TraxGateway.ETH

TraxBus to PROFINET CONVERTER

TraxBus™ is a dedicated fieldbus specifically designed to operate in very harsh environments where electrical noise generated by ignition transformers makes very difficult to operate for any standard physical layer.

PROFINET® is an industry technical standard for data communication over Industrial Ethernet, designed for collecting data from, and controlling equipment in industrial systems, with a particular strength in delivering data under tight time constraints.

TraxGateway.ETH allows to control, from PROFINET-IO controllers, up to 99 burners operated by QBK (Burner Control Units) in a TraxBus network.

CE

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.

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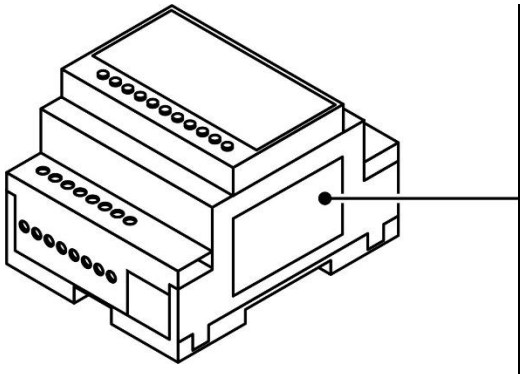
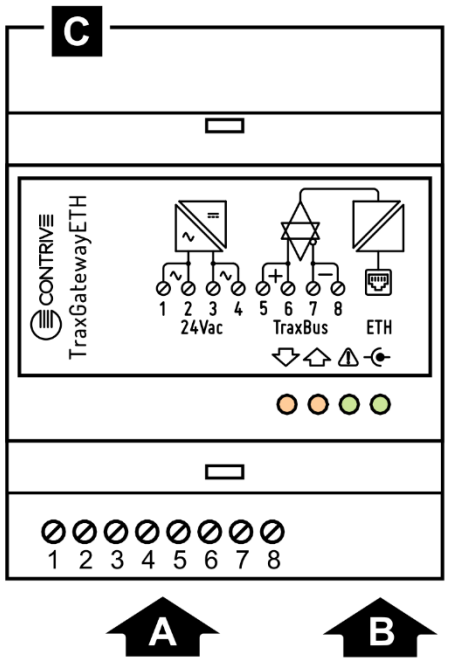
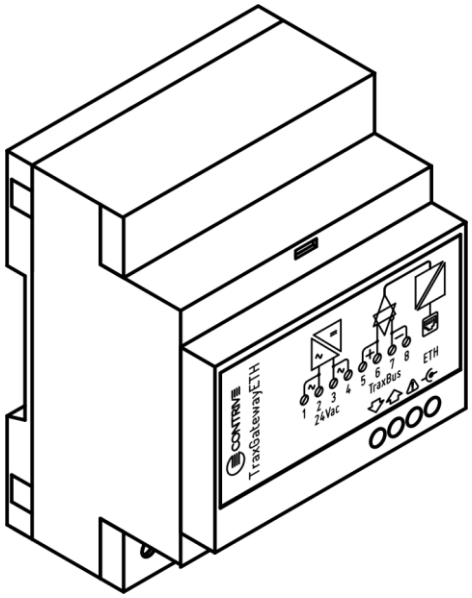


RECEIVING

Please perform the following tasks after receiving the TraxGateway:

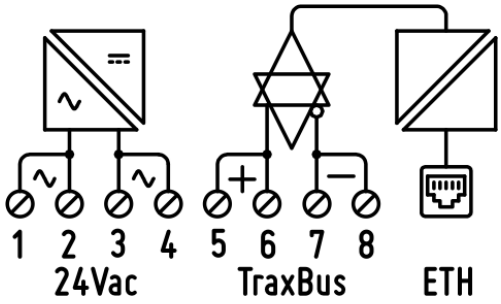
- Inspect the unit for damage. If the unit appears damaged upon receipt, contact the shipper immediately.
- Verify receipt of the correct unit by checking the label on the right side of the unit.
- If you have received the wrong model or the device does not function properly, contact your supplier.

