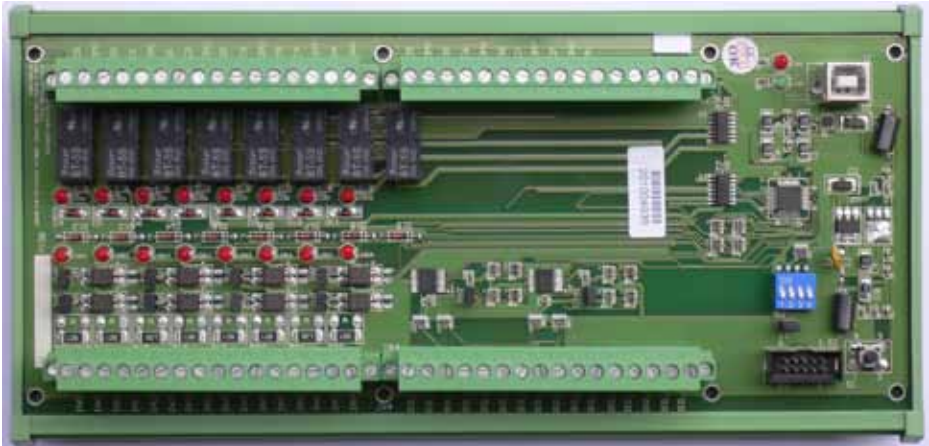


USB-I/O Manual



UHRO-8 - DIN-Rail-Version

UPRO-8 - Board-Version

8 photo couple input / 8 relay output channels / 16 DIO

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Product Code:

AUSB8P/R USB 8 PHOTO ISO./ RELAY BOARD

UHRO-8 - DIN-Rail-version

UPRO-8 - Board-version

Bus: USB 2.0

Description:

8 photo couple input / 8 relay output channels

Input maximum load voltage is 30V

By jumper, you can select two range of voltage

0 - 4.5V off and 6V - 20V on. (0 - 20V)

0 - 16.5V off and 18 - 30V on (0 - 30V)

PC817 photo couple chips.

5000V isolation voltage

8 Relays - 1 x COM/NO/NC

Max switching current: 1000mA

Max contact rating for relay: 30V DC

16 LED correspond to I/O ports activation status

Connections via Pluggable Screw Terminals

Features:

For direct DIN-Rail mounting

Also as board without DIN Rail adapter available

High Speed 8051 μ C Core

USB 2.0 Function Controller

Support USB ID 0~14 SET

POWER External DC+5V 0,5A

Software/Driver:

Windows-XP, Vista, Win-7 will use HID-interface and sample for programming, Linux driver and sample for programming.

Package includes the following items:

USB 8PR Board

USB cable

Software and Manual CD

The DIN-Rail-version comes with a EMI-Protection-kit

This kit is optional in the board-version!

Operating temperature range: 0 ~ 33C.

Relative humidity rage: 0 ~ 90%.

Size: 250 mm x 120 mm x 55 mm

Security Note

This device should not be used in applications where failure may result in death or injury without proper consideration and design of associated system architecture and redundant safety features. Connection and repairs are allowed only by a specialist.

When used in a machine or plant, is to ensure that after installation continues to the relevant provisions, rules and guidelines are complied with!

These products come into contact voltage, therefore to consider the applicable VDE regulations VDE 0550 / 0551, VDE 0700, VDE 0711, especially VDE 0100 and VDE 0860.

J1 USB Connection USB-B

A suitable cable is included

VCC	+5 VDC (USB VBUS POWER)
D-	Data -
D+	Data +
SGND	Signal Ground



B

USB wiring is very sensitive against EMI errors (mainly sparking when opening contacts). The U-EMI-1 Kit is included with the DIN rail version and includes two Würth folded cores for the USB data cable and a Ferrite sleeve for the power cable. If you are using a HUB, it should be protected the connection HUB/computer (U-EMI-2)! The kit includes two Würth folded cores for the USB data cable.

The cores must be mounted as shown in the illustrations, as close as possible on the connectors.

