

INTRODUCTION

The Brodersen RTU32 controller series based on a 32-bit platform provides the RTU with power and leading edge functionality. The platform is based on a fanless industrial PC platform with WinCE 5.0 .NET operating system. It provides an open and adjustable platform with both the power and functionality required to control advanced industrial applications.

Fully equipped with a powerful IEC61131 PLC functionality, web server HMI functions and real time clock with milliseconds resolution, it provides you with all the advantages the combination of a very fast PLC, IPC and RTU can give you.

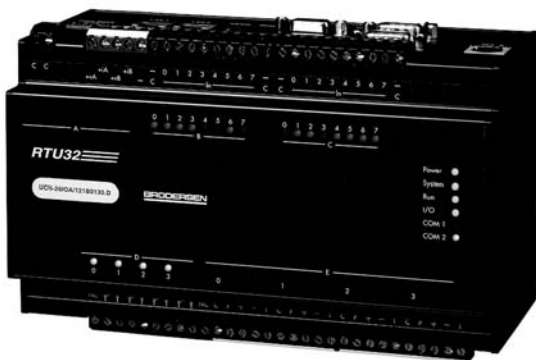
The BC RTU32 is in general based on the flexible hardware layout and design, known from the existing RTU8 and RTU870 product series. It is supplied in a robust aluminium enclosure and can be used with the wide range of Brodersen I/O expansion modules. It is in standard module kept in the modular size of 189mm.

Ethernet and TCP/IP are the basic communication and data environments, however, serial communication interfaces are still an important part of the RTU32 for interfacing to various system parts.

The RTU32 is available with or without integrated I/O. Different software functionality is provided.

Features

- Powerful RTU and Industrial Controller.
- Open Platform with WinCE Operating System.
- Integrated Powerful EN/IEC61131 Control Software.
- Several Communication Protocols Supported Including the full Modbus suite.
- EN/IEC60870-5-101/104 Protocol Support.
- Global Distribution and Subscription of Event Based Time Stamped Variables.
- Dual Ethernet and COM Interfaces.
- Robust Design for Industrial Applications.
- Optional drivers available, e.g. SMNP agent for network monitoring, alarming etc.



VERSIONS/ORDERING CODES

	UCN-26IOA/1	2	1	B	01	30	D
Type	UCN						
UCN	UCN						
26I/O type and counts. versions:	RTU32 basic without I/O						
16 dig. in/4 relay out./	B						
4 analog in./2 analog out.	26IOA						
CPU Motherboard type	300MHz x 86 CPU						
RAM/Flash size	64MB RAM/64MB Flash						
Optional drivers etc.	Standard (Modbus+IEC870)						
Standard + SNMP	2						
Branding	Brodersen						
COMs options	2 x RS232						
6 x RS232	02						
5 x RS232 + 1 x RS485	03						
1 x RS232 + 1 x RS485	04						
Power supply option	115-230VAC						
115-230VAC incl. 12V UPS	10						
Battery/charger	20						
24-48VDC incl. 12VDC	30						
ext. supply							
Input/output options	No IO type						
Analogue input/output range:	0						
Configurable	D						

Special versions

Special versions can be delivered as option. Contact us for more information.