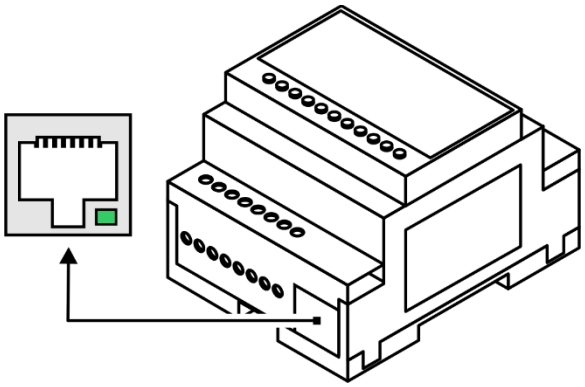




POWER SUPPLY AND TraxBus TERMINALS	**A**	
RJ45 FAST ETHERNET INTERFACE	**B**	
POWER SUPPLY FUSE REMOVE TOP COVER	**C**	

- TraxBus™ TRANSMITTED DATA INDICATOR
- TraxBus™ RECEIVED DATA INDICATOR
- Profinet® ERROR
- Profinet® STATUS
  - BUS NOT STARTED > OFF
  - SYSTEM ERROR / WARNING > FLASH 10Hz
  - WAITING FOR CONNECTION > FLASH 1 Hz
  - CONNECTION ESTABLISHED > ON





THE GREEN LED ON THE RJ45 CONNECTOR IS A COMBINED LINK AND ACTIVITY INDICATOR:
SOLID > NETWORK CABLE CONNECTED AND LINK DETECTED
BLINK > DATA ACTIVITY

WIRING DIAGRAM

1	POWER SUPPLY	(AC/DC POLARITY INDEPENDENT)
2	POWER SUPPLY	(AC/DC POLARITY INDEPENDENT)
3	POWER SUPPLY	(AC/DC POLARITY INDEPENDENT)
4	POWER SUPPLY	(AC/DC POLARITY INDEPENDENT)
5	TRAXBUS – POSITIVE	
6	TRAXBUS – POSITIVE	
7	TRAXBUS – NEGATIVE	
8	TRAXBUS – NEGATIVE	

USE POWER, SIGNAL AND CONTROL CABLE SUITABLE FOR THE TYPE OF OPERATION AND COMPLYING WITH ALL REGULATIONS
DO NOT ROUTE FILEDBUS CABLE TOGETHER WITH FREQUENCY CONVERTER CABLES OR CABLES EMITTING STRONG FIELDS
ALL ELECTRONIC SYSTEMS MUST BE SUPPLIED BY A DEDICATED TRANSFORMER IN A TN-S EARTHING SYSTEM

