Genesi LUX®

GE-ABS302 and GE-ABS604

LED voltage controller

DATASHEET

Features

- 32-bit Dual core ARM® Cortex-M4/M0
- Low power consumption
- Up to 4 independent channels
- Four selectable drive functions
- Four low current 0/10V outputs
- Less than 1µs timing resolution
- ETH 10/100 TCP/IP interface
- WEB page configuration
- Remote monitoring of external load currents
- Board temperature remote monitoring
- TCP/IP MODBUS configuration (several protocols available)
- Remote firmware upgrading and updating
- Compact size: 160mm x 100mm x 65mm
- TS-35 DIN rail mounting
- CE regulatory approvals

Applications

- Machine vision system illuminators
- LED lamps protection
- Sharp light modelling
- Data acquisition equipment
- Industrial machine control
- Inspection systems

Contents

1. Description

GE-ABS302 and GE-ABS604 are devices to control LED lamp in voltage mode in a compact protective plastic case. Modules allow user to drive independently up to four groups of LED lamps both in continuous and impulsive mode. Each output is equipped with an analog 0/10V signal to drive analog LED lamps.

Boards integrate ETH 10/100 connector with a TCP/IP embedded protocol, achieving a WEB page based configuration, along with a monitoring of currents and board temperature. Remote upgrade of the firmware is also possible by means of a proper Java® based software and a PC.

GE-ABS302 is a minor version of GE-ABS604 for smaller and/or cost sensitive applications, as parts for just 2 channels have been assembled.

2. Hardware specification

General condition are referred to Vin=24Vcc and Ta=25°C, when not otherwise specified.

2.1 Absolute maximum ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Min.	Typ.	Max.	Unit
T_{STG}	Storage temperature range	-40	-	85	°C
V_{PS}	Power supply voltage	20	-	28	V
I_{PS}	Power supply current	10	-	-	A
V_{ST}	Start pulse voltage	20	-	28	V
I_{ST}	Start pulse current	15	-	40	mA
I_{OI}	Current out impulsive per channel	-	-	17	A
I_{OC}	Current out continuous per channel	-	-	5	A
I_{OAN}	Current out analog per channel	-	-	200	mA

2.2 Recommended operating conditions

Due to impulsive high current levels, it is strongly recommended supplying the device with a dedicated power source, with shortest wires.

Table 2. Recommended operating conditions

Symbol	Parameter	Min.	Typ.	Max.	Unit
T_A	Operating ambient Temperature range	0	-	60	°C
V_{PS}	Power supply voltage	22	24	26	V
V_{ST}	Start pulse voltage	22	24	26	V
I_{ST}	Start pulse current	20	25	-	mA
I_{OI}	Current out impulsive(*)	-	-	15	A
I_{OC}	Current out continuous	-	-	4	A

(*)T_{ON}=1ms, T=100ms.

2.3 I/O operating characteristics

Table 3. I/O operating characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{IL}	Input low level voltage	-0.3	-	0.3 V_{PS}	V
V_{IH}	Input high level voltage	0.7 V_{PS}	-	V_{PS}+0.3	V
V_{OL}	Output low level voltage	-	0	0.5(1)	V
V_{OH}	Output high level voltage	V_{PS}-0.4(2)	V_{PS}-0.2(2)	-	V
V_{OANMIN}	Output analog min level voltage	0.4	-	-	V
V_{OANMAX}	Output analog max level voltage(3)	9.5	10.0	10.7	V

(1) I_O =-9 A

(2) I_O =9 A

(3) I_{OAN}=100 mA

2.4 Current consumption

Table 4. Current consumption

Symbol	Parameter	Test conditions.	Typ.	Unit
I_{DD}	Supply current for low power electronics (no loads)	Stand alone	85 (4)	mA
		Remote monitoring	100 (4)	mA
		Fault	n.a.	mA

(4) Output mean current values have to be added.