**Utility Outstation and Automation Controller
RTU32**

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TECHNICAL DESCRIPTION

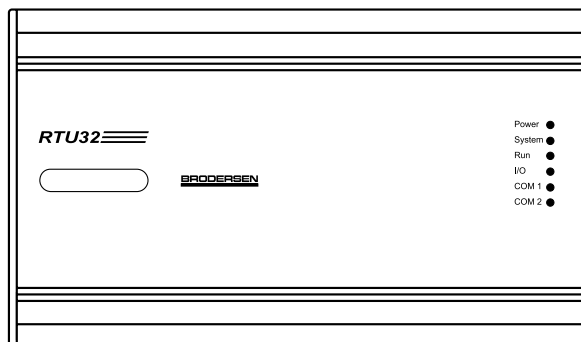
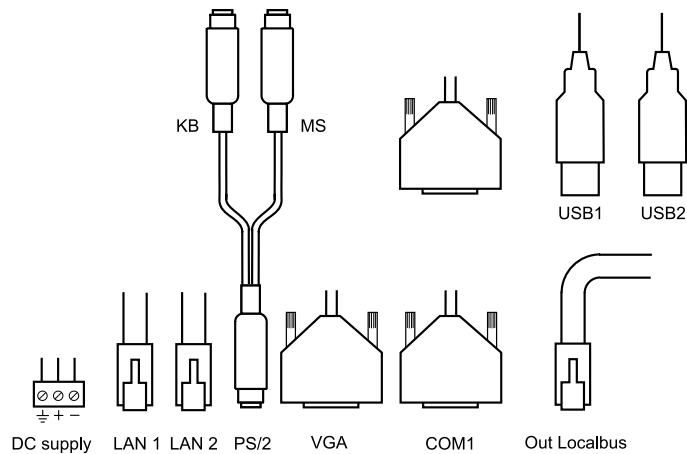
Input/output

The RTU32 basic I/O fit can include up to 32 input/output terminals. I/O options available:

Version	UCN- 26IO	
Digital inputs (10-30V DC)	16	Can also be used as S0 counter inputs (ZI)
Digital outputs (PNP o. c.)	0	
Analogue inputs (Configurable)	4	
Analogue outputs (Configurable)	2	Sources outputs
Relay outputs (NO)	4	

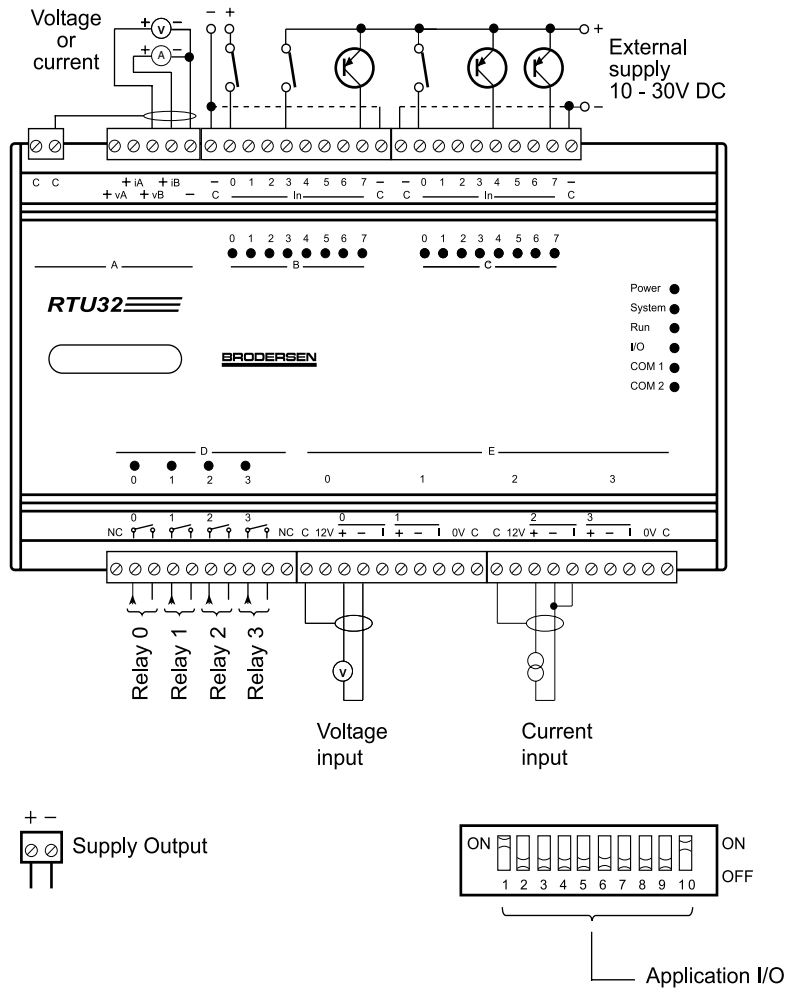
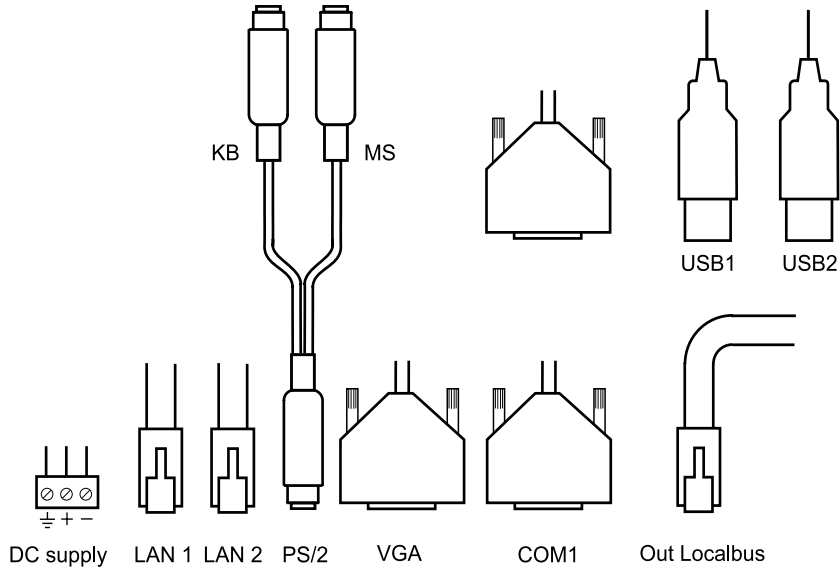
All digital I/O's are equipped with opto-couplers. The analogue inputs have galvanic isolation between the individual channels. Solid state relays are used for multiplexing the analogue inputs. No isolation on analogue outputs.

