTS**.

AFTER THE FLAME PROVING PERIOD THE MAIN VALVE (V2) OPENS. THIS COMPLETES START-UP. THE **MAIN VALVE** IS CONTROLLED BY MEANS OF THERMOSTAT 2 (IF ENABLED) OR REMOTE FIELD BUS COMMANDS.

FLAME FAILURES DURING OPERATION LEADS TO AN IMMEDIATE LOCKOUT OR A RESTART OR A COMPLETE RECYCLE, DEPENDING ON Q512 PARAMETER SETTINGS.

AIR FAILURES DURING OPERATION LEADS TO IMMEDIATE LOCKOUT OR RECYCLE DEPENDING ON F511 PARAMETER SETTINGS.

A **SHUTDOWN REQUEST** (THERMOSTAT 1 OR FIELD BUS COMMAND) WILL TURN OFF THE BURNER, WAITING FOR ALLOWED POSTCOMBUSTION AND OPTIONAL POSTPURGE, BUT AN OPTIONAL ADJUSTABLE **MINIMUM COMBUSTION TIME** ENSURES THAT THE BURNER BURNS FOR A DEFINED PERIOD EVEN IF THE THERMOSTAT 1 IS SWITCHED OFF OR AN HALT COMMAND IS RECEIVED THROUGH FIELD BUS BEFOREHAND.

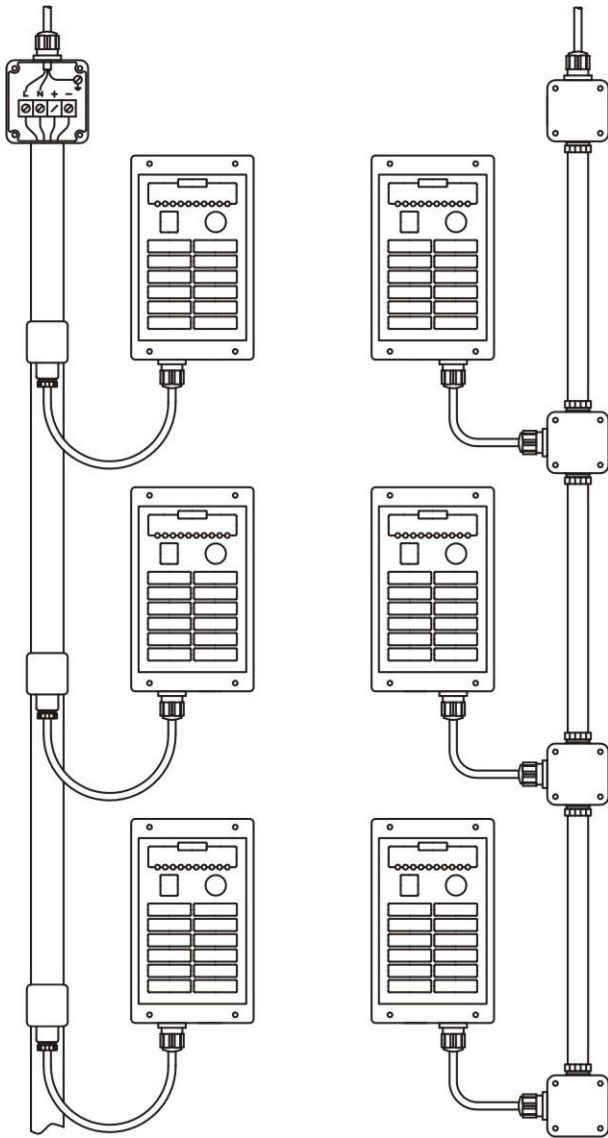
AN **AUTOMATIC SHUTOFF** OF THE BURNER CAN BE ACTIVATED, AFTER A PRESET TIME OF BURNER RUNNING. THE BURNER CAN WAIT FOR A MANUAL RESET OR RESTART IN AUTOMATIC MODE. A SELF TEST IS MADE AT EVERY RESTART. THIS PARAMETER MAY BE SET IN THIS WAY ONLY IF THE BURNER CAN RESTART AS INTENDED IN ALL OPERATING PHASES.