2.5 Pin assignment

Table 5. Pin assignment

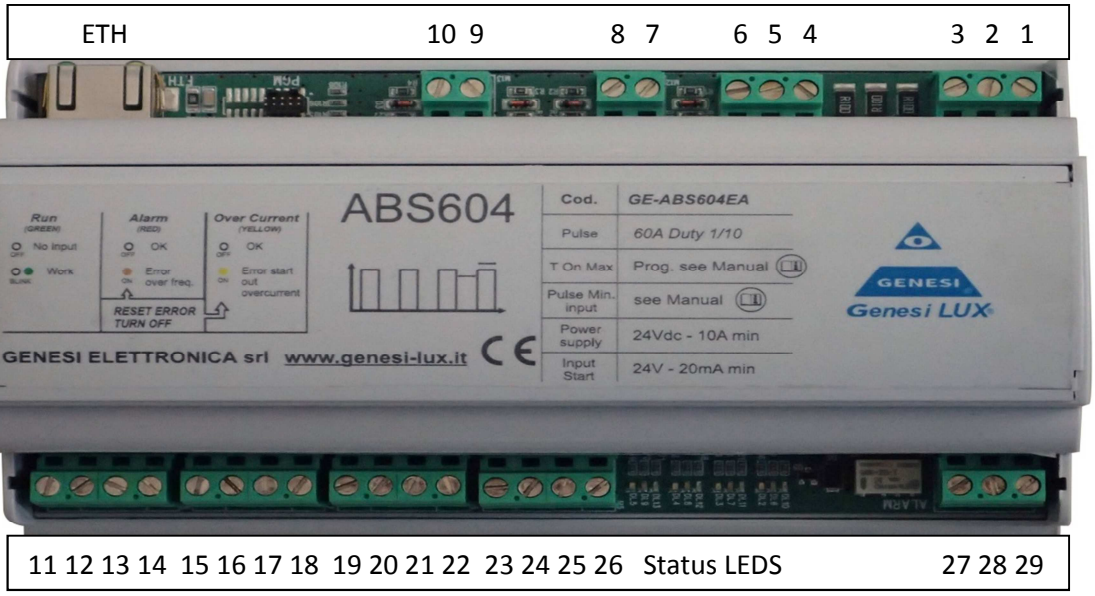
Pin	Name	Type	Description	Notes(5)(6)
1,2,3	+24V	Power	Power supply input voltage	
4,5,6	GND	Ground	Power supply and signals ground	Matchable1
7	PULSE1	I	Pulse input 1	
8	PULSE2	I	Pulse input 2	
9	PULSE3	I	Pulse input 3	
10	PULSE4	I	Pulse input 4	
ETH	ETH10/100	I/O	Ethernet 10/100 connector	
11	GND	Ground	Power out ground	Matchable1
12	OUT4	O	Pulse output 4	
13	+24V_BOUT	Power	Power out buffered voltage	Matchable2
14	ANALOG4	O	Analog output 4	
15	GND	Ground	Power out ground	Matchable1
16	OUT3	O	Pulse output 3	
17	+24V_BOUT	Power	Power out buffered voltage	Matchable2
18	ANALOG3	O	Analog output 3	
19	GND	Ground	Power out ground	Matchable1
20	OUT2	O	Pulse output 2	
21	+24V_BOUT	Power	Power out buffered voltage	Matchable2
22	ANALOG2	O	Analog output 2	
23	GND	Ground	Power out ground	Matchable1
24	OUT1	O	Pulse output 1	
25	+24V_BOUT	Power	Power out buffered voltage	Matchable2
26	ANALOG1	O	Analog output 1	
27	ALARM_NO	O	Alarm relay NO contact	
28	ALARM_NC	O	Alarm relay NC contact	
29	ALARM_COM	I	Alarm relay COM contact	

(5) Pin with same MatchableX notes can be tight together without any electrical injury.

(6) Any other matching connection should be avoided.