Wiring diagram UCN-B/xx



Utility Outstation and Automation Controller
RTU32

Wiring diagram
UCN-26IOA/xx



TECHNICAL DESCRIPTION

General

The RTU32 offers 2 main functions:

- A powerful stand-alone RTU with I/Os to perform embedded data processing, data control, data logging and monitoring.
- A networking communicator for collecting, managing and communicating data via protocols on different physical interfaces upwards and downwards in industrial applications.

The RTU32 Outstation and Industrial Controller is based on an Industrial PC platform running WinCE operating system with all the well known embedded Microsoft environment facilities. A range of industrial power supplies is integrated to support industrial supply levels and functions such as UPS. The basic IPC includes a range of communication and other interfaces. The RTU32 provides additional interfaces like LocalBus for expansion I/O and other COMs via the internal PC104 interface.

The RTU32 software is stored on a removable Flash. During start-up, the operating system and applications are moved to RAM where it is executed. System configuration settings are stored on the Flash. Retained variables are stored on flash when required.

WinCE is the RTU32 operating system. Integrated I/O and LocalBus for external I/O connectivity are controlled in an implemented I/O database. A STRATON SoftPLC VM (Virtual Machine) is ported to the WinCE real-time task. This enables the STRATON SoftPLC runtime application program to be executed in the RTU32.

Using the Ethernet network for primary communication provides all the advantages of existing TCP/IP networking communication facilities (FTP, HTTP etc). Fast, reliable and secure communication are the main features and all networking components (software, routers, switches, etc.) are available. In addition, serial ports for interfacing to application specific protocols (e.g. Modbus, Fieldbus, utility protocols, network management and traffic proprietary protocols etc.) are available.

Configuration

RTU32 main settings, such as network settings, time settings and other basic configuration parameters, are configured via the RTU32 WebPages. In addition a number of configuration files in the WinCE file system are used for driver specific settings and are adjusted either from the editor provided in the Webpages or remotely via the RTU32 configuration tool.

