INNOVATIVE SAFETY SYSTEM GAS PRODUCTS

TECHNICAL PRODUCT SPECIFICATION

ELECTRONIC INGNITION AND CONTROL BOARD FOR WALL HUNG BOILER MIAL2

PREMISES

This technical specification is for MIAL2 family electronic boards

MIAL2XXX	Multiplatform board

REFERRING STANDARDS

The integrated modulation board MIAL2 is designed to fulfil the following European Standards:

UNI EN 298 / 2003	Automatic gas burner control system for gas burner and gas burning appliances with or without fan
CEI EN 60730	Automatic electrical controls for household and similar use

APPLICATION FIELD

The integrated electronic board MIAL2 acts all necessary safety and regulation conditions to manage gas boilers with an atmospheric or pre-mix gas burner and all the other functions necessary for an instantaneous and storage tank boiler.

CORRELATED PRODUCTS

The integrated board is preset to interface, as necessary or optional components, with the gas heater components having the following electrical specifications:

Product	Manufacturer /Model	Characteristics	Boiler version
MMI (Lcd display board)	Nordgas KDAE00C	Sk display LCD	All models
Pump		230Vac 1A cos φ 0,6	All models
Diverting valve		230Vac 1A cos φ 0,6	No bithermic version
Water filling valve		230Vac 1A cos φ 0,6	All models
Gas valve	SIT – SIGMA 845 / HWL	230 Vac 0,4A cos φ 0,6 Mod 9V- 310 mA	Atmospheric versions
Gas valve	SIT – SIGMA 848 / HWL	230 Vac 0,4A cos φ 0,6	Premix Condensing version
Combustion fan		230Vac 0,8A cos φ 0,6	Atmospheric fan assisted version
Combustion fan	EBM – RG128	230Vac – Vcc=18-43Vdc / Freq PWM 1-6KHz 2 pulse/rev	Premix Condensing version
Flame ignition device	Nordgas AC01ABK1FQ / other	External ignite	Atmospheric versions
Flame ignition device	Nordgas AC04ABK1LG / other	External ignite	Premix condensing version

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Air pressure switch	Nordgas NS2 – Huba - Yamatake	Contact COM-NO – contact load 24VDC 4 ÷ 40mA	Atmospheric fan assisted version
Flue thermostat		Contact NC – contact load 24VDC 4 ÷ 40mA	Atmospheric version
Flue thermostat		Contact NC – contact load 24VDC 4 ÷ 40mA	Premix condensing version
Timer switch		230Vac	All models
Timer switch (contact)		contact load 24VDC 4 ÷ 40mA	All models
Safety thermostat		Toff=100℃ / Ton=80℃ Contact NC – contact load 24VDC 4 ÷ 40mA	All models
Water pressure switch		Contact NC – contact load 24VDC 4 ÷ 40mA	All models
Floor heating thermostat		Contact NC – contact load 24VDC 4 ÷ 40mA	All models
CH Temperature probe	Nordgas TP - others	NTC 10K β3977	No premix condensing versions
CH Temperature probe	Nordgas TP - others	NTC 10K β3435	Premix condensing version
DHW temperature probe	Nordgas TP - others	NTC 10K β3435	All models
External temperature probe	Nordgas TP - others	NTC 10K β3977	All models
Return temperature probe	Nordgas TP - others	NTC 10K β3977	Premix condensing version
Room thermostat TA1/TA2		Contact NO – contact load 24VDC 4 ÷ 40mA	All models
DHW Flowswitch		Clean contact - contact load 24VDC 4 ÷ 40mA	All models
Remote control	Nordgas ROAB	OpenTherm remote control	All models
SK TA3 / optional zone	To Be Defined		All models

User Interface

Setting

There are 2 setting (potentiometers) on board, in order to set operating mode, heating temperature setpoint and DHW temperature setpoint. Selection pot has a rotation corner of 265° with 3- position and a modulation range for T° settings (He ating and DHW). Increasing temperature in clockwise (looking at the solders side)

P1 : Trimmer set heating

- 1° fixed position: summer .
- 2° fixed position: stand by/reset
- 3° position + setting range : winter with heating temperature setting

P2 : Trimmer set DHW

- 1° fixed position: service (chimney / offset setti ng)
- 2° fixed position: Test position for maximum heati ng power
- 3° position + setting range: DHW temperature setti ng