FIRING SYSTEMS OPERATING ABOVE 750°C ARE CONSIDERED TO BE A **HIGH TEMPERATURE EQUIPMENT** (SEE EN 746-2): FLAME PRESENCE MUST BE VERIFIED UNTIL THE FURNACE IS BELOW 750°C, BYPASS REQUEST CAN BE ISSUED THROUGH A CONTACT AT TERMINAL 27 (TWIN THERMOCOUPLE SAFETY TEMPERATURE MONITOR, DIN 3440) OR FIELD BUS CONTINUOUS COMMAND. LOCAL THERMOCOUPLE COULD BE USED AS REDUNDANT SIGNAL TO CONFIRM THE TEMPERATURE IS ABOVE 750°C (DIN 3440). WHEN A VALID BYPASS REQUEST IS RECEIVED THE INTERNAL FLAME CONTROL SYSTEM IS BYPASSED AND THE GAS VALVES ARE OPENED WITHOUT FLAME CONTROL: THE SYSTEM WORKS AS USUAL BUT WITHOUT FLAME MONITORING. WHEN THE TEMPERATURE IN THE FURNACE DROPS BELOW 750°C THE REMOTE CONTROL MUST BE RELEASED.

THE **BUTTERFLY AIR VALVE** IS MOVED TO CLOSE POSITION ENTERING THE SHUTDOWN, LOCKOUT AND AIR RUN-UP TIME. BEFORE TO START THE PREPURGE IT'S MOVED UNTIL THE MAX LIMIT SWITCH IS DETECTED, ONCE COMPLETED THE BUTTERFLY VALVE IS CLOSED AGAIN UNTIL THE MIN LIMIT SWITCH IS DETECTED. THE TRAVEL TIME IS EVALUATED AND WILL BE USED TO ESTABLISH THE POSITION WITHOUT HAVING TO USE FEEDBACK FROM A POTENTIOMETER. ONCE THE BURNER IS RUNNING AN EXTERNAL CONTROLLER CAN MODULATE THE POWER (REF. APPLICATION DRAWING), THE SAME CONTROL CAN BE ACHIEVED BY MEANS OF REMOTE CONTROL THROUGH FIELD BUS COMMANDS.

THE POSITION OF BUTTERFLY VALVE CAN BE CONTROLLED THROUGH FIELD BUS (ALSO WHILE IN SHUTDOWN AND LOCKOUT CONDITIONS TO MANAGE COOLING PROCESSES) ONLY AFTER THE FIRST TRAVEL TIME EVALUATION HAS BEEN PERFORMED.

FIELDBUS REMOTE CONTROL



TraxBus using busbars or single wire lines
Ref. to TraxInterface³ literature [B1300] for wiring details

Complete remote control and supervision is possible through built-in serial communication interface using proprietary fieldbus, designed for reliable operation in harsh industrial environments with simplified wiring. Communication protocol could be easily implemented into any programmable controller for great efficiency and low cost. Ready to use gateways are available to convert TraxBus into standard industry fieldbus systems. Typical communication time at different baud rates are summarized below.

Since any supervisor takes some time for internal processing, the real performance of the fieldbus must be computed adding such delay.

POLLING TIME FOR 1 BURNER

	4800	9600	19200	38400
COMMAND	15 ms	8 ms	4 ms	2 ms
ANSWER	15 ms	8 ms	4 ms	2 ms
OVERALL	30 ms	16 ms	8 ms	4 ms

POLLING TIME FOR 10 BURNERS

	4800	9600	19200	38400
COMMAND	150 ms	80 ms	40 ms	20 ms
ANSWER	150ms	80 ms	40 ms	20 ms
OVERALL	300 ms	160 ms	80 ms	40 ms

POLLING TIME FOR 100 BURNERS

	4800	9600	19200	38400
COMMAND	1,5 s	800 ms	400 ms	200 ms
ANSWER	1,5 s	800 ms	400 ms	200 ms
OVERALL	3,0 s	1600 ms	800 ms	400 ms

Messages to/from remote host supervisor must be ASCII characters, 8 bits, no parity, 1 or 2 stop bits.

COMMAND FROM SUPERVISOR TO PERIPHERALS

Commands are issued to peripherals within a single string terminated with Carriage Return.

< S N C KK <Cr>

- <** Preamble (from master)
- S** Segment, Zone identifier
- N** Node, Unit identifier
- C** Command
- KK** Checksum
- <Cr>** Carriage return

STATUS FROM PERIPHERALS TO SUPERVISOR

Peripherals will acknowledge all valid command received from supervisor:

> S N T KK <Cr>

- >** Preamble (to master)
- S** Segment, Zone identifier
- N** Node, Unit identifier
- T** Status
- KK** Checksum
- <Cr>** Carriage return

S and N can be any alphanumeric character and must match the settings of the peripheral to be addressed. Since Quad600 valid settings are within the range 01...FD, the maximum addressable units on a single bus are 252. The special character * (star) can be used like wild card to send broadcast command: a star character instead of S will address all existing nodes, a star character instead of N will address the whole segment, two star characters will address all the connected units. Of course no acknowledge answer will be sent back after broadcast commands.