I/O's and Database

Internal I/O and expansion I/O are managed in an independant database. The I/O database structure is designed as a multi-accessible database. The database runs in its own task providing fast and reliable I/O communication. The STRATON SoftPLC has drivers to access the database both at board level where the I/O is accessed in I/O sections, and in single level where each I/O can be accessed individually according to the specific application requirement.

In addition, an API for WinCE provides access to the database from your own C#, C++ or VBA application. It can even be used as gateway access to a STRATON application program.

STRATON SoftPLC

The STRATON programming tool fully supports EN/IEC61131 and is used for making SoftPLC programs in the RTU32. The application program kernel is implemented and runs in WinCE real-time task. STRATON offers complete SoftPLC functionality and supports all features needed in today's industrial environment. STRATON supports programming languages such as Structured Text, Function Block, Ladder, Instruction List and Sequential Function Chart. The STRATON SoftPLC supports cold restart, hot restart and on-line changes.

The STRATON Workbench is used for configuration protocols, programming and debugging. It supports several tools for multi-program handling and documentation. It is also a powerful tool for complete system design and programming, providing unique functions for event based communication. The Global Binding Editor makes it possible to publish and subscribe variables in a large network with minimum communication load. The events are time stamped and can also be used directly in ZenOn SCADA HMI applications.

Programming, debugging and upload and download of application programs can be done remotely via Ethernet or RS232.

The basic drivers and protocols available for the RTU32 are:

- I/O drivers for integrated I/O and I/O Expansion.
- ModbusRTU Master and Slave.
- ModbusTCP Client and Server.
- EN/IEC60870-5-101 Master and Slave.
- EN/IEC60870-5-104 Client and Server.
- SNMP Agent driver (optional).

I/O Drivers

The RTU32 I/O can be accessed in 2 ways, either as boards (I/O is reported in sections as they are connected physically) or as profiles (each I/O is directly addressed). I/O status is reported in a function block. The I/O driver support up to 32 I/O expansion modules - and more than 1000 I/Os

Fieldbus Configurator

With the Fieldbus Configurator Tool in STRATON, the Modbus suite of protocols can be configured. It is also possible to publish or subscribe any variables in RTU32 networks or on other STRATON runtime platforms and ZenOn HMI platforms.

EN/IEC60870-5-101/104

Utility protocols EN/IEC60870-5-10x provide full configuration flexibility of almost any interoperability requirements. The protocol links are provided as a driver in STRATON and the application layer data and protocol structures are generated in Structure Text (ST). This gives full access to set up any Interrogation and ASDU required for the application.

In addition, the protocol drivers support advanced features for gateway functions where, for example, information in monitor direction can be moved from one protocol interface to another without compromising the actual value and original time stamp. Also sharing data queue from more ports are possible.

IEC60870 configurator- a powerful and flexible configuration tool for the drivers are available.

Data Logging

A special data logging function block is available for logging event based or cyclical data to the flash file system. The data logging also supports functions for formatted log directly exportable to ZenOn HMI and SCADA software. Log files can be downloaded from the RTU32 via FTP.

Modem Control / Dial-up / Dial-in

Both dial-up and dial-in functions via a PSTN, ISDN or GSM modem connected to the serial port of the RTU32 are possible when using the STRATON modem function. It can be used for any serial communication e.g. ModbusRTU and EN/IEC60870 serial protocols.

**Utility Outstation and Automation Controller
RTU32****Real-Time / Real-Time Clock**

The WinCE real-time task is used for the application program execution. Time stamps and cyclic execution are also based on the WinCE real-time clock. Time stamps are reported in milliseconds. In order to achieve high time accuracy the clock has synchronisation option with SNTP and special clock slave and master function for synchronisation from RTU32 to RTU32.