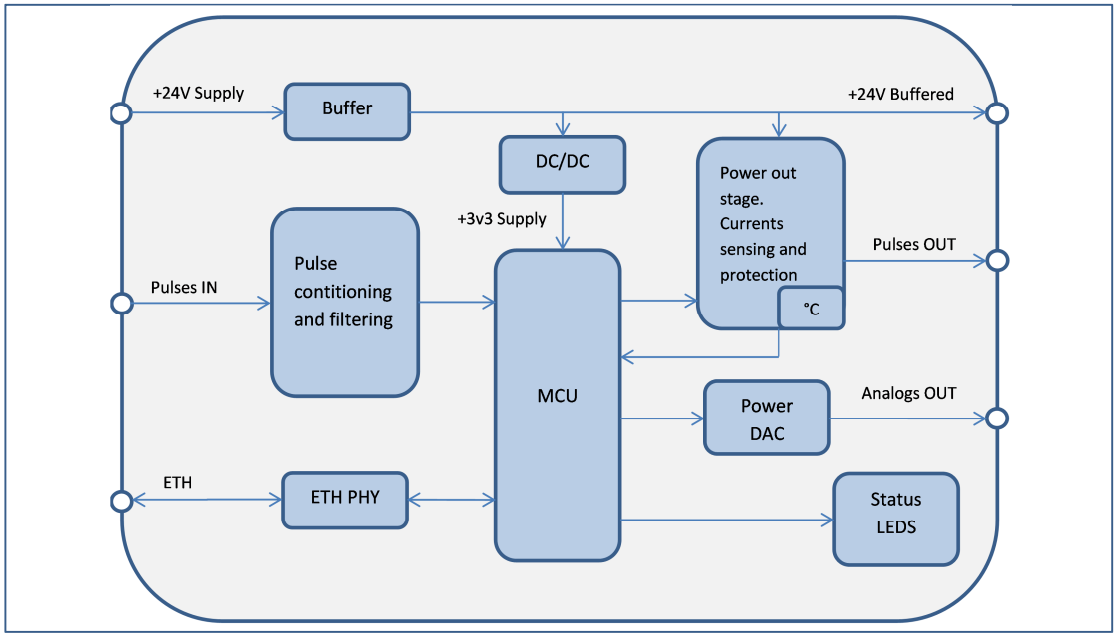
2.6 Pin placement

Figure 1. Pin placement



2.7 Hardware block diagram

Figure 2. Hardware block diagram



3. Hardware design

3.1 Drive functions

GE-ABS302 and GE-ABS604 (aka Board) can implement four drive functions, independently on each channel. Accordingly on the model, such functions could be hardcoded or user selectable and configurable, by http page and ETH connection.

3.1.1 Supervisor

Board uses the trigger signal applied to pulse INx to activate the Pulse OUTx correspondingly. Board checks the Duty Cycle of the input pulse in order to validate it.
When its Duty Cycle is greater than the programmed value, the output pulse is switched off and Alarm risen up (yellow LED fixed ON).
User can be allowed to set up both Period and Duty Cycle thresholds of guard pulse.

3.1.2 Generator

Board works as a square wave generator. Trigger signal applied to pulse INx enables the pulse OUTx correspondingly and starts wave generation.
User can be allowed to set up both Period and Duty Cycle of square wave to be generated.

3.1.3 Delayed

Board generates a delayed single pulse OUTx upon a trigger INx - rising slope - has been applied.
User can be allowed to set up start delay and pulse width.

3.1.4 Analog OUT

Board can provide an additional voltage Analog OUTx to dim lamp current properly.
User can be allowed to set voltage up in continuous range of 0V (see par. **2.3** for further details) up to 10V.

3.2 Pin usage

When used with default firmware, GE-ABS302 and GE-ABS604 have the minimal requiring of Power Supply, Ground and a pulse input so that a pulse output can be shaped. Any output channel has been featured with three color LED for quick status check. Other signals can be managed upon specific application, or left unconnected. Accordingly with table below, signals can be managed:

Table 6. Pin usage

Pin	Name	Description
1,2,3	+24V	Connect to power supply 24Vcc – 10A minimum
4,5,6	GND	Connect to ground
7,8,9,10	PULSEN	Pulse input N. Apply a 24V – 20mA signal (N=1..4)
13,17,21,25	+24V_BOUT	Power out buffered voltage. Can be used to supply loads when required.
12,16,20,24	OUTN	Pulse output N (N=4..1). Connect to enable input of loads or directly to load supply. These are switched to +24V_BOUT
11,15,19,23	GND	Connect to load ground if necessary.
26,22,18,14	ANALOGN	Analog signal out, (N=4..1), connect to load if featured with 0-10V analog in pin.
ETH	ETH10/100	Ethernet 10/100 RJ45 connector
27	ALARM_NO	Alarm relay NO contact
28	ALARM_NC	Alarm relay NC contact
29	ALARM_COM	Alarm relay COM contact. It can be used to signal to an external device an error condition, in conjunction with pins 27 and/or 28

3.3 Typical application diagram

GE-ABS302 and GE-ABS604 can drive different LED loads at the same time. All channels can be chosen for user porpoises and programmed separately. Loads can be parallelized and driven by the same channel out, accordingly to current absorption. Below are some examples of Genesi LUX® products connected to driver device.