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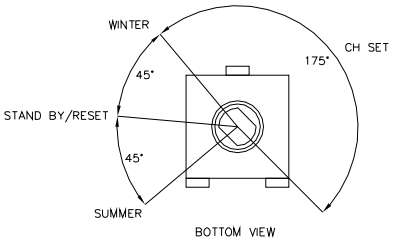
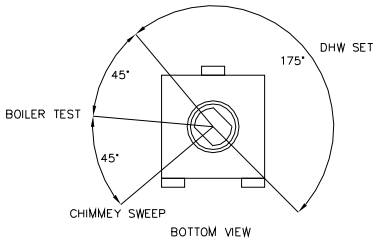




P1 : Trimmer set heating **P2 : Trimmer set DHW**

SIGNALS SIGHT

LED's
Electronic board driving 3 led's, are communicated following mode/info's

LD1 GREEN ON / OFF MODE

Led off	No power supply
led on (permanent)	ON mode selected : Summer or Winter
led on (blinking 50%)	OFF selected : Stand-by – Reset
led on (blinking 12%)	chimney mode selected; otherwise a Service function implemented

LD2 RED alarm

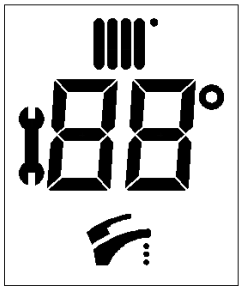
Led off	nessuna anomalia
led on (permanent)	anomalia ripristinabile dall'utente – RESET
led on (blinking 50%)	anomalia non ripristinabile dall'utente riservata ad assistenza tecnica – SERVICE
led on (blinking 12%)	selezione di modalità di funzionamento non consentita all'utente / una delle funzioni Service che lo prevedono

LD3 YELLOW flame presence

Led off	No flame
led on (permanent)	Flame (false flame too)
led on (blinking 50%)	Automatic water fill running, if released by SW6

LCD board optonal

The system support also an optional display LCD board as below:



LCD description

S1 – radiator:

- S1 is fixed ON when is selected WINTER mode (Heating on)
- S1 is blinking ON when a heating cycle is running
- S1 is blinking ON with digit DG1 when modifying heating temperature setpoint by potentiometer P1 or slope of weather depending control (when outside probe is connected)

S2 – tap:

- S2 is OFF if the boiler is known as ONLY HEATING
- S2 is fixed ON when is selected winter or summer mode (DHW released)
- S2 is blinking ON when a DHW cycle is running
- S2 is blinking ON with digit DG1 when modifying DHW temperature setpoint by potentiometer P2.

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S3 – SERVICE tool:
- S3 is fixed ON when is selected the SERVICE mode (only for service).

S4 – degree:
- S4 is fixed ON when with digit DG1 is showed temperature
- S4 is blinking ON with digit DG1 when modifying SETPOINT

DIGIT
2 digit, called DG1 shows follows info (dependig selected mode, boiler state)

- ALARM code signal (blinking)
- SERVICE functions signal
- During DHW temperature setting, shows blinking value
- During HEATING temperature setting, shows blinking value
- During weather depending control slope (when outside probe is connected), shows blinking value
- Shows DHW actual temperature when running (no implemented on DHW tank boiler version).
- Shows heating flow temperature when running (if no one above conditions are present)

SETTINGS

COMBUSTION GROUP CONFIGURATION
Self recognition of combustion group acts in follows way

Return sensor	***Feedback Hall (FAN)***	***Bridge FF/ATM* M1 pin 1 - 5**	***Boiler version***
Not connected	Not connected	Connected	ATMO Open chamber
Not connected	Not connected	Not connected	FF Close chamber
Connected	Connected	Not read	CONDENSING

HYDRAULIC GROUP CONFIGURATION
By a couple of bridges can be configured the boiler hydraulic group by this schema

M2 pin 8-10 BHITERMIC or MONOTHERMIC	**M16 pin 73-74 DHW TANK BOILER or ISTANTANEOUS**	**BOILER CONFIGURATION**
Not connected	Not connected	MONOTHERMIC
Connected	Not connected	BITHERMICA
Not connected	Connected	DHW TANK BOILER
Connected	Connected	Not assigned

NOTE: ONLY HEATING version
The 'monothermic' configuration (= Not connected bridge M2 pin 8 - 10), could be used also to support ONLY HEATING boilers, by installing a fixed resistance 2,2kohm replacing DHW sensor, in order to assume a 70℃ temperature and also to avoid the alarm for the sensor and no frost protections. The firmware is able to manage in right way, the displayed info's on eventual LCD board.