COM communication for NullModem, radio and LeasedLine modems

The RTU32 has implemented extended necessary data communication features for communication of ModbusRTU, serial EN/IEC60870-5-101 etc. over serial modems and converters. The features cover detailed handshake control with timing of RTS and CTS.

Power supply options

The RTU32 can be delivered with some different built-in power supplies. Option for 24-48VDC and 115-230VAC is available. In addition the mains version can be delivered with an UPS for connecting a battery. If the main is disconnected the RTU32 will continue to run on the battery. Some internal I/O for mains alarm is provided. When the main comes back, the battery is charged and will be standby fully charged for fall back situations next time the mains is interrupted.

The power supply also provide an 12VDC output for used for I/O control.

Other interfaces

The RTU32 include also 2 USB ports for use for mouse, keyboard, Flash disc storage etc.

A VGA port for connecting a monitor and the mouse/keyboard connection provide possibility for work with the RTU directly on the WinCE user interface.

TECHNICAL DATA**BASIC 32-BIT CPU SYSTEM**

CPU:	AMD Geode™ GX1 300 MHz
BIOS:	AWARD 256KB Flash BIOS
System chipset:	Geode™ GX1/CS5530A
System RAM memory:	64MB SDRAM (in 144-pin SODIMM socket). Supports up to 256 MB.
Non volatile RAM (optional):	1MB battery backed RAM.
Disc / SSD:	Min. 64MB removable Compact Flash in Type I/II socket. Support up to 512MB.
Watcdog timer:	
CPU:	Reste/IRQ; 16 sec.-127min. and 30 sec./step.
System:	Separated Watchdog controller for monitoring primary tasks in WinCE and application system.
Expansion:	Internal PC104 interface.

PHYSICAL INTERFACES

Dual Ethernet:	2 x RJ45 Ethernet interfaces, IEEE 802.3c 100Base-Tx Fast Ethernet compatible (Dual realtek RTL8139C).
COMS:	1 x RS232 and 1 x RS232/RS422/RS485 (factory configurable).
USB:	2 x USB 1.0 ports.
VGA/LCD:	PCI bus VGA/LCD interface
PS/2:	Single interface for keyboard and PS/2 mouse. Twin interface cable included.
I/O Expansion:	RJ45 LocalBus interface for Brodersen I/O Expansion modules. See industrial I/O section.

INDUSTRIAL I/O

Expansion I/O:	Expansion I/O is possible via the Brodersen I/O LocalBus system to all Brodersen I/O Expansion modules. Supports up to 32 I/O Expansion modules of any type.
Integrated I/O:	26IO board integrated supports; 16 Digital inputs 4 Relay outputs 4 Analogue inputs 2 Analogue outputs. Scantime better than 5ms for digital I/O for smaller applications.

INTEGRATED DIGITAL I/O

Inputs:

Input voltage activated:	10-30V DC.
Input voltage deactivated:	Max. 3V DC.
Input current:	12V DC: Typical 3mA. 24V DC: Typical 6mA.
Input delay:	Typical 1ms.

Counting on digital inputs:

Max. 100Hz
Min. 5ms is required for detecting pulse and pause.

Isolation: 1kV AC

Indicators: One LED for each digital input (red) indicating active input.

INTEGRATED RELAY OUTPUTS

Relay outputs: 4 potential free SPST-N/O contacts.
Output voltage: Max. 240V AC.
Output current: Max. 1A AC (resistive).
Output delay: Typical 5ms.

Lifetime (relay): Min. 100.000 operations at rated load.

Contact material: Gold overlay silver alloy.

Isolation

(coils-contacts): 2kV AC 50Hz 1 min (IEC255-5).
4kV 1,2/50micro s. / impulse withstand (IEC255-5).

Indicators: One LED for each output (yellow) indicating active output.

INTEGRATED ANALOGUE INPUT

Inputs: 4 multiplexed analogue channels with solid state multiplexer.

Input configuration: Differential (+/-), flying capacitor type.