Figure 3. Homogeneous loads connection examples

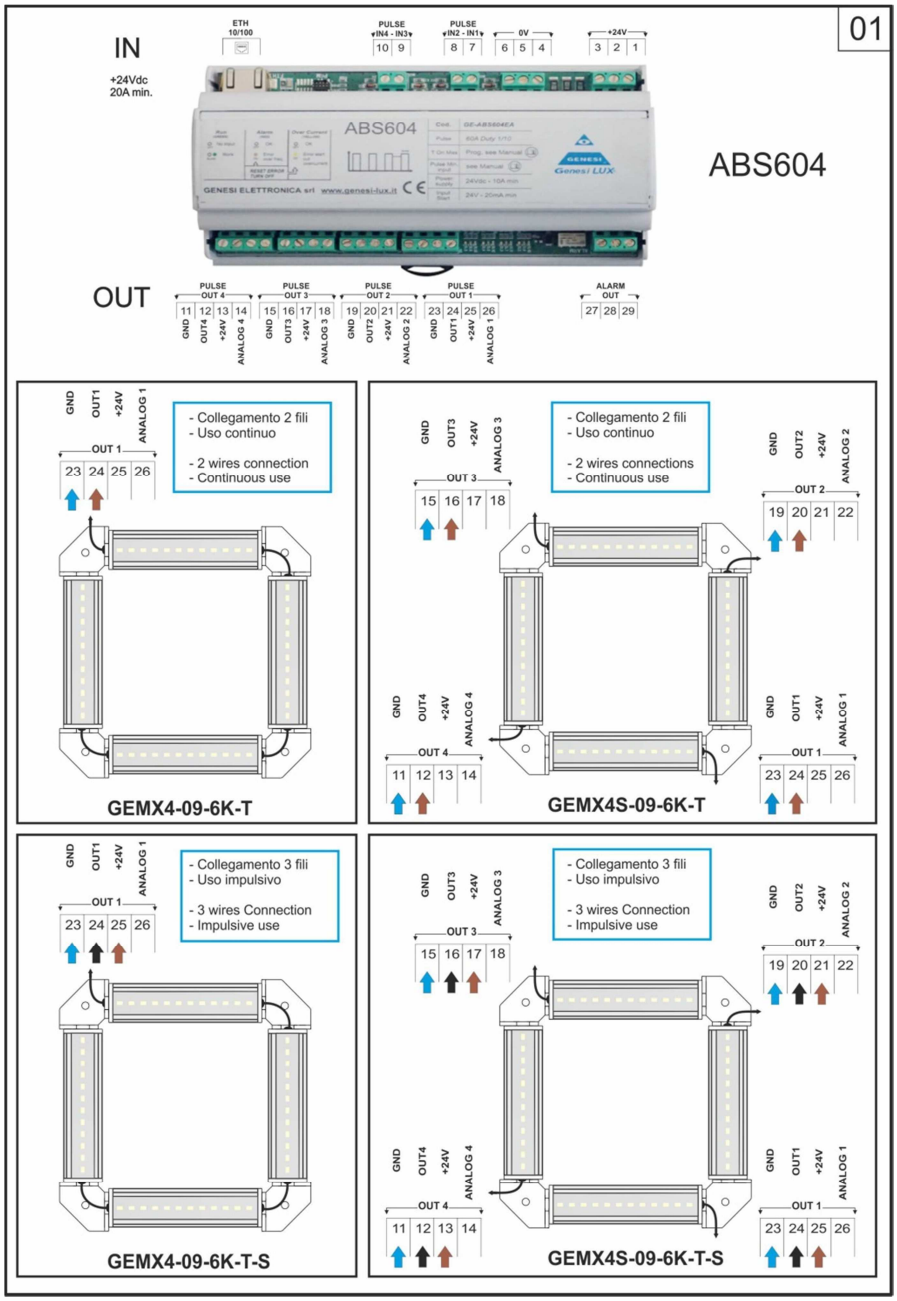
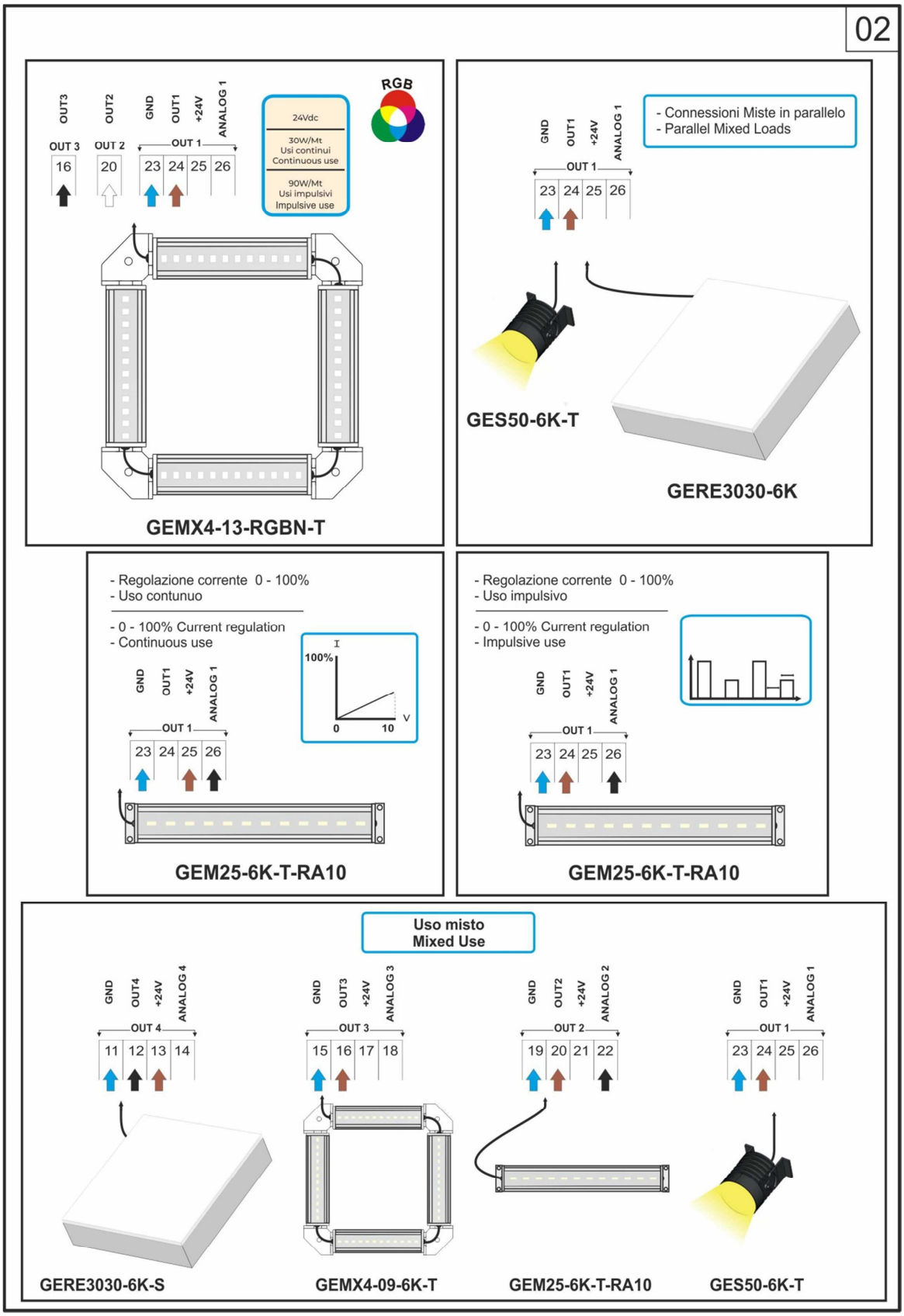