CHECKSUM CALCULATION

Each command must include a valid checksum KK to be executed, all the answers will include a valid checksum KK that can be optionally evaluated by supervisor. KK is the ASCII figure of the sum of all characters HEX values, including Carriage Return. See example and use only last two characters, ignoring trailing ones (if any).

< 0 8 S 04 <Cr>	<	Equals HEX	3C +
	0	Equals HEX	30 +
	1	Equals HEX	38 +
	S	Equals HEX	53 +
	<Cr>	Equals HEX	0D =
		ASCII	<u>104</u>

COMMAND LIST

a	AIR OFF	F	TURN OFF THE AIR VALVE (OR FAN) OUTPUT WHEN MODE BUS IS ENABLED	
A	AIR ON	F	TURN ON THE AIR VALVE (OR FAN) OUTPUT WHEN MODE BUS IS ENABLED	
H	BURNER HALT	Q	SHUTDOWN THE BURNER (ONLY IF THERMOSTAT 1 IS DISABLED)	
R	BURNER RUN	Q	RESTART THE BURNER FROM SHUTDOWN (ONLY IF THERMOSTAT 1 IS DISABLED)	
m	MAIN OFF	F	TURN OFF MAIN BURNER, BACK TO PILOT BURNER	
M	MAIN ON	F	TURN ON MAIN BURNER	
f	FLAME OFF	F	TURN OFF FLAME DETECTION (HI-TEMP BYPASS ACTIVE)	§1
F	FLAME ON	F	TURN ON FLAME DETECTION (HI-TEMP BYPASS RELEASED)	
B	UNLOCK	Q	RESET THE BURNER FROM LOCKOUT, MUST BE CONFIRMED	§2
Y	UNLOCK CONFIRM	Q	CONFIRM THE RESET FROM LOCKOUT	
E	EXTEND	Q	FORCE THE BURNER TO PREPURGE UNTIL A 'COMPLETE' COMMAND IS RECEIVED	§3
C	COMPLETE	Q	COMPLETE THE PREPURGE TIME	
S	STATUS	Q	NO ACTION BUT STATUS REQUEST	
Bxx	BUTTERFLY RATE	F	MOVE THE BUTTERFLY AIR VALVE TO SPECIFIED RATIO, xx = 00 ... 99 %	§4
Oxx	OVERDRIVE BUTTERFLY	F	MOVE THE BUTTERFLY AIR VALVE BEYOND LOW (IGNITION POSITION), xx = 00 ... 99 s	
t	TEMPERATURE	F	ASK FOR CURRENT MEASURED TEMPERATURE	
Lxxxx	SET TEMP LIMIT	F	SET HIGH TEMPERATURE LIMIT, xxxx = 0100 ... 1000 °C	§5
L	READ TEMP LIMIT	F	READ CURRENT HIGH TEMPERATURE LIMIT	

- §1 HI TEMPERATURE FLAME SURVEILLANCE BYPASS COMMAND MUST BE ISSUED CONTINUOUSLY, A VALID BYPASS COMMAND MUST BE CONFIRMED PERIODICALLY WITHIN 1 MINUTE TO KEEP THE BYPASS ACTIVE, ELSEWHERE IT WILL BE RELEASED.
- §2 THE SUPERVISOR MUST SEND A RESET CONFIRMATION WITHIN 25 SECONDS FROM PERIPHERAL ACKNOWLEDGE TO RESET COMMAND. AN UNCONFIRMED RESET COMMAND WILL BE CANCELLED AFTER 25 SECONDS. RECEIVING AN ILLEGAL RESET COMMAND (i.e.: RESET WHILE NOT IN LOCKOUT) A LOCKOUT WILL BE FORCED TO PREVENT DANGEROUS OPERATION.
- §3 RECEIVING AN EXTEND COMMAND THE BURNER IS FORCED TO PREPURGE, IF THE BURNER IS RUNNING IT WILL BE TURNED OFF PERFORMING A COMPLETE RECYCLE INCLUDING SELF TEST. WHEN A 'COMPLETE' COMMAND IS RECEIVED, THE REMAINING PREPURGE TIME (IF ANY) WILL BE COMPLETED PROCEEDING TO NEXT CYCLE STEP.
- §4 BUTTERFLY COMMANDS WILL BE ACCEPTED ONLY AFTER FIRST TRAVEL TIME EVALUATION (1ST PREPURGE AFTER POWER-ON). A LIMIT SWITCH FAILURE WILL INHIBIT THE REMOTE CONTROL FEATURE UNTIL A NEW VALID TRAVEL TIME HAS BEEN EVALUATED.
- §5 A BURNER LOCKOUT IS PERFORMED WHEN THE TEMPERATURE MEASURED BY LOCAL THERMOCOUPLE IS ABOVE THE OPTIONAL TEMPERATURE LIMIT. ANY VALUE IN THE RANGE 0000 ... 0099 WILL DISABLE THE FEATURE, ANY VALUE ABOVE 1000 WILL BE CONSIDERED AS 1000°C.

