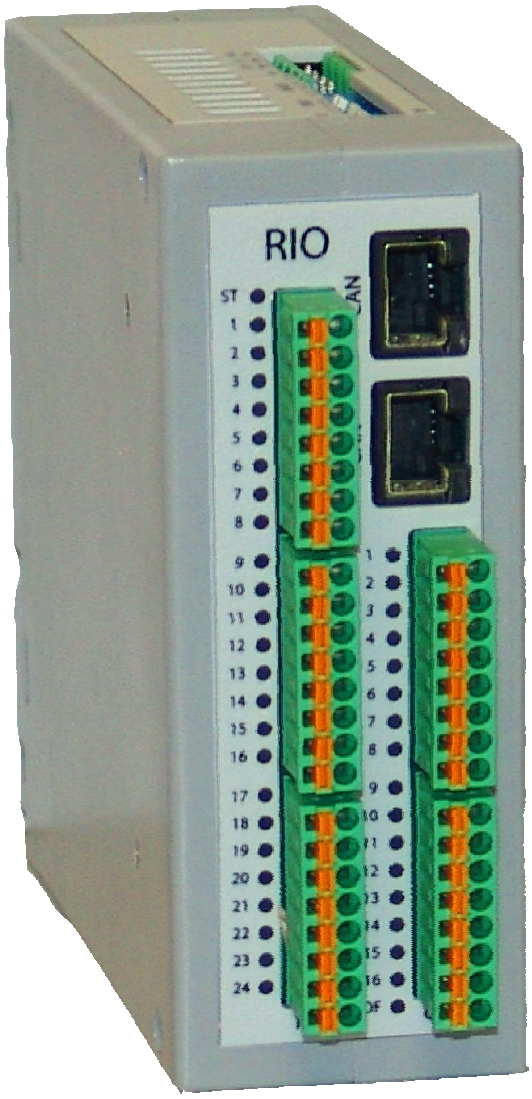
Remote Input / Output Module
Module RIO 40S



INSTALLATION GUIDE

Read carefully this manual before installing and respect all indications with the icon :

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SUMMARY

1- Description

1-1- Inputs / Outputs

- Inputs :
  Number of channels : 24
  Galvanic insulation : Yes
  Type : PNP 24V (20 to 33V), 10mA per channel

- Outputs :
  Number of channels : 16
  Type : Static, 24Vdc, 500mA
  Calling current : 1,4A maxi
  Protection against the short-cuts: Yes
  Diagnostic CPU : Yes

1-2- Communication protocoles

- CANopen :
  Version : Draft DS 401 V1.4
  NMT : Class 0
  DBT : Class 0
  PDO : 2 Rx, 2 Tx
  SDO : 1 server, 0 client
  Opto isolation : yes
  Address node: 7 bits
  Speed communication: from 10 Kb to 1Mb
  Node number: 127

- Modbus :
  Version: RTU slave, functions 3, 4 and 16
  Opto isolation: No
  Address module number: 8 bits
  Linking type: RS 232
  Speed communication : 300 to 38 400 bauds
  Node number : 1

1-3- Dipswitchs configuration

The communication setup is directly doing by module RIO 40S's dipswitchs.
You must restart the module after change communication configuration.

1-4- Removable connectors

The module had 5 removable spring-cage connectors who allow an easy and quickly I/O installation:

- 1 connector for the 1 to 8 inputs.
- 1 connector for the 9 to 16 inputs.
- 1 connector for the 17 to 24 inputs.
- 1 connector for the 1 to 8 outputs.
- 1 connector for the 9 to 16 outputs.

It also has a screw connector for the various power supply of the module

The CANopen bus is connected on either the 2 connectors RJ45 (allows chaining several modules)

Bus MODBUS is only connected on the RJ45 top connector.