But also the avoidance of errors is very important. Therefore, the careful layout and installation of the wiring is very important!



Folding core on the USB cable to the computer



Folding core on the USB cable to the USB IO
1 or 2 x through the core

Power Supply - TB1



TB1 - External 5V DC		
1	EXT+V	5V+
2	SGND	5V-

Ferrite sleeve on the power supply cable

The power-supply of our products must be 5V external DC. It is to pay attention to correct polarity. Otherwise, the product could be damaged. If the board is by wrong power supply except function, you can try new store the firmware.

The U-EMI-1 Kit is included with the DIN rail version, and includes ferrite sleeve, shielded by EMI for the power cable. Are shown on the image above.

For earlier versions of the Decision-USB IO was also the possibility of the power supply via the USB bus. To get greater stability, this connection was removed. The USB bus power is not always able to provide enough power for the Relais switched on! The result is a loss of connection or "hanging" USB module. An external power supply provides a secure power supply!

USB Power Management in Windows - In Window System, USB communication might disconnect under Power Saving Mode or Sleep Mode. When connecting USB boards on PC, please make sure windows power management set in case interference with USB communication.

S1 Reset Button

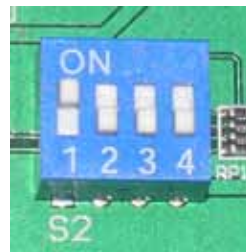
To reset the "hanging" USB-Module



S2 USB ID

Set different ID for each board

1	2	3	4	Card ID
ON	ON	ON	ON	--
OFF	ON	ON	ON	14
ON	OFF	ON	ON	13
OFF	OFF	ON	ON	12
ON	ON	OFF	ON	11
OFF	ON	OFF	ON	10
ON	OFF	OFF	ON	9
OFF	OFF	OFF	ON	8
ON	ON	ON	OFF	7
OFF	ON	ON	OFF	6
ON	OFF	ON	OFF	5
OFF	OFF	ON	OFF	4
ON	ON	OFF	OFF	3
OFF	ON	OFF	OFF	2
ON	OFF	OFF	OFF	1
OFF	OFF	OFF	OFF	0



Multiple Boards Connect

When you need to connect more than 3 boards on one PC, please make sure the following below

1. Set different ID for each board.
2. Supply external 5V to each USB board.
3. Supply external 5V to USB hub.

Please make sure your external 5V power supply enough for the USB I/O boards. If input voltage is below 4.8V for USB I/O board, it can't work normally and sometimes it will cause device manager keeping refreshing itself or can't recognize the device.

TB2/3 ISOLATOR Input Ports

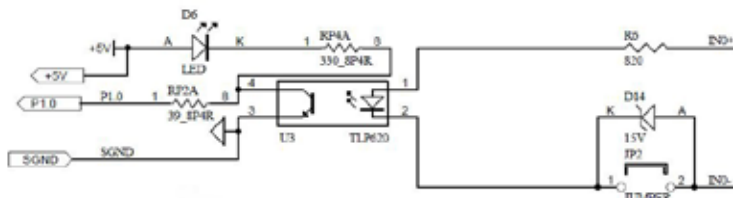
Pin	Signal	Description TB 3
1	IN0+	Opto-isolator Ch. 00 + Input
2	IN0-	Opto-isolator Ch. 00 - Input
3	IN1+	Opto-isolator Ch. 01 + Input
4	IN1-	Opto-isolator Ch. 01 - Input
5	IN2+	Opto-isolator Ch. 02 + Input
6	IN2-	Opto-isolator Ch. 02 - Input
7	IN3+	Opto-isolator Ch. 03 + Input
8	IN3-	Opto-isolator Ch. 03 - Input
9	IN4+	Opto-isolator Ch. 04 + Input
10	IN4-	Opto-isolator Ch. 04 - Input
11	IN5+	Opto-isolator Ch. 05 + Input
12	IN5-	Opto-isolator Ch. 05 - Input
13	IN6+	Opto-isolator Ch. 06 + Input
14	IN6-	Opto-isolator Ch. 06 - Input
15	IN7+	Opto-isolator Ch. 07 + Input
16	IN7-	Opto-isolator Ch. 07 - Input