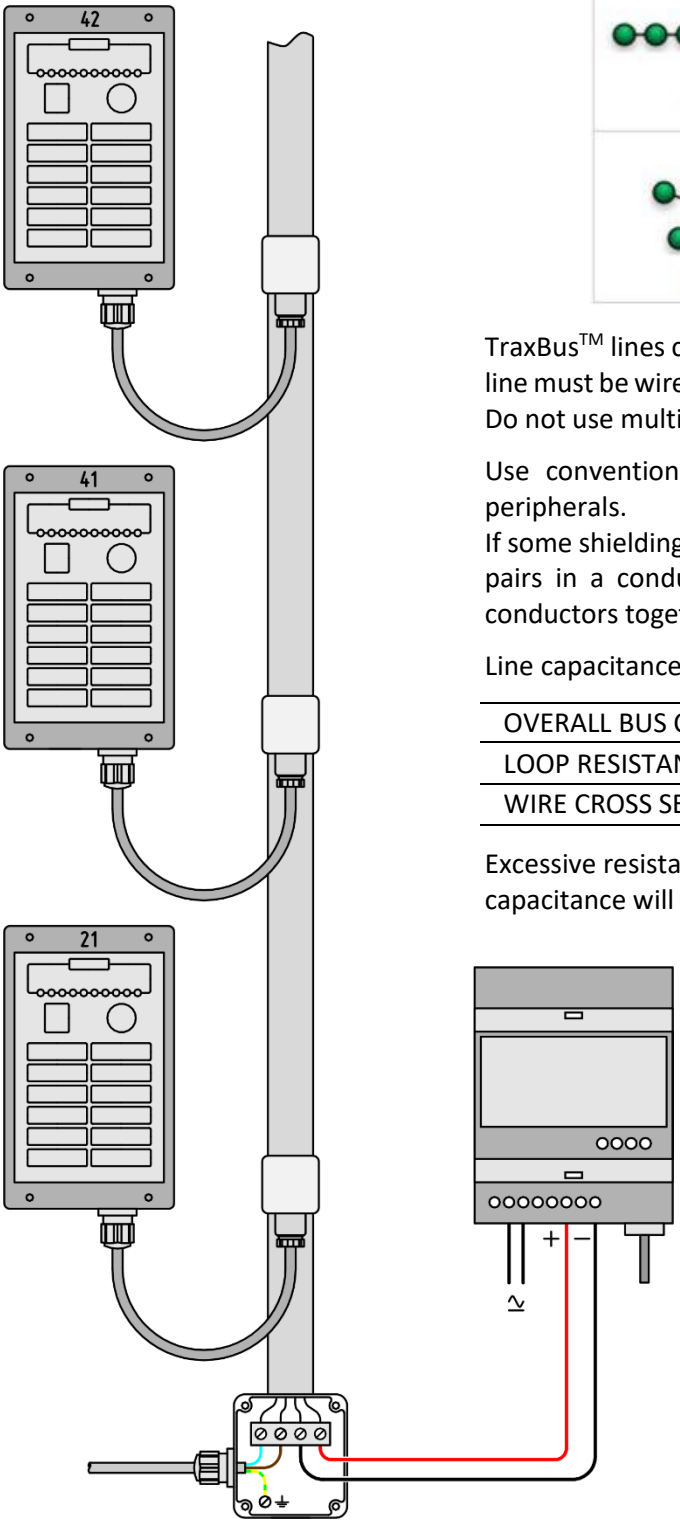
ETH

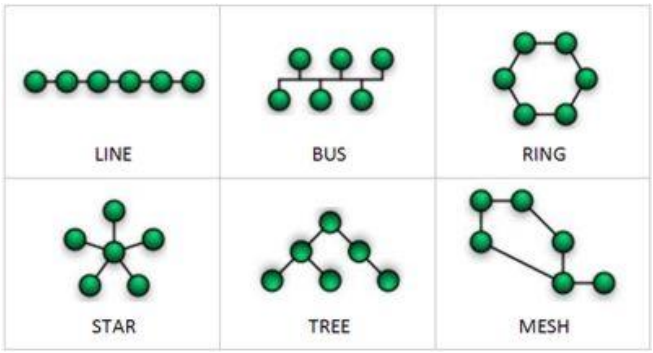
1	TD+	PROFINET-IO TRANSMISSION LINE +
2	TD-	PROFINET-IO TRANSMISSION LINE -
3	RD+	PROFINET-IO RECEIVE LINE +
6	RD-	PROFINET-IO RECEIVE LINE -

TERMINALS 4, 5, 7, 8 CONNECTED TO PE (RJ45 METAL FRAME) VIA RC (BOB SMITH TERMINATION).

TraxBus™ NETWORKS

TraxBus™ is an industrial network system for distributed control using a multi-drop wire pair: digital communication enables improved control capability, which can improve product yields. Near real-time operation is possible, despite the relatively low speed, thanks to an efficient protocol.
TraxBus™ features high electromagnetic noise immunity and great wiring simplicity, also using busbar trunkets: possible application are in hostile industrial environments where other standard networks doesn't work.
Live connection and disconnection – while the communication is running – are allowed, though a short break in the data flow may result from this operation.
A short-circuit on the TraxBus™ while the unit is transmitting can damage the TraxGateway.ETH, a limited time short-circuit while the unit is in idle mode (receiving) is tolerated.
Specific set of commands available for each device equipped with TraxBus™ interface (see detailed information on respective device technical literature).