FUNCTIONAL CONFIGURATIONS
By setting a 6switch mini-deep can be made follows selections:

Switch-dip	**Selezione**	**Posizione OFF**	**Posizione ON**
SW1	GAS type	NATURAL GAS	LPG
SW2	HEATING RANGE main zone	Standard Range	Reduced Range
SW3	EXCLUSION Heating switch on delay	Delay - 3 minuts	No delay
SW4	DHW switch off	Fixed	Linked to the set point
SW5	Function mode heating pump	Standard	Excluded during heating
SW6	Automatic water filling	Excluded	Released

PARAMETER SETTING – Only by Remote Control
Besides to the settings above, it is previewed other settings by TSP parameters supported by Remote Control:

Nr. par	**Parameter**	**Range**	**Description**
0-2	Not supported		
3	POWER soft switch on (COND)	35¸99	Showed as % of the maximum power
4	Max POWER in Heating	00¸99	Showed as % of the maximum power
5-10	Not supported		
11	Pre-Heating (ISTANTANEOUS) Today non implemented	0¸1	0 = Not actived 1 = Actived
12	Chimney sweep / Offset	0¸1	1= Actived to the maximum power 0 = ONLY COND – actived to the minimum power

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13	Minimum FAN speed - COND	NatGas:13,30 LPG: 15,30	Showed in RPM / 100
14	MAXIMUM FAN speed - COND	NatGas:38,62 LPG: 38,,62	Showed in RPM / 100
15	Pre-purge time COND	1,10	Showed in sec.
16	Post-purge time COND	10,30	Showed in sec.
17	Configuration input TA2	20,78	Flow temp requested by TA2 (2nd zone)
18	RPM fan display - Premix	0 // show	Changing value from 0 is realised display RPM /100 actual

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GENERAL TECHNICAL FEATURES

Main voltage / frequency	230Vac -15% + 10% 50Hz
Max load	25 VA
Fuse protection	2 FA
Operating temperature	-20℃ ¸ +60℃
Operating temperature LCD board	-10℃ ¸ +60℃
Stocking temperature	-25℃ ¸ +80℃
Humidity	90% @ 40℃ not condensing
Protection class against electrical picks	cl.II
Working ambient	clean
Protection class	IP00

FLAME CONTROLS PARAMETERS

GENERALS

Classification according to EN298	B-M-C-L-X-N
System type	not permanently operating
Lock type	non-volatile
Operating mode	direct burner ignition
Flame detection method	ionisation
Control cycle	recycling
Polarization (phase/neutral) main supply	present
Rated ionisation current (Imin)	0,5µA
Recommended Ionisation current	3÷5 * Imin
Maximum parasitic capacity electrode	<1nF
Detection electrode and cable (to earth) resistance	≥50MΩ
Kind of manual reset	manual
Flame ignition device	external
Max length connections wire	2 mt
Max length flame electrode wire	1 mt
Ignition attempts for close chamber versions (FF e PREMIX)	3
Ignition attempts for open chamber versions (ATMO)	2
Ignition attempts during test cycling	1
Waiting time (TW) (1st relay Vgas ON)	1,5 sec
Safety time (TS) (both relays Vgas ON)	10 sec
Answer time after flame disappearing	<1 sec

NOTE: Timings declared are in compliance with the standards. Real TW value can be longer and TS value can be shorter compared to declared.

TIMINGS ATMO VERSIONS ATM/FF

T purge between multiple attempts cycle (1st relay Vgas = fan FF ON)	20 sec
T off between multiple attempts cycle (1st relay Vgas = fan FF OFF)	10 sec
T air pressure switch error signal	20 sec
T air pressure switch state analysis	3 min
T reset after safety shut down	5 min
T post purge ending cycle - FF	20 sec

TIMINGS PREMIX CONDENSING VERSION

T PRE purge starting cycle (TSP 15)	1-10 sec
T POST purge ending cycle (TSP 16)	10-30 sec
T purge between multiple attempts cycle (both relays Vgas OFF- PREMIX fan ON in RLA)	20 sec
T off between multiple attempts cycle (both relays Vgas OFF- PREMIX fan ON in RLA)	10 sec
T flame detection	3 sec

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HEATING MANAGEMENT

Range Heating temp STANDARD	+35 ℃ ¸ +78 ℃
Range Heating temp REDUCED	+20 ℃ ¸ +45 ℃
Overheating Thermostat OFF	set-point + 5 ℃
Overheating Thermostat ON	set-point
Timing Heating power increasing (CONDENSING and ATMO)	25 sec
Timing Heating power increasing (overheating)	2 min
Timing Heating overrun	30 sec
Timing overheating thermostat	0 - 3 min
External temp sets Min flow temp requested	+27℃
External temp sets Max flow temp requested	+5℃
KD coefficient slope range	0.0-3.0