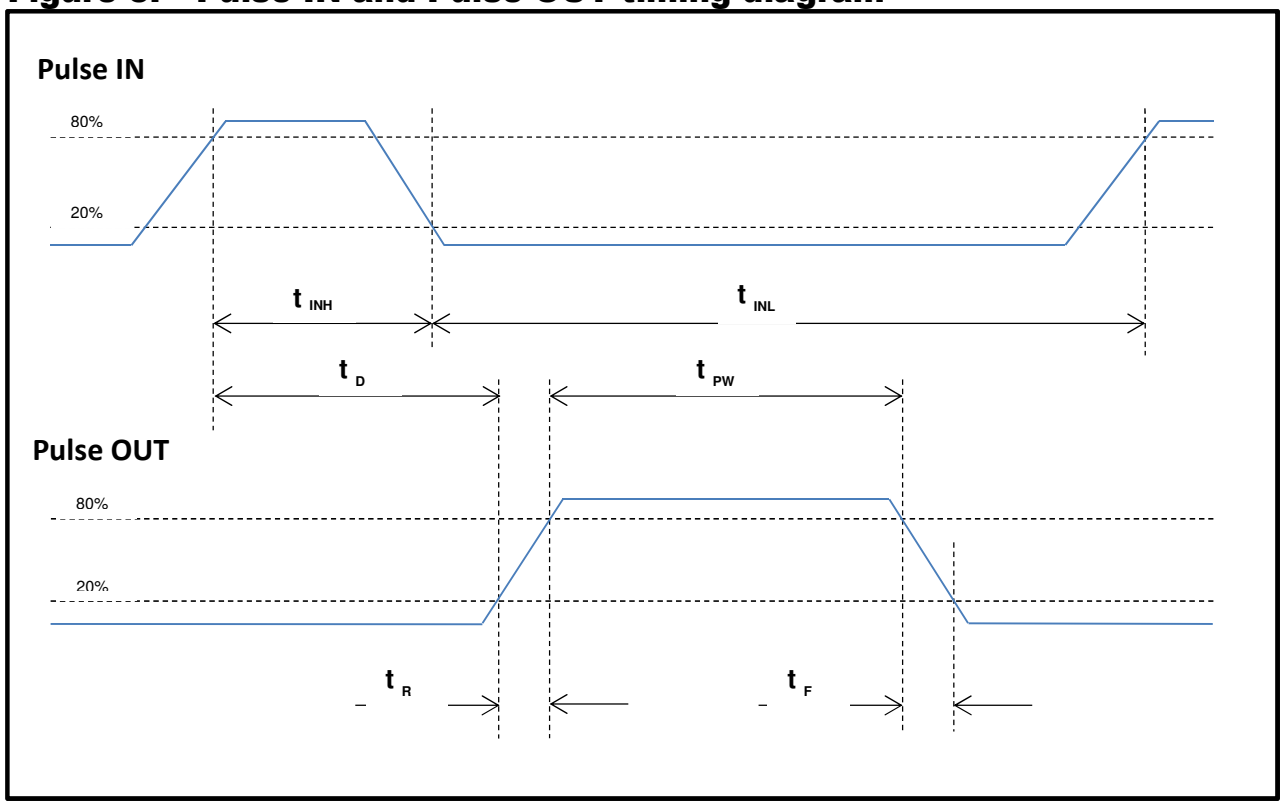
Figure 4. Heterogeneous loads connection examples



3.4 Designing considerations

When designing with GE-ABS302 and GE-ABS604, some parameters have to be kept into consideration. Please refer to **Figure** and **Tables** below.