TraxBus™ lines can be wired in any form: star, ring, line or mixed but signal line must be wired separately from power lines. Do not use shielded cables. Do not use multicore cables or limit the usage to short stubs.

Use conventional single wires or busbar trunkets to interconnect all peripherals.
If some shielding is absolutely necessary it is always possible to put twisted pairs in a conduit or grounded metal tube, without packing too many conductors together.

Line capacitance and resistance are important factors.

OVERALL BUS CAPACITY	100 nF MAXIMUM
LOOP RESISTANCE	60 Ω MAXIMUM
WIRE CROSS SECTION	1 mm^2 MINIMUM

Excessive resistance will cancel commands to peripherals, while excessive capacitance will cancel status response from peripherals.

- Each TraxGateway.ETH can drive up 99 logic units and up to 250 physical units. Network topology, cables characteristic and other environmental conditions could reduce the number of driven units.
- To extend the number of peripherals install more TraxGateway.ETH, each driving an independent bus.
- The power supply current depends on the number of remote units, as a general rule consider 300 mA + 10 mA per each connected peripheral (e.g.: having 100 units connected on a single bus the external power supply must be capable to deliver 300 + (10*100) = 1300 mA @ 24Vac).
- Additional overvoltage protections on both power supply and data lines must be provided when TraxBus™ is exposed to severe EMC condition.

DATA MAPPING OVERVIEW

The PROFINET-IO controller sends commands that TraxGateway.ETH will forward to the remote devices from which it receives the current status that will be returned to the PROFINET-IO controller.
Since the communication speeds of the two buses are different, TraxGateway.ETH stores information that are cyclically updated for all TraxBus devices that have been set as INSTALLED (from1 to 99 burners).
The following table summarizes the addresses managed by TraxGateway.ETH, which are described in detail in the following pages.

PROFINET-IO > TraxBus		ADDRESS	DESCRIPTION	TraxBus >PROFINET-IO	
WRITE		0	GENERAL	**READ**	
0-3	CONFIGURATION			CONFIGURATION	0-3
8-15	BROADCAST			BROADCAST	8-15
BURNER CONTROL		1	BURNER 01	**BURNER STATUS**	
0	–	2	BURNER 02	FLAME SIGNAL IF ENABLED	0
1	–	3	BURNER 03		1
2	–	4	BURNER 04		2
3	–	5	BURNER 05		3
4	–	6	BURNER 06		4
5	–	7	BURNER 07	–	5
6	–	8	BURNER 08	–	6
7	–	9	BURNER 09	–	7
8	UNLOCK	…	…	PILOT BURNER	8
9	HALT / RUN	91	BURNER 91	MAIN BURNER	9
10	MAIN BURNER	92	BURNER 92	LOCKOUT	10
11	AIR VALVE	93	BURNER 93	AIR VALVE	11
12	FLAME SIGNAL	94	BURNER 94	PURGING	12
13	–	95	BURNER 95	–	13
14	READ ONLY	96	BURNER 96	MANUAL SHUTDOWN	14
15	INSTALLED	97	BURNER 97	LINKED	15
		98	BURNER 98		
		99	BURNER 99		

REFER TO SPECIFIC INSTRUCTIONS OF DEVICES FOR THE ASSIGNMENT OF THE ADDRESSES TO REMOTE UNITS

CONFIGURATION

First octet of address 0 holds the current configuration.
The control byte sets the behavior of TraxGateway.ETH. The status byte returns the current settings.
TraxBus baud rate must be the one set for remote devices and it is the same for all units.