Input measuring ranges:

0 - 10V
0 - 5V
-5 - +5V
-10 - +10V
0-2V/0 - 20mA
0,4-2V/4 - 20mA
Selection between these ranges shall be done in STRATON.

Resolution: 14 bit, 0-16383.

Impedance: Voltage: 1M Ohm.
Current: 100 Ohm $\pm 0,25\%$.

Absolute maximum ratings:

Input voltage: $\pm 15V$ DC.
Input current: $\pm 30mA$ DC.

Update time: Better than 250 ms.

Measuring accuracy: 25°C: $\pm 0.1\%$ (typically 0.05%).
-10°-55°C: $\pm 0.3\%$ (typically 0.1%).

Linearity: Better than $\pm 0,05\%$.

Temperature stability: Better than $\pm 50ppm/^{\circ}C$ (typical).

Common mode voltage: Max. $\pm 80V$ DC.

Common mode rejection ratio: Min. 72dB.

Series mode rejection: Min. 36dB (50-120Hz)

Isolation: (input to input): 500V.

INTEGRATED ANALOGUE OUTPUT

Outputs: 2 sourced analogue channels.

Output ranges: 0 - 10V
0 - 5V
-5 - +5V
-10 - +10V
0 - 20mA
4 - 20mA
Selection between these ranges shall be done in STRATON.

Resolution: 14 bit, 0-16383.

Absolute maximum ratings:

Iout: Output voltage: 27V DC.
Load: 1kOhm
Output current: 25mA DC.
Vout: Output voltage: $\pm 15V$
Load: 1kOhm

Update time: Better than 100 ms.

Accuracy Iout: 25°C @ 100Ohm: $\pm 0,1\%$
-10°-60°C @ 100Ohm: $\pm 0,2\%$

Linearity: Better than $\pm 0,05\%$.

Leakage current: Max. 10 μA (typically 3 μA)

Temperature stability: Better than $\pm 50ppm/^{\circ}C$, @ 100Ohm.

Accuracy Vout: 25°C: $\pm 0.1\%$
-10°-60°C: $\pm 0.2\%$

Linearity: Better than $\pm 0,05\%$.

Isolation: (input to input): No isolation.

SOFTWARE

Operating system: WinCE 5.0 .NET.
Open platform with possibility for developing and running customer application.

**Utility Outstation and Automation Controller
RTU32**

**EN/IEC61131
SoftPLC:** STRATON SoftPLC VM Embedded.

Standard drivers: STRATON binding, ModbusRTU, ModbusTCP, EN/IEC60870-5-101/104.

Optional drivers: SNMP Agent driver
Via ZenOn several additional drivers.

POWER SUPPLY

Supply Voltage versions: 24-48VDC (20-60VDC).
115-230VAC (90-265VAC).
115-230VAC (90-265VAC) with UPS and battery charger 12VDC.

Power consumption: Max. 40W - Configuration dependent.

Isolation: Power supply to electronics: 3750V

GENERAL

Indicators (LEDS):
Power (green): Indicating power ON.
System (green): Indicate system status.
Run (green): Indicate SoftPLC program status.
I/O (green): Indicate status of integrated and expansion I/O.
Com x (yellow): Indicate Rx/Tx activity on the specific com port.

Ambient temperature: Storage: -40 - +85°C
Operation: -10 - +60°C.
(Optional: -40 - +70°C)

EMC/LVD: EN55022:1998 Class A
EN61000-3-2:2000
EN61000-3-3:1995
EN55024:1998 Class A
EN55024:1998 (EN61000-4-2:1995, EN61000-4-3:1996, EN61000-4-4:1995, EN61000-4-5:1995, EN61000-4-6:1996, EN61000-4-8:1993, EN61000-4-11:1994)
EN 61000-6-2: EMC/ Immunity Industry.
EN 61010-1: Safety requirements for electrical equipment for measurement and control.