Figure 5. Pulse IN and Pulse OUT timing diagram



3.4.1 Pulse IN characteristics

Table 7. Pulse IN timings

Symbol	Parameter	Min.	Typ.	Max.	Unit
t_{INL}	Pulse IN – low level time	4	-	-	µs
t_{INH}	Pulse IN – high level time	5	-	-	µs

3.4.2 Pulse OUT characteristics

Table 8. Pulse OUT timings

Symbol	Parameter	Min.	Typ.	Max.	Unit
t_D	Pulse OUT programmable delay	1(8)	-	2^{32}-1	µs
t_R	Pulse OUT rise time	4	-	7	µs
t_{PW}	Pulse OUT width time	1(8)	-	2^{32}-1	µs
t_F	Pulse OUT fall time	6	-	9	µs

(8)STANDARD FIRMWARE defined. Customizations down to 100ns and less are possible.

3.4.3 Time step resolution

Table 9. Pulse OUT time step resolution

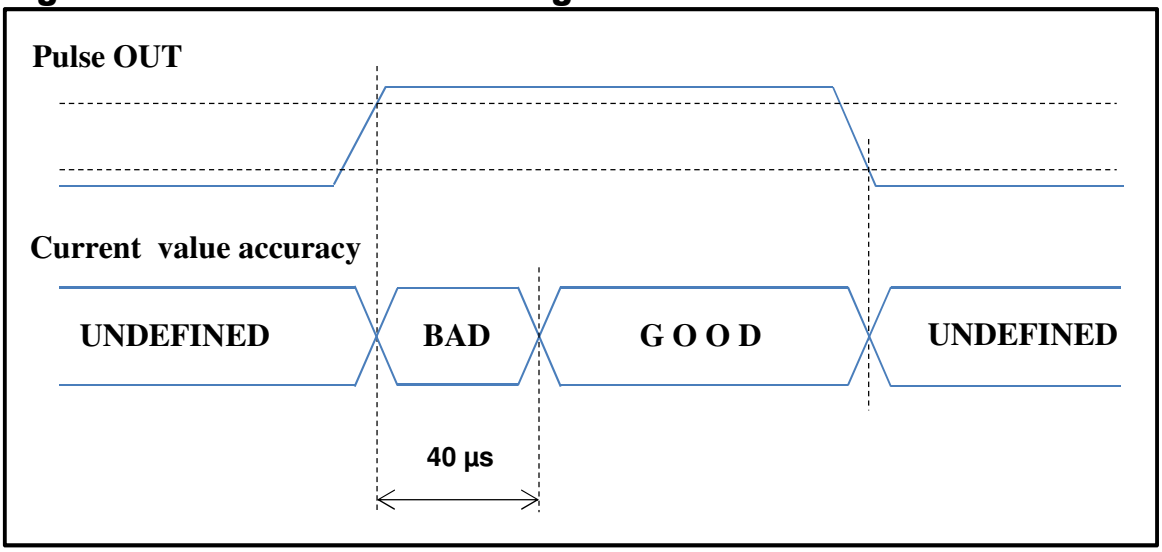
Symbol	Parameter	Min.	Typ.	Max.	Unit
t_D	Pulse OUT delay time step	1(9)	-	-	µs
t_{PW}	Pulse OUT width time step	1(9)	-	-	µs

(9)STANDARD FIRMWARE defined. Customizations down to 100ns and less are possible.

3.4.4 Current reading

In order to read reliable current values on power output stages, graph below have to be taken into consideration when working with standard models. Customization lands improved results.