BIT	DESCRIPTION		4800	9600	19200	38400
0	TraxBus BAUD RATE [1]	—	0	1	0	1
1		—	0	0	1	1
2	PROFINET CABLE DISCONNECT [2]	—	0	CONTINUE USING THE LAST CONDITION		
			1	HALT ALL BURNERS		
3	PROFINET NOT CONFIGURED [2]	—	0	CONTINUE USING THE LAST CONDITION		
			1	HALT ALL BURNERS		
4	—					
5	—					
6	—					
6	—					
7	—					

[1] The default value for baud rate is 4800

[2] The default behaviour is HALT ALL BURNERS when PROFINET is not configured or cable is disconnected (set to 1)

BROADCAST

Second octet of address 0 is used to send commands to ALL devices at the same time.
Broadcast HALT (setting the value 55) will continuously send the command to stop ALL connected burners (overriding individual commands), the status of each burner will be updated as the scan of the installed devices proceeds.
Broadcast RUN (setting the value AA) will send a simultaneous start command to all burners and then the normal scan of the installed devices will resume sending the individual commands.
The control byte sets the broadcast control. The status byte returns the current broadcast status.

BIT	DESCRIPTION		VALUE	DESCRIPTION		VALUE
8	HALT ALL BURNERS HEX 55	—	0	RUN ALL BURNERS HEX AA	—	1
9		—	1		—	0
10		—	0		—	1
11		—	1		—	0
12		—	0		—	1
13		—	1		—	0
14		—	0		—	1
15		—	1		—	0

BURNERS CONTROL

The addresses 1 … 99 refer to the devices to which the corresponding address from 01 to 99 has been assigned.
The control byte sets the behaviour of the burner controlled by remote device.

BIT	DESCRIPTION		VALUE	
BITS 0 … 7 ARE NOT USED				
8	UNLOCK [1]	—		TRANSITION 1 → 0 RESETS BURNER FROM LOCKOUT
9	HALT/RUN	—	0	STOP BURNER
			1	START BURNER
10	MAIN BURNER [2]	—	0	STOP MAIN (2nd STAGE) BURNER
			1	START MAIN (2nd STAGE) BURNER
11	AIR VALVE [3]	—	0	SWITCH OFF AIR VALVE OUTPUT
			1	SWITCH ON AIR VALVE OUTPUT
12	FLAME SIGNAL [4]	—	0	DOES NOT ACQUIRE THE FLAME SIGNAL
			1	ACQUIRES THE FLAME SIGNAL
13	—			
14	READ ONLY [5]	—	0	THE BURNER CAN BE CONTROLLED BY PROFINET-IO
			1	RETURNS THE STATUS BUT DOES NOT RECEIVE COMMANDS
15	INSTALLED [6]	—	0	ADDRESS NOT IN USE
			1	ADDRESS CORRESPONDING TO A BURNER

[1] The reset of the remote burner (if currently in lockout) occurs when this bit is reset.
No action is produced when the bit is set to 1. A correct release procedure involves setting the bit and then resetting it after a while, emulating the typical behaviour of a push button.
Remember that reset action is supposed to be a clear defined manual action, thus an automatic reset is not allowed by EN 13611: the maximum number of resets is limited by remote units to 5 actions within a span of 15 minutes.

[2] The 2nd stage (main) burner is available only for some specific version of burner controllers.

[3] The air valve output can be remotely controlled only during the cycle steps in which it has been configured for bus control. Air valve output is available only for some specific version of burner controllers.

[4] The flame signal is acquired from the remote unit, this leads to an increase in the scanning time when the burner is running (additional command to get the data).

[5] By setting the read-only mode it will be possible to acquire the current status of the burner but any commands received from the PROFINET-IO are not forwarded to remote units.

[6] This bit must be activated when a remote burner will be associated with the specific address.
When a remote device does not respond, the TraxBus scan is slowed down and it is therefore important not to declare as INSTALLED devices that are not reachable.