ISOLATOR Input SET JP3 to JP18

The JP3 is used to select voltage signal opto+ and opto- range of photo couple input channel 1, and the JP4 is used to select voltage signal range of photo input channel 2, ...etc. When we short the jumper, the input voltage range is 0 to 20V, and open the jumper means input voltage range is 0 to 30V

Jumper	Input Range	Inactive Voltage	Active Voltage
Open	0 to 30V	0 to 1.5V	3 to 20V
Short	0 to 20V	0 to 16.5V	18 to 30V

Schematic Input Ports



Strong electromagnetic sources, such as power lines, large electric motors, switches, or welders can cause strong electromagnetic interference. Video monitors and cables are strong sources of interference.

If the cable must be led by an area with significant electromagnetic interference, shielded cables with grounding on the source should be used.

Avoid placing your cable parallel to a high-voltage line! to minimize adverse effects, insert the cable at right angle to the power line.

Digital Input / Output Port Setting

UHRO-8 provide 16 digital channels (TTL level) and allow user to set them as 8 channel input port or 8 channel output port. Default setting is both of the ports as input

Pin	Signal	Description TB 4
1	DIO 00	Digital input/output Ch. 00
2	DIO 01	Digital input/output Ch. 01
3	DIO 02	Digital input/output Ch. 02
4	DIO 03	Digital input/output Ch. 03
5	DIO 04	Digital input/output Ch. 04
6	DIO 05	Digital input/output Ch. 05
7	DIO 06	Digital input/output Ch. 06
8	DIO 07	Digital input/output Ch. 07
9	DIO 08	Digital input/output Ch. 08
10	DIO 09	Digital input/output Ch. 09
11	DIO 10	Digital input/output Ch. 10
12	DIO 11	Digital input/output Ch. 11
13	DIO 12	Digital input/output Ch. 12
14	DIO 13	Digital input/output Ch. 13
15	DIO 14	Digital input/output Ch. 14
16	DIO 15	Digital input/output Ch. 15

When user needs to change the port setting, it must be set in both software and hardware. In software setting, USB Init Tool.exe is a setting tool for USB series products. User can find it in Decision Studio CD with its manual. In hardware setting, JP9 and JP10 on the board are used to select input/output of digital I/O. When shorting JP9 means setting DIO_00 to DIO_07 as input mode, otherwise opening JP9 means setting DIO_00 to DIO_07 as output mode. When shorting JP10 means setting DIO_08 to DIO_15 as input mode, otherwise opening JP10 means setting DIO_08 to DIO_15 as output mode.

DIO Port1 (DIO_00~DIO_07)		DIO Port2 (DIO_08~DIO_15)	
Input	Output	Input	Output
Short JP9	Open JP9	Short JP10	Open JP10

After setting by the software, the setting of JP9 and JP10 must match the setting, or it could be dangerous. Especially in setting ports as output, it must open the jump on the board, or it may cause main IC damaged.

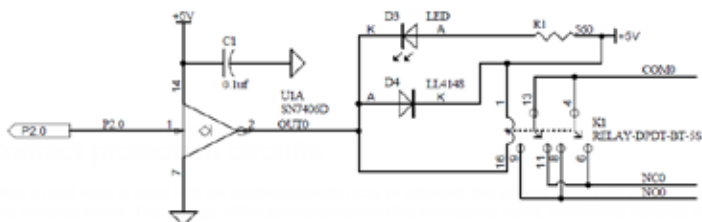
Please use this function extremely carefully.