DHW ISTANTANEOUS - BITHERMIC and MONOTHERMIC

Preselection DHW temp range: SAN-OUT	+30 ℃ ¸ +55 ℃
Switch off DHW Temp. – overtemperature thermostat OFF (fixed mode)	75 ℃
Switch on DHW Temp. - overtemperature thermostat ON (fixed mode)	60 ℃
Switch off DHW Temp. – overtemperature thermostat OFF (linked to setpoint mode)	setpoint + 3 ℃
Switch on DHW Temp. - overtemperature thermostat ON (linked to setpoint mode)	setpoint + 2 ℃
Switch off Flow Temp. - overtemperature thermostat DHW OFF (bithermic version)	+95 ℃
Switch on Flow Temp. - overtemperature thermostat DHW ON (bithermic version)	+80 ℃
Limit Set Flow Temp. DHW (monothermic version)	75 ℃
Switch off Flow Temp. - overtemperature thermostat DHW OFF (monothermic version)	+90 ℃
Switch on Flow Temp. - overtemperature thermostat DHW ON (monothermic version)	+80 ℃
Overrun time (DHW) Bithermic	0,25 sec
Overrun time (DHW) Bithermic /Monothermic in WINTER MODE	3 sec

DHW TANK BOILER

Tank sensor version

Temp setting range DHW tank	+30 ℃ +60 ℃
Temp Storage tank priority - thermostat priority DHW ON	setpoint - 3 ℃
Temp. Storage tank end priority - thermostat priority DHW OFF	setpoint + 3 ℃
Modulation Max flow Temp. In DHW Tank phase	80 ℃
Modulation Min flow Temp. In DHW Tank phase	setpoint + 15 ℃
DHW tank Temp. sets Max flow temp	setpoint - 8 ℃
DHW tank Temp. sets Min flow temp	setpoint
Flow Temp. Switch off - thermostat overtemperature flow OFF	+85 ℃
Flow Temp. Switch on - thermostat overtemperature flow ON	+75 ℃

Thermostat version

Modulation flow Temp DHW tank boiler phase	setpoint + 15 ℃
Flow Temp. Switch off - thermostat overtemperature flow OFF	+80 ℃
Flow Temp. Switch on - thermostat overtemperature flow ON	+70 ℃

DHW tank sensor and Thermostat common data

Overrun time DHW	180 sec
Legionella DHW tank Temp. (switch on)	+ 60 ℃
Flow Temp. Switch off - thermostat overtemperature flow OFF during Legionella protection function	+85 ℃
Flow Temp. Switch on - thermostat overtemperature flow ON during Legionella protection function	+75 ℃

SERVICE (Chimney sweep / Offset)

Time Setting service functions	5 sec
Time entering service functions	15 sec
Max Time service functions	15 min
Overtemperature (flow) thermostat in Service OFF standard heating range	+ 85 ℃
Overtemperature (flow) thermostat in Service ON standard heating range	+ 60 ℃
Overtemperature (flow) thermostat in Service OFF reduced heating range	+ 48 ℃
Overtemperature (flow) thermostat in Service ON reduced heating range	+ 45 ℃
Overtemperature (DHW) thermostat in Service OFF	+ 75 ℃
Overtemperature (DHW) thermostat in Service ON	+ 60 ℃

FROST PROTECTION

Flow Temp. Starting frost protection Heating ON	+ 5℃
Flow Temp. Starting frost protection Heating OFF	+ 30 ℃

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DHW Temp frost protection DHW ON	2 ℃
DHW Temp frost protection DHW OFF	3 ℃
Overtemperature thermostat Flow phase Frost protection DHW ON	55 ℃
Overtemperature thermostat Flow phase Frost protection DHW OFF	60 ℃
Overtemperature DHW tank phase Frost protection DHW ON	+ 5 ℃
Overtemperature DHW tank phase Frost protection DHW OFF	+ 30 ℃
Overtemperature thermostat Flow phase Frost protection Boiler ON	75 ℃
Overtemperature thermostat Flow phase Frost protection Boiler OFF	85 ℃
Overrun time frost protection heating side	30 sec
Overrun time frost protection DHW side	30 sec
Burner power during Frost protection	30% pot MAX
Flow temp / DHW starting emergency Frost protection ON	+ 5 ℃
Flow temp / DHW starting emergency Frost protection OFF	+ 8 ℃
Emergency Frost protection timing heating side	2,5 min
Emergency Frost protection timing DHW side (if present)	2,5 min
Flow temp / DHW starting Frost protection ON	+ 0 ℃
Flow temp / DHW starting Frost protection OFF	+ 1 ℃