1-5- Technical information

- Supply voltage : 24 V DC nominal (± 20%)
- Power requirement: 2 W
- Operating temperature : 5 to 45°C
- Storage temperature : -20 to 70°C

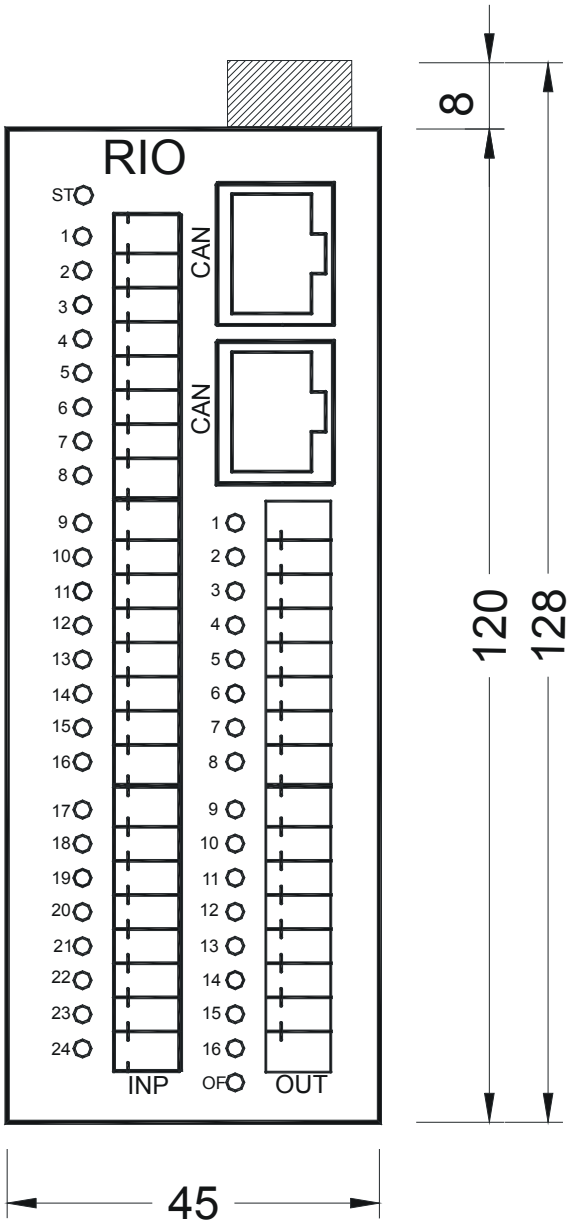
1-6- Diagnostic LED

A Status LED on font view give RIO 40S module status:

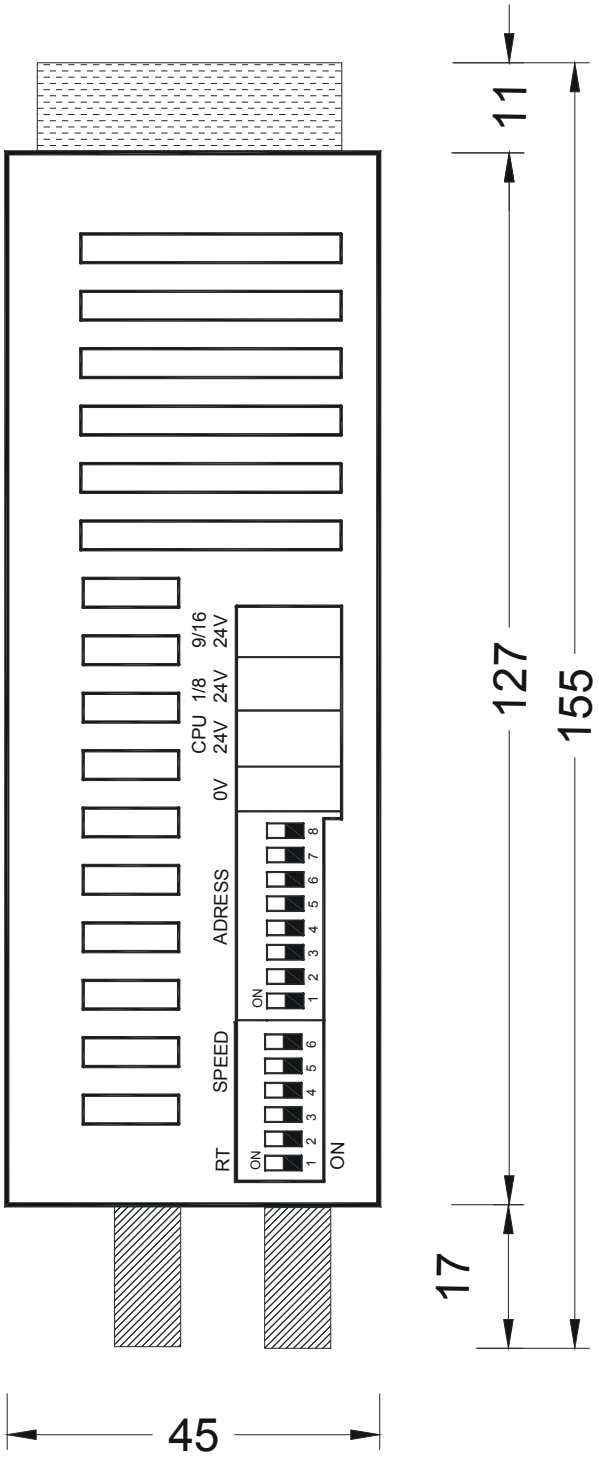
- OFF if the module is not initialized.
- Blinking every second if the module is READY (ready to receive SDO messages)
- Blinking quickly if the module is RUN (exchange PDO massages)