TB4/5 Relay-Output

Pin	Signal	Description TB1
1	NC 0	Relay Ch. 00 - Output
2	COM 0	Relay Ch. 00 - Output
3	NO 0	Relay Ch. 00 - Output
4	NC1	Relay Ch. 01 - Output
5	COM 1	Relay Ch. 02 - Output
6	NO 1	Relay Ch. 02 - Output
7	NC 2	Relay Ch. 03 - Output
8	COM 2	Relay Ch. 03 - Output
9	NO 2	Relay Ch. 04 - Output
10	NC 2	Relay Ch. 04 - Output
11	COM 3	Relay Ch. 05 - Output
12	NO 3	Relay Ch. 05 - Output
13	NC 4	Relay Ch. 06 - Output
14	COM 4	Relay Ch. 06 - Output
15	NO 4	Relay Ch. 07 - Output
16	SGND	SGND

Pin	Signal	Description TB2
1	NC5	Relay Ch. 08 - Output
2	COM 5	Relay Ch. 08 - Output
3	NO 5	Relay Ch. 09 - Output
4	NC 6	Relay Ch. 09 - Output
5	COM 6	Relay Ch. 10 - Output
6	NO 6	Relay Ch. 10 - Output
7	NC 7	Relay Ch. 11 - Output
8	COM 7	Relay Ch. 11 - Output
9	NO 7	Relay Ch. 12 - Output
10	SGND	SGND
11	+5V	+5V
12		
13		
14		
15	SGND	SGND
16	+5V	DC +5V Stromversorgung

Schematic Outputs



3 voltage when the
as several hundred

- DC: Protection circuit with a diode
- DC and AC: Protection circuit with Varistor or RC-element

The suppressor must be made to the load.

Installation

The decision-computer USB devices use the HID (human interface device). The HID belongs to the generic device class is integrated in the operating system. If a new HID device is connected, no driver installation is required. The functions for access and control of HID hid.dll you can find in the Windows System32 folder.

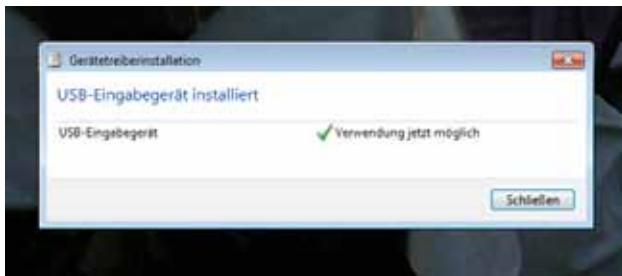
Windows 7 installation example



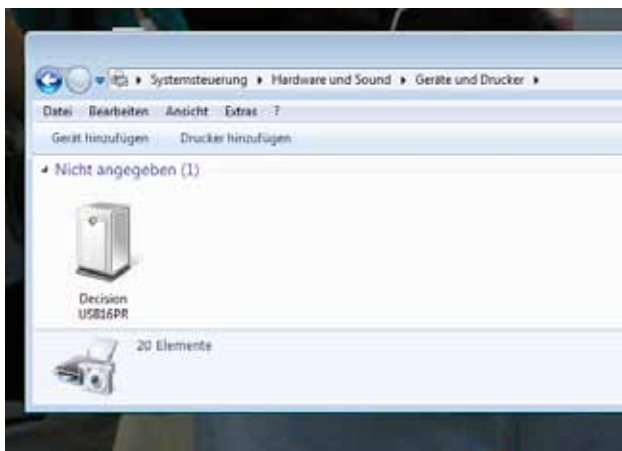
1. Power supply 5V connect

2. USB connect

3. USB input device - device driver software is successfully installed



4. USB input device - use now possible



5. In the Control Panel, you can find the Decision-USB module now

6. Ready to use

SOFTWARE PROGRAMMING UNDER WINDOWS AND LINUX

On Windows, we offer a function library and dll file as programming help. See the manual „USBII_Manual.pdf“ and demo code in VB/V C / Delphi on the decision-Studio CD.

We offer a C-source Linux users for direct access to the USB devices. See „Dcihid 0.5.1.tgz“ manual and example.

DIAGNOSTICS UNDER WINDOWS/XP

USB test Program.exe is a diagnostic tool to test USB devices on Windows/XP.
The USB test software can be found on the decision-Studio CD.