Figure 6. Current measure diagram



3.4.5 Application examples

Figure 7. Master camera configuration

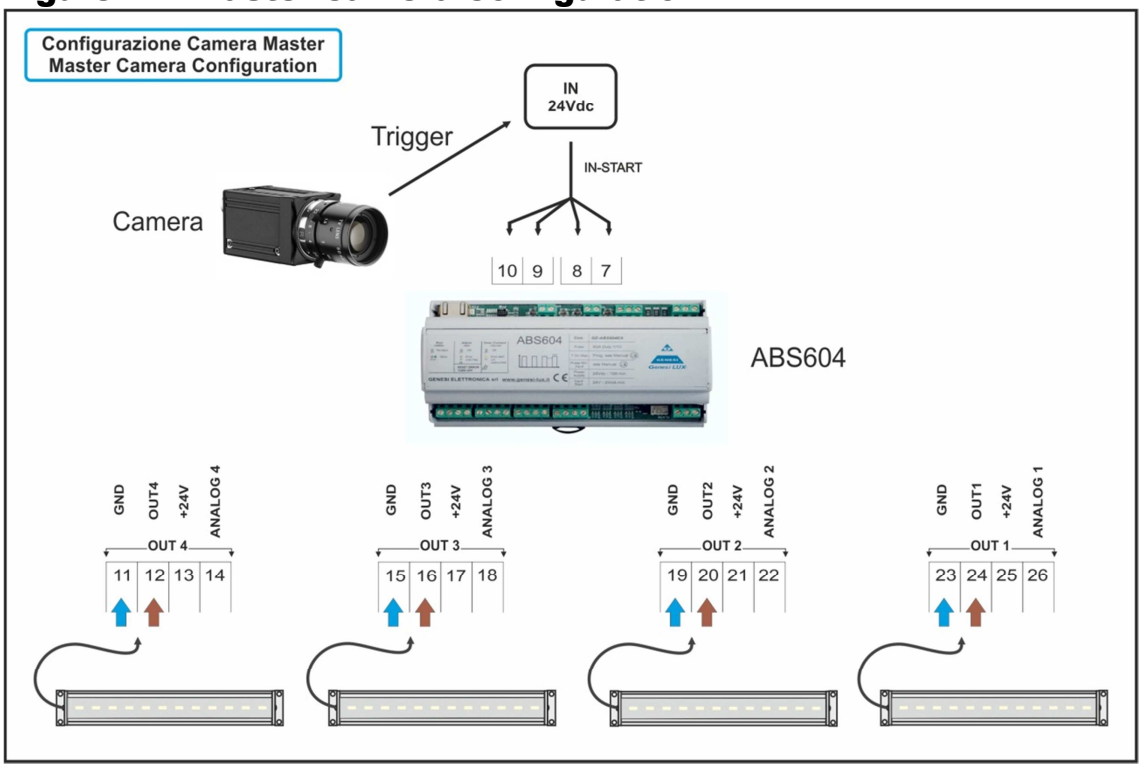
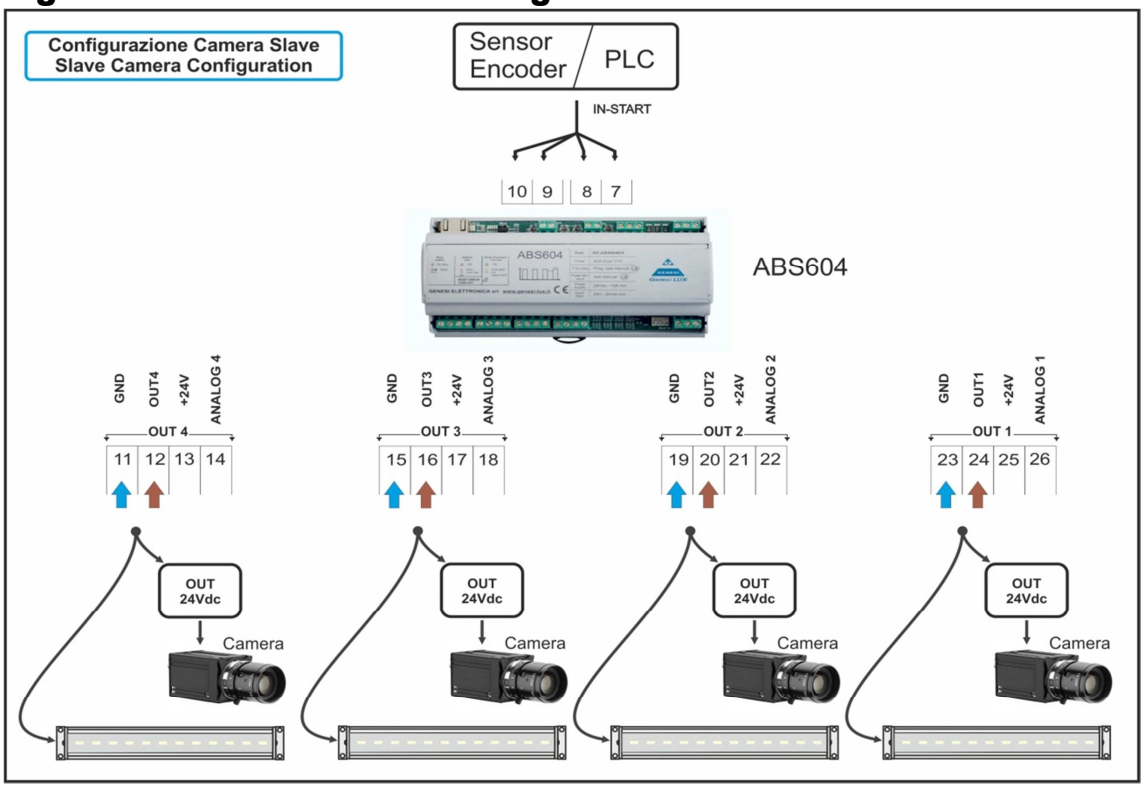
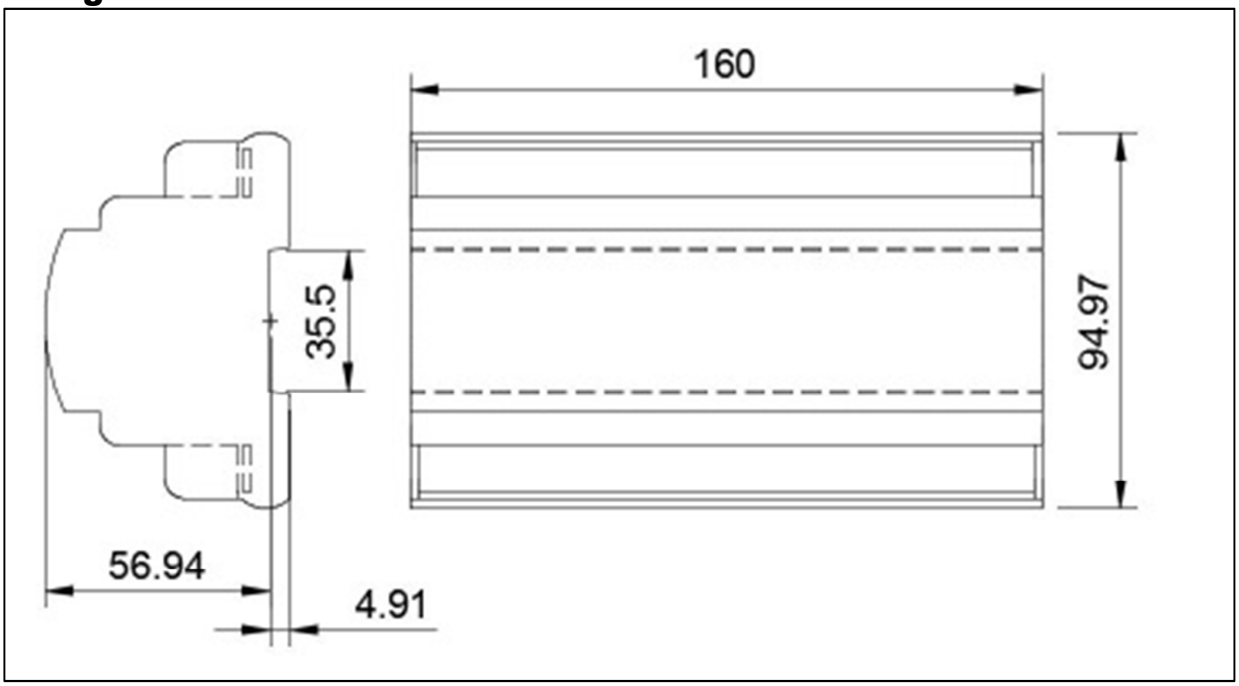