BURNERS STATUS

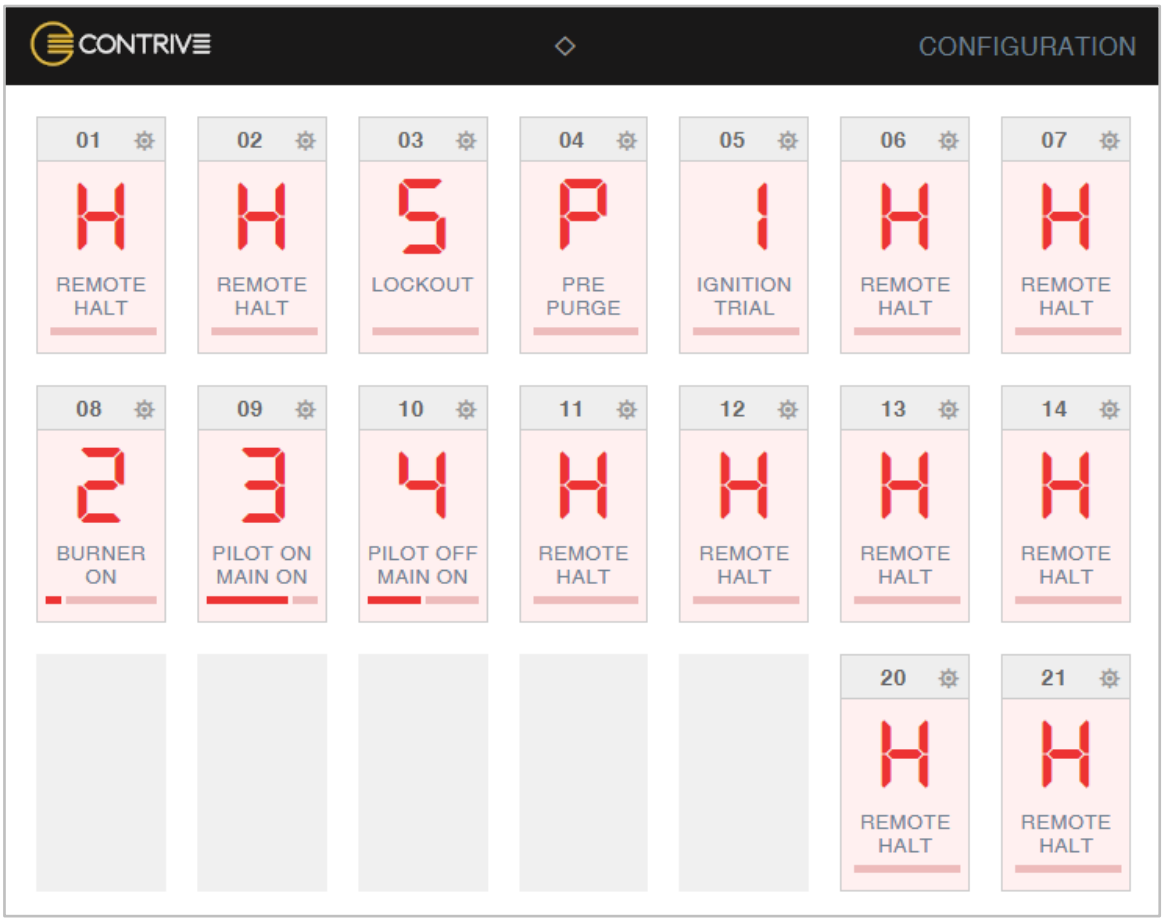
The addresses 1 … 99 refer to the devices to which the corresponding address from 01 to 99 has been assigned.
The status byte returns the current status of the burner controlled by remote device.

BIT	DESCRIPTION		VALUE	
0	FLAME SIGNAL	—		0 NO FLAME 1 … 25 ≈1 to ≈25 µA 26 ≥26 µA This value is only returned if BURNER CONTROL bit 12 is set
1				
2				
3				
4				
5	—			
6	—			
7	—			
8	BURNER	—	0	BURNER IS OFF
			1	BURNER IS RUNNING
9	MAIN BURNER	—	0	MAIN (2nd STAGE, IF ANY) BURNER IS OFF
			1	MAIN (2nd STAGE, IF ANY) BURNER IS RUNNING
10	LOCKOUT	—	0	–
			1	LOCKOUT OR FAILURE OF THE BURNER
11	AIR VALVE	—	0	AIR VALVE OUTPUT (IF ANY) IS OFF
			1	AIR VALVE OUTPUT (IF ANY) IS ON
12	PURGING	—	0	–
			1	PREPURGE OR POSTPURGE IN PROGRESS
13	—			
14	MANUAL SHUTDOWN	—	0	–
			1	THE BURNER HAS BEEN SHUTDOWN LOCALLY
15	LINKED	—	0	NO ANSWER FROM REMOTE DEVICE
			1	THE REMOTE DEVICE COMMUNICATES REGULARLY

When the reading of the flame signal is enabled, TraxGateway.ETH makes an additional request to the remote device (only when the burner is on). This results in a slowdown in the cyclic scanning of devices.
It is therefore advisable to activate this option only if really necessary or in any case after verifying that a longer scan time has no negative impact on the process.