The examples and drivers be developed continuously. See the latest on the decision-computer-Merz „Service CD“.

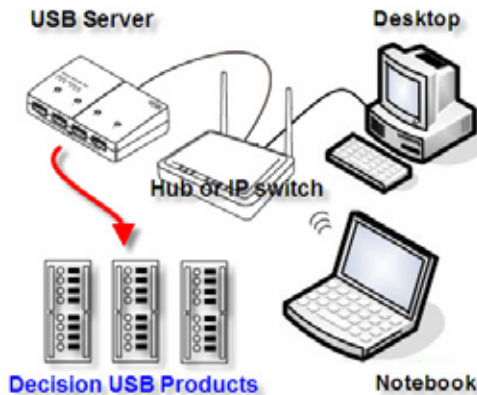
An important way to get more informations you find at <http://www.usb-industrial.com>

Software support on the short way: <http://www.usb-industrial.com/support.html>

USB Industrial.com Overview:

Windows Support	2010/04 USBII.dll 2.0.0.4	This package includes Dynamic-link library which is developed by Decision Computer to communicate with the USB Series Device. It can be included in multiple computer language (VB6, VC6, VB.NET, C# Delphi) under Windows.
Watchdog Timer		This watchdog timer is a kind of software timer that triggers a system reset or other corrective action if the main program, due to some fault condition. The intention is to bring the system back from the unresponsive state into normal operation. This function is new released and please contact us to get further information.
VCP driver	(For LABKIT Only)	Virtual COM port (VCP) drivers cause the USB device to appear as an additional COM port available to the PC. Application software can access the USB device in the same way as it would access a standard COM port. This function is only implemented in USBLABKIT
Linux Support	dcihid - 0.5.1 Basic function library and demo program 2009.05.01	This package includes a c library and a demo program which is developed by Decision Computer to communicate with the USB Series Device under Linux. It also includes a ReadMe file to demonstrate how to use it and package's format is .tgz.
Firmware Update	Firmware Hex file Download	This Package includes a driver and a software which is developed by Decision Computer to update the newest firmware into the USB Series Device. When new version of firmware is released, user can follow the instructions to update the firmware.
LabVIEW Support	LabVIEW 8 LabVIEW 2009	This package includes manual and examples which demonstrate how to connect and develop USB Series Device under LabVIEW, which is a well-known platform and development environment for a visual programming language from NI.
ProfilAB Support		This package includes manual and examples which demonstrate how to connect and develop USB Series Device under ProfilAB, which is a well-known platform and development environment for a visual programming language from Abacom.
Init Value Setting Tool	(For Output Channel)	The Init Value Setting Tool is a software tool to set init value for output channel. User can use this tool to plan output channel as default high or default low when power on.
Data Acquisition and Remote Monitoring Tool		The Data Acquisition and Remote Monitoring Tool (DARMT) is a software tool to record high/low state reports at local computer, and transmit them to FTP site to achieve data acquisition and remote monitoring

USB by LAN or Wireless



The remote control of Decision USB products by LAN or wireless with a remote-PC is very simple with a multi port USB Server

Because no driver should be installed to the installation and programming is very easy.

Under Windows, are the external USB I/O directly in the Device Manager and can be connect or control such as in the original host PC.

The module is not recognized - troubleshooting

Should the USB module is no longer found by the computer's operating system, usually helps new plug or to change the USB port.

Can be also an unstable power supply. A switching power supply with sufficient reserve should be used

Should the previous notes remedy not usually it helps to replace the firmware!

Firmware Update Manual

USBBootloader.exe is the tool software to update firmware into the USB SerialDevice Board developed by Decision Computer. When you get a new version of firmware (.hex), you can follow the steps to update firmware to the board.

1. Remove the external input signal Voltage and only support device power.
2. Set Board Id 15 (All on) for Update Mode and press the Reset button.
3. Connect PC to the Board by USB
4. If this is the first to use this function, please indicate the driver install path to the Driver Folder to install the driver.
5. Open the Software USBBootloader.exe and press the Open button and indicate the hex file and then press the Download button to update firmware.
6. Set Board Id between 0 ~ 14 and press Reset button and connect PC again.