Climatic:
Dry heat: IEC 68-2-2, Test Bd, Temp. +55°C, Duration 8h.
Cold: IEC 68-2-1, Test Ad, Temp. -10°C, Duration 8h.
Damp heat: IEC 68-2-3, Test Ca, Temp. 40°C, RH 95%, Duration 8h.

Mechanical:
Vibration: IEC 68-2-6, Test Fc (sinusoidal), Freq. 10-150Hz, Amp. 4g, 5 sweeps in 3 orthogonal axes.
Shock: IEC 68-2-27 (half sine), Acc. 15g, Pulse time 11msec., 3 x 6 shocks.

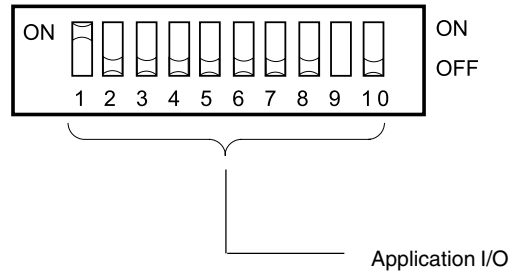
Protection: IP20.

Mounting: 35 mm DIN-rail, EN50022.

Housing: Black aluminium housing.

Dimensions:
HxWxD: Standard: 94(+connectors)x189x101 mm.
Other dimensions depending on configuration.

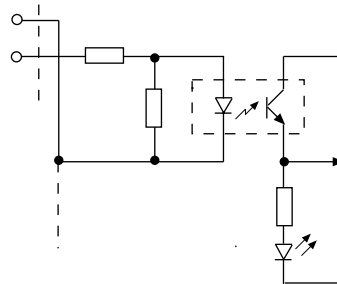
CODE SWITCH/ADDRESS SELECTOR



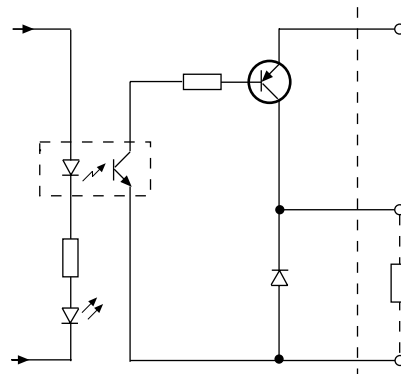
The DIL switches can be read from the STRATON application program and can be used for simple end user configuration.

CIRCUIT CONFIGURATION (DIGITAL)

Input

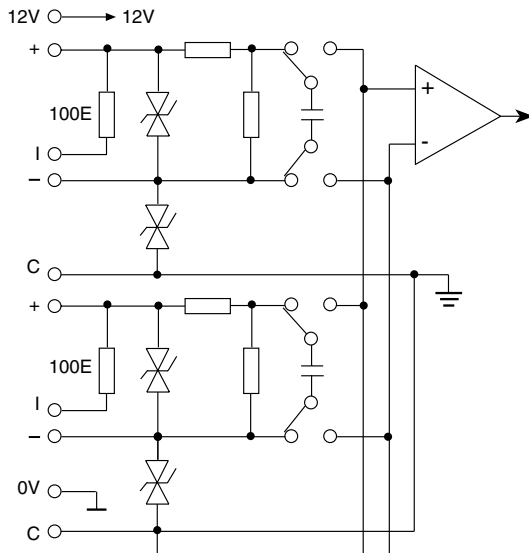


Output (PNP)



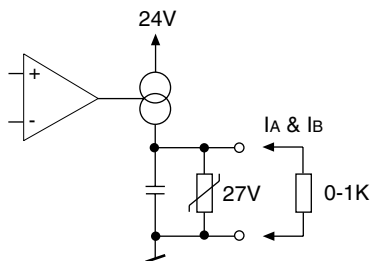
CIRCUIT CONFIGURATION (ANALOGUE)

Analogue Input



Analogue Output

I Out



V Out