Figure 8. Slave camera configuration



4. Mechanical data

Figure 9. Mechanical data



5. Regulatory compliance

All Genesi LUX® products are RoHS compliant.

6. Ordering information

Several commercial models are available with different features, accordingly to the **Table** below:

Table 10. Ordering information and functions

Model	Notes	N. Ch.	User configurable	Supervisor	Generator	Delayed	Analog OUT
GE-ABS302-10X-20	1	2		✓			
GE-ABS302E		2	✓	✓	✓	✓	
GE-ABS302EA		2	✓	✓	✓	✓	✓
GE-ABS604-10X-20	1	4		✓			
GE-ABS604E		4	✓	✓	✓	✓	
GE-ABS604EA		4	✓	✓	✓	✓	✓

Notes

1 : Guard - Period=200ms, Duty Cycle=10%.

More models are available upon customer's request.

7. Revision history

Table 11. Revision history

Rev	Date	Author	Description	Approved by
1.0	01/06/2018	Giuliano Calzolari	Preliminary release	Mauro Munari
2.0	15/11/2018	Giuliano Calzolari	Added timing specs	Mauro Munari
	15/11/2018	Giuliano Calzolari	Added working example	Mauro Munari
2.1	22/03/2019	Giuliano Calzolari	Note on power supply	Mauro Munari

8. Disclaimers

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