2- Dimensions :

2-1- Front view:

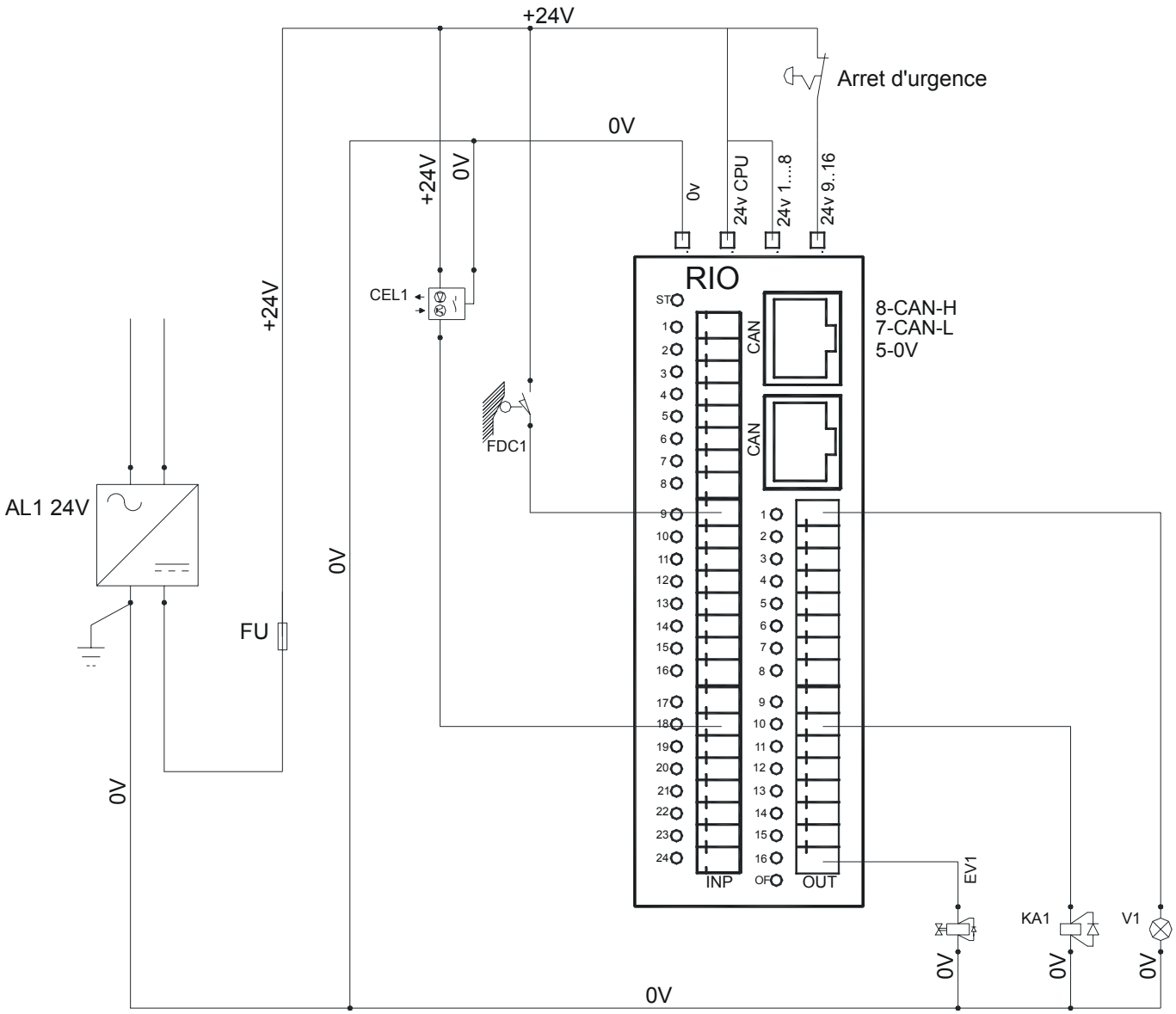


2-2- Top view:


11
127
155
17
45
9/16 24V
1/8 24V
CPU 24V
0V
ADRESS
ON
1 2 3 4 5 6 7 8
SPEED
1 2 3 4 5 6
RT
ON
1 2
ON

3- Connection :

3-1- Example :



In that example, in case of emergency stop the outputs 9 to 16 will be forced to 0.

3-2- CANopen / Modbus RS232 connector pin assignment

Connector RJ45

N°	Nom	Type	Description
1	GND		GND in Modbus RS232
2	RXD	Inp	Data reception in Modbus RS232
3	TXD	Out	Data transmission in Modbus RS232
4			
5	0V		0V of CANopen bus
6			
7	CAN_L	I/O	LOW signal of CANopen bus
8	CAN_H	I/O	HIGH signal of CANopen bus
	SHIELD		**Connection of the shield on the SUBD material**

Do not connect anything on pines 1, 2 and 3 if the module is not used in Modbus RS232

In CANopen, we can connect on either 2 connectors RJ45, this allowing chaining several modules.

In MODBUS, the connection must be done only on the RJ45 top

3-3- 24Vdc connector pin assignment

Removable screw connector 4 pts	
0V	0V commun
CPU 24V	Module power supply
1/8 24V	Power supply of the 1 to 8 outputs
9/16 24V	Power supply of the 9 to 16 outputs

4- Setup :

4-1- CANopen :

- Address setup:

Change the ADDRESS dipswitchs position, to select an address.
The address corresponds to the value of the dipswitchs + 1
Ex: For Node = 32, set dipswitchs 1, 2, 3, 4, 5 and reset all other (32 = 1+2+4+8+16 +1)

- CANopen protocol and speed setup:

Set dips 2 and 3 to select the CANopen protocol.

Speed (Kbits/s)	DIP 4	DIP 5	DIP 6
10	OFF	OFF	OFF
20	ON	OFF	OFF
50	OFF	ON	OFF
125	ON	ON	OFF
250	OFF	OFF	ON
500	ON	OFF	ON
1000	OFF	ON	ON

Set dip 1 to activate the terminal resistor of the module if this one is located at the beginning or the end of the network.