LOCKING PROTECTION

Switch on time no lock pump	every 24 hours
Timing cycle locking protection pump	30 sec
Switch on time no lock diverting valve	every 24 hours
Timing cycle locking protection diverting valve	10 sec

WATER FILLING FUNCTION

H2O automatic fillings after “power-on”	5
H2O automatic fillings 24 hours after “power-on“	3
Minimum Time between H2O automatic fillings	4 sec
Maximum time of H2O automatic filling	4 min
Time to “reset” 3 H2O automatic fillings	24 hours

VARIOUS

Pump overrun time after safety thermostat	3 min
Fan overrun after safety thermostat	3 min
Display time real maximum power	5 sec
Time confirmation for set value	30 sec
Time test function	10 min
Switching time electric diverting valve	5 sec
Floor thermostat timing	30 sec
Time-out to reset on board by remote control	5 min
Timing remote control re-connection	1 min
Maximum reset trying by remote control	5
Maximum reset trying by panel	5
Flow temperature sensor range	-5 ℃ ¸ +105 ℃
DHW temperature sensor range	-5 ℃ ¸ +105 ℃
External temperature sensor range (if connected)	-40 ℃ ¸ +60 ℃
Return temperature sensor range (if connected)	-5 ℃ ¸ +105 ℃
Switching temperature tolerance (into the range)	± 3 ℃
Timing general tolerance	5 %

Tradizional combustion version (Atmo open-close chamber)

Timing max slope traditional softlite	8 sec
Safety thermostat timing (fan) in stand by mode	3 min
Modulator correct functional range with CH4	30 ¸ 230 mA
Modulator correct functional range with LPG	45 ¸ 310 mA
Final % in softlite (FF version)	80%
Final % in softlite (ATM version)	65%
Final % in heating mode (ATM-FF versions)	99%
Current tolerances	10%

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Premix condensing combustion version

Time holding on RLA	3 sec
Fan supply	230Vac 50Hz
Frequency PWM fan	4Khz
Hall signal RPM	2 pulse/rev
PWM fan tolerance	+-5%
Minimum PWM start up	20%
Minimum PWM running	5%
Minimum fan speed range CH4 (SW1 = OFF)	1300÷3000 RPM
Maximum fan speed range CH4 (SW1 = OFF)	3800÷6200 RPM
Minimum fan speed range LPG (SW1 = ON)	1500÷3000 RPM
Maximum fan speed range LPG (SW1 = ON)	3800÷6200 RPM
Fan speed to release burner CH4 (SW1 = OFF)	1000 RPM
Minimum safety limit fan speed CH4 (SW1 = OFF)	1000 RPM
Fan speed to release burner LPG (SW1 = ON)	1300 RPM
Minimum safety limit fan speed LPG (SW1 = ON)	1300 RPM
Sicurezza massimi giri ventilatore	Setpoint + 400 RPM
Post-purge timing	10¸30 sec
Pre-purge timing	1¸10 sec
Maximum fan speed time after reset	15 sec

Working mode and priority

Operating mode and decreasing priority

OFF - STAND-BY
All normal functions are enabled. Only following functions are running (decreasing way)

External frost protection
Automatic water refill (if released)
Frost protection heating plant
Frost protection DHW plant
Emergency frost protection
Lockout electric diverting valve
Lockout pump

SUMMER

External frost protection
Automatic water refill (if released)
Chimney sweep function / Setting OFFSET / Service functions set in summer mode
Heat demand for DHW instantaneous - only in the DHW instantaneous version
Heat demand for DHW boiler tank - only in the DHW boiler tank version
Legionella function - only in the DHW boiler tank version
Frost protection heating plant
Frost protection DHW plant
Emergency frost protection
Lockout electric diverting valve
Lockout pump

WINTER

External frost protection
Automatic water refill (if released)
Heat demand for heating
Heat demand for DHW instantaneous - only in the DHW instantaneous version
Heat demand for DHW boiler tank - only in the DHW boiler tank version
Legionella function - only in the DHW boiler tank version
Frost protection heating plant
Frost protection DHW plant
Emergency frost protection
Lockout electric diverting valve
Lockout pump