WEB SERVER

TraxGateway.ETH has an integrated web server, the main page can be accessed from any browser by specifying the IP address of the device (factory default IP = 192.168.90.101).



On this page there is a panel that shows status and flame signal of the burners installed, each with its own numbering. This status is updated cyclically and corresponds to the information made available on the PROFINET-IO side.

By clicking on the icon next to the burner number it is possible to open a page for individual acyclic control, useful for commissioning and debugging.

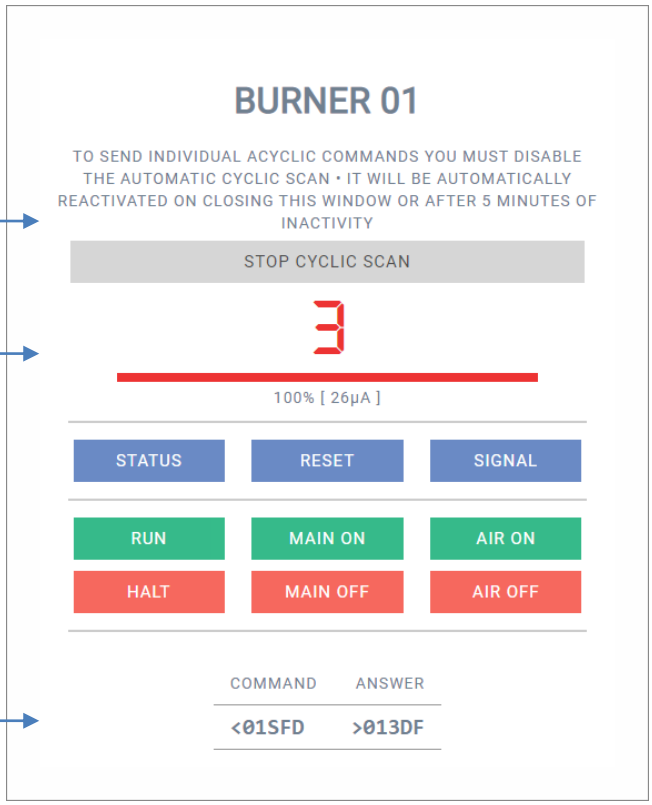
After stopping the cyclical scan, it is possible to send commands using the keys on the page.

The upper part shows the status display corresponding to the response received by the device after the last request.

It is also possible to request the level of the flame signal.

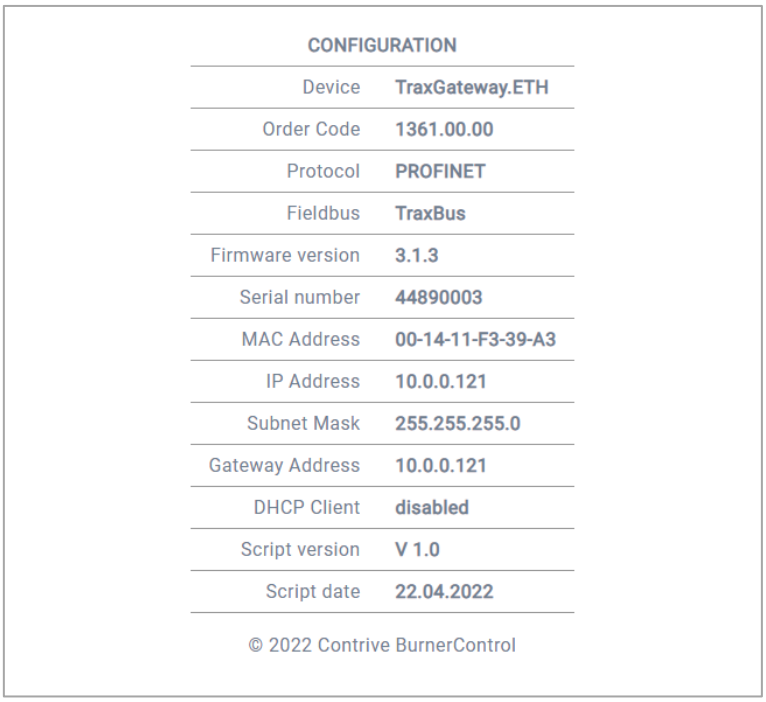
In the lower part you can see the command sent to the remote device and the relative response in the TraxBus format.