- Dictionary CANopen :

The dictionary contains the different parameters and variables of the module RIO40S

Dictionary

Index	Object	Name	Type	Access	M/O
1000H	VAR	device type	Unsigned 32	ro	M
1001H	VAR	error register	Unsigned 8	ro	M
1002H	VAR	manufacturer status register	Unsigned 32	ro	O
1003H	ARRAY	pre-defined error field	Unsigned 32	ro	O
1004H	ARRAY	number of PDO supported	Unsigned 32	ro	O
1005H	VAR	COB-ID SYNC-message	Unsigned 32	rw	O
1006H	VAR	communication cycle period	Unsigned 32	rw	O
1007H	VAR	synchronous window length	Unsigned 32	rw	O
100BH	VAR	Node-ID	Unsigned 32	ro	O
100CH	VAR	guard time	Unsigned 32	rw	O
100DH	VAR	life time factor	Unsigned 32	rw	O
100EH	VAR	COB-ID guarding protocol	Unsigned 32	rw	O
100FH	VAR	number of SDO supported	Unsigned 32	ro	O
1014H	VAR	COB-ID Emergency	Unsigned 32	rw	O
1200H	RECORD	1st Server SDO parameter	SDOPar	rw	O
1400H	RECORD	1st receive PDO parameter	PDOCommPar	rw	O
1401H	RECORD	2nd receive PDO parameter	PDOCommPar	rw	O
1600H	RECORD	1st receive PDO mapping	PDOMapping	rw	O
1601H	RECORD	2nd receive PDO mapping	PDOMapping	rw	O
1800H	RECORD	1st transmit PDO parameter	PDOCommPar	rw	O
1801H	RECORD	2nd transmit PDO parameter	PDOCommPar	rw	O
1A00H	RECORD	1st transmit PDO mapping	PDOMapping	rw	O
1A01H	RECORD	2nd transmit PDO mapping	PDOMapping	rw	O
6000H	ARRAY	Read State 8 Input Lines	Unsigned 8	ro	O
6002H	ARRAY	Polarity 8 Input Lines	Unsigned 8	rw	O
6003H	ARRAY	Filter Constant 8 Input Lines	Unsigned 8	rw	O
6100H	ARRAY	Read State 16 Input Lines	Unsigned 16	ro	O
6120H	ARRAY	Read State 32 Input Lines	Unsigned 32	ro	O
6200H	ARRAY	Write State 8 Output Lines	Unsigned 8	rw	O
6202H	ARRAY	Polarity 8 Output Lines	Unsigned 8	rw	O
6206H	ARRAY	Fault Mode 8 Output Lines	Unsigned 8	rw	O
6207H	ARRAY	Fault State 8 Output Lines	Unsigned 8	rw	O
6300H	ARRAY	Write State 16 Output Lines	Unsigned 16	rw	O

The complete description of all RIO 40S module parameters and variables is available on SERAD website in loading (RIO40 Dictionary.xls).

- Example : Supervisor80 and 1 module RIO40S :

```
StartCan(Serial3,5,100) ' speed 500K, S80node=100
ID#=32 ' RIO40S node=32
CanSetup&(Serial3, 1280h, 1, 600h+ID#)
CanSetup&(Serial3, 1280h, 1, 580h+ID#)
Loop:
      E&=CanRemote&(Serial3, 6120h, 1)     ' E&= state of 24 inputs
      CanRemote%(Serial3, 6300h, 1, S%)    ' Send of 16 outputs
                                           ' contained in S%
      Goto loop
```

4-2- Modbus :

- Address setup :

Change the ADDRESS dipswitchs position, to select an address.
The address corresponds to the value of dipswitchs + 1
E.g.: To get the address 32, set the dipswitchs 1, 2, 3, 4 and 5 (32 = 1+2+4+8+16 +1)

- Setup Modbus protocol :

Set the dips. 2 and 3 to choose the Modbus protocol

Bauds speed	DIP 4	DIP 5	DIP 6
300	OFF	OFF	OFF
600	ON	OFF	OFF
1200	OFF	ON	OFF
2400	ON	ON	OFF
4800	OFF	OFF	ON
9600	ON	OFF	ON
19200	OFF	ON	ON
38400	ON	ON	ON

- Word modbus array :

Address	Function	Description
600	Read	E1 to E16 inputs states Warning: state of the inputs E1 to E8 on MSB, state of the E9 inputs to E16 on LSB.
1	Read	State of inputs E17 to E24 Warning: state of the inputs E17 to E24 on MSB.
602	Write	Change outputs S1 to S16 Warning: change outputs S1 to S8 on MSB, change outputs S9 to S16 on LSB.

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