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Functional characteristics

- Managing and display protections
- Reset alarms
- Gas type selection
- Lighting on mode with power setting
- Power slope increasing in heating mode
- Combustion modulation in heating mode
- Burner switch on delay in heating mode (set)
- Two way to run of the pump in heating mode
- Timed pump overrun
- Two heating temperature range (set) for main heating zone
- Second heating zone with different temperature
- SERVICE functions (Chimney-sweep or OFFSET setting)
- Heating maximum power setting
- SERVICE function display maintenance
- Test function
- Heating frost protection
- Emergency frost protection
- External frost protection
- Display necessity to set parameters (ALARM E22)
- Lockout pump
- Electric diverting valve
- Lockout electric diverting valve
- Floor heating thermostat input
- H2O pressosthat min displayed – Automatic H2O filling NOT released – alarm E10
- H2O pressosthat min displayed – Automatic H2O filling released by SW6
- Temperature sensors test
- Displaying switch P2 (DHW) not allowed position (to the user)
- Short-circuit gas modulator protection – ATMO (FF & Open Ch) versions
- Frost protection by warming resistance
- Analogic clock timer allowed (optional)
- Boiler remote control
- Functions managed from remote control
- Main heating zone managed by remote control
- Wheater depending functions by remote control
- Flow temperature management by wheater depending function (external sensor) - WITHOUT remote control
- Flow temperature management by wheater depending function (external sensor) - WITH remote control
- Plant configuration (with or without remote control / external sensor)
- Display – with display LCD board alone (and combined with remote control)
- PC connection for technical diagnostic

Characteristics versions : Atmo bithermic and monothermic, instantaneous boiler version

- DHW combustion modulation –Bithermic and Monothermic versions
- Switch-off and (re)switch-on temperature setting in DHW mode
- DHW frost protection

Characteristics version : DHW storage tank with sensor or thermosthat (priority switch)

- DHW combustion modulation (in DHW storage tank warming)
- Flow overtemperature thermostat in in DHW storage tank warming
- Legionella function
- DHW tank frost protection
- Pump overrun time
- DHW tank recognized presence
- Disabled DHW storage tank warming function

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Characteristics version condensing premix combustion

- Fan speed modulation
- Pre-purge time
- Post-purge time
- Fanspeed minimum and maximum setting
- Safety management minimum / maximum fan speed
- Ventilation cycle after reset
- Condensing Premix typical safety management

Burner flame control characteristics

- Timeout function 12/24 hours
- Boiler start-up cycle ATMO open chamber version
- Boiler start-up cycle ATMO close chamber version
- Boiler start-up cycle PREMIX CONDENSING version
- Deviations from normal switch-on sequence
- Loss of flame during normal running
- Timing of post purge
- Typical faults of burner control
- Reset of typical faults of burner control
- Configuration fault boiler version ATM/FF and CONDENSING
- Safety thermostat working with heat demand
- Safety thermostat working without heat demand
- Flue thermostat (ATM and CONDENSING)
- Return overtemperature sensor working with heat demand (CONDENSING)
- Return overtemperature sensor working without heat demand (CONDENSING)
- Loss of flame
- Air pressure switch fault (FF version)
- Non volatile lockout
- Safety shut-down
- Temporary safety lockout (APS for FF)
- Permanent lockout for changed boiler configuration ATM/FF or TRAD/COND

Boiler diagnostic – Fault conditions displayed

Alarm status are displayed on main board by red led and, if present, on LCD display board abd/or remote control with assigned error code. On following schema the supported errors by an decreasing priority

Error description	Effective reset	Boiler displaying		Remote displaying	
		Led	LCD	Indication	Error
System Error - specific indication if possible - if not possible	OFF cause OFF cause	3 led fixed ON 3 led fixed ON	42 ---	RIC SERVICE	E42
Boiler configuration error ATM/FF No condensing version	RESET (if originally configuration)	Red blink 50 %	33	BOILER RESET	E33
Boiler configuration error Bit/Mono version	RESET (if originally configuration)	Red blink 50 %	34	BOILER RESET	E34
Boiler configuration error DHW tank/Ist	RESET (if originally configuration)	Red blink 50 %	46	BOILER RESET	E46
Remote control communication error (if recognized)	OFF cause	Red blink 50 %	31	COMMUNICATION	E31
Request setting parameters working	Power-off	Red blink 50 %	22	RIC SERVICE	E22
Frost protection running	OFF cause	Red blink 50 %	39	RIC SERVICE	E39
H2O allowed refill's end (automatic H2O refill released)	ON/OFF power supply	Red blink 50 %	21	RIC SERVICE	E21
H2O refill not completed for timeout (automatic H2O refill released)	ON/OFF power supply	Red blink 50 %	19	RIC SERVICE	E19
H2O refill running (automatic H2O refill released)	-----	YELLOW	18	FAULT	E18
H2O switch	Manual H2O refill	Red fix	10	BOILER RESET	E10
Safety fault # RPM fan – ONLY CONDENSING	RESET + OFF cause	Red fix	16	BOILER RESET	E16