STATUS LIST

S	STOP	Q	BURNER LOCKOUT OR FAILURE	
0	MANUAL SHUTDOWN	Q	BURNER OUT OF SERVICE (SHUTDOWN FROM PUSH BUTTON) / COMMISSIONING	
H	HALT	Q	BURNER SHUTDOWN	
P	PREPURGE	Q	PREPURGE IN PROGRESS	
1	IGNITION	Q	BURNER IGNITION TRIAL IN PROGRESS	
2	PILOT ON	Q	PILOT BURNER ON	
3	PILOT & MAIN ON	F	PILOT & MAIN BURNER ON	
4	MAIN ON	F	MAIN BURNER ON	
g	LIFE EXPIRED	Q	POST-LOCKOUT MAINTENANCE ALERT	
Y	POSTCOMBUSTION	Q	WAITING FOR FLAME QUENCHING	
W	POSTPURGE	Q	POSTPURGE IN PROGRESS	
txxxx	READ TEMP LIMIT	F	CURRENT TEMPERATURE, xxxx = 0000 ... 1024°C / EEEE ERROR / ---- TC OPEN	

TECHNICAL DATA

POWER SUPPLY

VOLTAGE	115 or 230 V +10-15%
FREQUENCY	50/60 Hz
LINE FUSE	3,15 A QUICKBLOW - 5x20mm
POWER CONSUMPTION	4 VA MAX
POWER DISSIPATION	3 W MAX
LIFECYCLE COUNTER	524288 IGNITIONS

ENVIRONMENT

OPERATING TEMPERATURE	0...60 °C
STORAGE TEMPERATURE	-20...80 °C
PROTECTION CLASS (EN 69529)	IP65
RELATIVE HUMIDITY	90% MAX
MOUNTING POSITION	ANY

OUTPUTS

RATED VOLTAGE	250 Vac MAX
SWITCHING VOLTAGE	277 Vac MAX
LOAD CURRENT	3 A MAX
MINIMUM CURRENT	1 mA @ 5 V
BREAKING CAPACITY	750 VA MAX

PROCESS INPUTS

RATED VOLTAGE	230, 115, 48, 24 Vac/dc
CURRENT	3 mA MAX

FLAME DETECTION

MINIMUM IONIZATION CURRENT	> 1 µA
CURRENT LIMITATION	1 mA
SIGNAL DISPLAY	0...100 µA
DETECTOR LINE LENGTH	< 30 m
SINGLE ROD LINE LENGTH	< 1 m
DETECTOR VOLTAGE	250 Vac
DETECTOR INSULATION	> 50 MΩ

AIR PRESSURE SWITCH

RATED VOLTAGE	250 Vac
RATED CURRENT	5 A

MULTI FUNCTION INTERFACE

VOLTAGE	30 Vdc MAX
OUTPUT CURRENT	35 mA @ 12 Vdc
INPUT CURRENT	10 mA @ 24 Vdc
FIELDBUS	TraxBus
BAUD RATE	4800, 9600, 19200, 38400

THERMOCOUPLE INPUT

MEASUREMENT RANGE	0...1023 °C
RESOLUTION	1 °C (INTERNAL 0,25°C)
COLD JUNCTION COMPENSATION	-20 ... 85°C
ERROR	±1 % (0÷700°C) ±2% (700÷1023°C)

EXTENDED PARAMETERS (FULL)

	F003	F004	F102	F201	F202	F203	F301	F302	F303	F304	F403	F501	F502	F503	F504	F505	F506	F511	F513	F601	F802	F803	F804	F805	F806	F807	F808	
F	2	-	N	N	00	N	00	Y	A	01	1	A	3	3	3	1	0	2	L	Y	P	T	T	R	B	L	-	DEFAULT

BASIC CONFIGURATION (QUAD)

	Q002	Q001	Q801	Q101	Q305	Q402	Q507	Q602	Q512	Q510	
Q6	N	230	G	A	020	03	01	001	L	-	DEFAULT

DEVICE CLASSIFICATION ACCORDING TO EN298	A / B	M / B	L / C / R	L	B	N (B)
DEVICE CLASSIFICATION ACCORDING TO EN230	A / B	I / T / M	L / C / R	L	B	N (B)



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