More details on the TraxBus communication protocol are available in the specific QBK documentation.



In the main page of the webserver the flame signal will be reported only for the burners that have this option enabled, while it is always possible to view it on the individual control page of the remote device.

Click on CONFIGURATION at the top right of the main page to view the current settings.



In the center of the top bar of the main page there is an indicator that flashes with each information update, which occurs every 10 seconds.
Errors in the communication between the browser and the device are indicated by the red flashing of this indicator.

GSD FILES

The GSD (General Station Description) file is required to integrate TraxGateway.ETH in the configuration of the PROFINET-IO controller (PLC), it contains all the information for configuring the network and the data exchange.
The GSD file can be downloaded here: *http://www.burner-control.com/E/TraxGatewayETH.php*

TECHNICAL DATA

POWER SUPPLY

VOLTAGE	24 VAC 50/60Hz / 28VDC ±10%
LINE FUSE	3 A QUICKBLOW - 5x20mm
POWER CONSUMPTION	8 … 30 VA 1 … 250 PERIPHERALS
POWER DISSIPATION	3 … 10 W 1 … 250 PERIPHERALS
TERMINALS	4 x 2,5 mm^2 (AWG14)

ENVIRONMENT

OPERATING TEMPERATURE	-20 … 40 °C
STORAGE TEMPERATURE	-40 … 85 °C
ENCLOSURE	POLYCARBONATE UL94-V0
PROTECTION CLASS	IP20
RELATIVE HUMIDITY	30 … 90% NON CONDENSING
MAX ALTITUDE	2000 m
INSTALLATION POSITION	ANY
DIMENSIONS (W x H x D)	71 x 90 x 58 mm
WEIGHT	170 g

ETHERNET

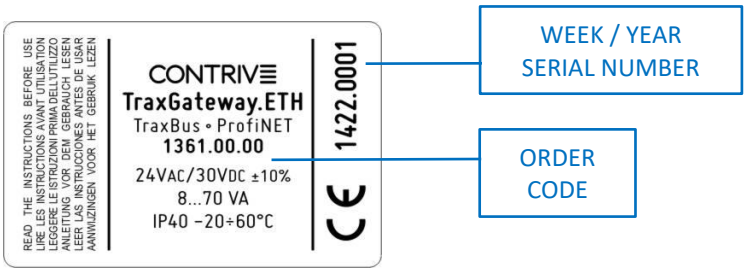
INTERFACE	100 Base T
ISOLATION TO POWER SUPPLY	5000 V DC / 1 min
ISOLATION TO TraxBus	3750 V DC / 1 min
DATA RATE	100 Mbit/s
CONNECTOR	RJ45 ISOLATED

MAX CABLE LENGTH SHOULD NOT EXCEED 100 METER
AND MUST NOT LESS THAN 60 CENTIMETERS

TRAXBUS™ INTERFACE

TYPE	ASYNCHRONOUS MULTIDROP HALF DUPLEX
PERIPHERALS	300 MAX
BAUD RATE	38400 MAX
BUS VOLTAGE	24 VDC MAX
BUS CURRENT	2,5 A MAX
ALLOWABLE VOLTAGE DROPOUT	3 V MAX
ALLOWABLE LINE CAPACITANCE	100 nF MAX
TERMINALS	4 x 2,5 mm^2 (AWG14)

LABEL



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