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T°Fuse (ONLY CONDENSING)	Fuse's no reset chance, mandatory SERVICE	Red blink 50 %	03	RIC SERVICE	E03
Flow sensor fault	OFF cause	Red blink 50 %	05	RIC SERVICE	E05
Return sensor fault ONLY CONDENSING	OFF causa	Red blink 50 %	15	RIC SERVICE	E15
Overtemperature return ONLY CONDENSING	RESET	Red fix	43	BOILER RESET	E43
Safety thermostat	RESET	Red fix	02	BOILER RESET	E02
Flue thermostat Only ATMO open ch. version	RESET (with close contact)	Red fix	03	BOILER RESET	E03
LOCKOUT for loss of flame	RESET	Red fix	01	BOILER RESET	E01
Floor safety thermostat	RESET (with close contact)	Red fix	24	BOILER RESET	E24
Only ATMO FF Air pressure switch fault (not switched after 20"sec after fan ON and before 3' min of release)	OFF cause	Red fix	03	BOILER RESET	E03
Only ATMO FF	RESET	Red fix	03	BOILER RESET	E03
Air pressure switch fault NOT switched (released after 3' min)	- Automatic after 5' min If RT on - New RT	Red fix	03	BOILER RESET	E03
Only ATMO FF Air pressure switch fault switched with fan OFF	OFF cause (after RESET fault displaying remains)	Red fix	03	BOILER RESET	E03
False flame recognition (immediately latch of error with/without RT)	- Automatic after 5' min If RT on - New RT	Red fix Yellow fix	35	BOILER RESET	E35
DHW sensor fault	OFF cause	Red blink 50 %	06	RIC SERVICE	E06
DHW tank sensor fault	OFF cause	Red blink 50 %	12	RIC SERVICE	E12
External sensor fault	OFF cause	Red blink 50 %	38	RIC SERVICE	E38
Chimney sweep running	---	GREEN blink 12 %	S3 on	STATE 7	
OFFSET set running	---	GREEN blink 12 %	S3 on	STATE 7	
Setting MAX Power Heating-mode running	---	GREEN blink 12 %	S3 on	RIC SERVICE	
Operating mode selection not allowed	Reset correct position P2	Red blink 12 %	"- -" blink	RIC SERVICE	E31
Remote control connected, operating mode OFF or WINTER	Reset correct position P1	Local mode as P1		RIC SERVICE	

Reset fault conditions
In case of fault conditions with manual reset needed, it will be made on main board by Reset Turning selector to STAND-BY/RESET position and hold in this way for at least 1" sec.
The reset could be made also by remote control, if present, by the reset button.
NOTE : User RESET's made by boiler panel (board) P1, as by remote control, are limited (5 consecutive RESET's). The number of RESET's possible is re-increased after 1' min (Max limit of 5).

Reset of configuration errors (simplified procedure)
The configuration errors (E33,E34,E46) could be reset after switch-off / switch-on only if the configuration is correctly recognized and released when fault is found. In this case E33 needs manual reset from user, for others errors the reset is automatic.

SERVICE functions (chimney sweep traditional boiler or condensing Premix boiler offset setting)

FUNCTIONS MANAGEMENT FROM BOILER PANEL

a. turn P1 (set heating) to summer position
b. turn P2 (set DHW) to chimney sweep position (if LCD present displayed '--')
c. hold selector in this position at least for service release time [5"sec], up to green led starts blinking for function running or if on LCD is displayed ' SE';
d. put P2 in original DHW setting position within service functions activation time [15"sec]. Green led blinking and LCD (if present) displays S3 (service tool). Digit's displays flow temp in atmo version or RPM fan (x100) in cond version.
If P2 will not put within right time, function will be interrupted and will be displayed wrong operating mode fault; to reset it will be necessary to repeat all the procedure.

This function when activated, leads the burner to the MAX power in ATMO boiler version (chimney sweep). In COND boiler version is possible manage power to the minimum or maximum in order to set the "offset" for P2 trimmer.

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FUNCTIONS MANAGEMENT PARAMETERS – TSP 12 (by REMOTE CONTROL)

Chimney sweep/ Offset setting is activated modifying value par 12 from default value 0 to value 1.
The activated function will be displayed on boiler panel with green led blink 12% and on LCD with S3 (service tool) fixed switch on.
This function when activated, leads burner to the MAX power with ATMO boiler version (chimney sweep). With COND boiler versions is possible manage minimum power or maximum power acts on parameter 12 to the value 0 or 1.

Function Heating maximum power

FUNCTION ACTIVATION by BOILER PANEL

a. turn P1 (set heating) to summer position
b. turn P2 (set DHW) to TEST position (if LCD present displayed '--')
c. hold selector in this position at least for service release time [5"sec], up to green and red led starts blinking for function running; or if LCD is present after release time will be displayed for 5"sec actual value MAX heating power and then ' PO'
d. put P1 in original Heating temp setting to the MAXIMUM value within service functions activation time [15"sec]. LCD (if present) displays maximum heating power blinking value.

Note: Burner switch on starts when P1 return to the MAXIMUM heating temp setting value. If in that moment is present DHW heat demand, burner is not switch on.

During MAX heating power setting is possible release the "record" holding selector P1 in the same position for all the release time value. Green led is fix switched on and LCD (if present) displays power value. Now MAX heating power could be recorded in EEprom putting P2 into the DHW setting range. When recording is done the green and red led are light on fixed or LCD displays '--'
If P2 selector is not returned to the DHW tem setting position in right time, function will be interrupted and operating mode select not allowed will occurs; to reset it will be necessary to repeat all the procedure.
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FUNCTION ACTIVATION by REMOTE CONTROL – PARAMETERS TSP 4

Max Heating Power function become running after par 4 value modification.
The running function is displayed on boiler panel with green led blinking 12% and on LCD with S3 (service tool) fixed light on. During MAX power setting from remote control by TSP 4, on LCD is displayed the same MAX power value as by remote control with DG1 LAMPEGGIANTE.

This function takes time as max time service functions, starting from beginning of function activation; it can be interrupted within end, turning P1 to STAND-BY position if this is released, or modifying value of selected parameters if remote control connected.

Room thermostat / Remote control

The electronic board support the connection with an OpenTherm remote control, or contacts for room thermostat TA1. Wirings of remote control to the board is made by 2 no-polarized contacts, protected against short-circuit. Communication between board and remote control is supported only in SUMMER mode selected by P1 on boiler panel; after communication estabilished the electronic board user interface becomes enabled. In case of communication-fall, system will try to restore it for a max time (Remote restore trying time); after this time the board restart to work locally up to the connection will be re-established. In alternative to the opentherm remote control, it is preview chance of connecting a classic chronothermostat with closure contact. In this case, making a short-circuit of 2 connectors will source an heat demand in heating mode.

Test function

In order to simplify the end production line test on start supply voltage and up to end of Test function time [10" min], when it is powered on, it starts this function; during this an eventual heat demand will be given resetting timings (Heating power increasing and Heating switch on delay. Test function running is not displayed. During this test function collaudo trying numbers is limited to 1, in order to boost the end production line test procedure. There is a maximum limit number of function test allowed. There are 10 power-on; ending this number a new power-on doesn't work and this function is enabled.

Telemetria (Data log acquisition)

By an appropriate board RS232 it is possible to transmit in real time functionals parameter of the boiler to a PC (with a dedicated software installed). It allows managing data received from boiler; the data's are displayed on PC and could be saved and transformed in a data-sheet (.Xls).

"ISP" functions – Microprocessor re-programming in-situ

Electronic board is supplied with an appropriate connector to re-programming ISP (In Situ Programming); it allows microprocessor firmware update without removing it from board (allowing an update without removing electronic from boiler).

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INSTALLATIONS

General conditions

- When installed the protection class must be at least IP40 (EN60730-1).
- High ambient temperature acts on effective product life. Try to install board in a position with minimum ambient temperature and with less infra-red heating possible.
- The board could not be repaired. In that case safety functions getting compromised and for this reason are FORBIDDEN.
- Connected devices must be correct from electrical point of view for charges leaded by automatic burner control.

Electrical wirings

- Connection and configuration of device must be made without power supply.
- Connection device must be made in compliance with the standards.
- It is recommended to check, correct timings and item code, before installing or replacing device.
- Must be insured correct connection between device ground connector, metallic body of the burner and protection ground of electric plant.
- In case of reverse connection PHASE – NEUTRAL, device goes in lockout flame.

Wirings

- Electronic board must be connected follows indications:
- Use separated tracks between wires (must be avoid to bind low and net voltage wires).
- Must NOT be used multipolar wires to connect more than one external device with one cable. Use of this kind of wire (multipolar) to connect more than one device it is forbidden.
- It is recommended to use connecting cables with correct insulation, working temperature and humidity resistance. Sparks generator outputs cable must be separated from all other wirings and must shorter than possible (EMC).
- Electrode cable (flame detection) must be separated from all other wirings and must shorter than possible (EMC).
- Electrode cable (flame detection) is not protected against electric shock; wire and flame sensor must be protected for direct contact. Corrent value is 0,1mA (0,0001 A).

DOC REV:	DATA REV:	DESCRIZIONE REV:

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