Communication JP1 - only option!

Some unused holes (2 x 5) for JP1 are located on the board. Here a serial port can be added at a special version, with an optional expansion board, RS-232 or RS-422/RS-485. The ports are controlled via the USB. Please contact us if necessary

PC817 Series

- Lead forming type (I type) and taping reel type (P type) are also available. (PC817/PC817P)
- TUV (VDE0884) approved type is also available as an option.

■ Features

1. Current transfer ratio
(CTR: MIN. 50% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$)
2. High isolation voltage between input and output (V_{iso} : 5000V_{min})
3. Compact dual-in-line package
PC817: 1-channel type
PC827: 2-channel type
PC837: 3-channel type
PC847: 4-channel type
4. Recognized by UL, file No. E64380

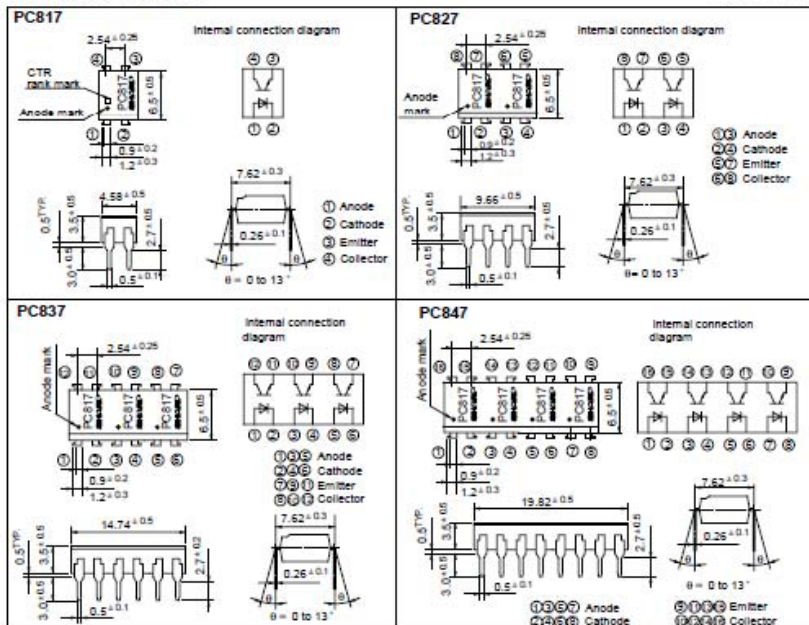
High Density Mounting Type Photocoupler

■ Applications

1. Computer terminals
2. System appliances, measuring instruments
3. Registers, copiers, automatic vending machines
4. Electric home appliances, such as fan heaters, etc.
5. Signal transmission between circuits of different potentials and impedances

■ Outline Dimensions

(Unit: mm)



* In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that occur in equipment using any of SHARP's devices, shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest version of the device specification sheets before using any SHARP's device.

■ Absolute Maximum Ratings

(Ta = 25°C)

Parameter	Symbol	Rating	Unit
Input	Forward current	I _F	50 mA
	*Peak forward current	I _{FM}	1 A
	Reverse voltage	V _R	6 V
	Power dissipation	P	70 mW
Output	Collector-emitter voltage	V _{CEO}	35 V
	Emitter-collector voltage	V _{ECO}	6 V
	Collector current	I _C	50 mA
	Collector power dissipation	P _C	150 mW
Total power dissipation		P _{tot}	200 mW
*Isolation voltage		V _{iso}	5 000 V _{rms}
Operating temperature		T _{opr}	-30 to +100 °C
Storage temperature		T _{stg}	-55 to +125 °C
*Soldering temperature		T _{sd}	260 °C

*1 Pulse width ≤ 100 μs, Duty ratio : 0.001

*2 40 to 60% RH, AC for 1 minute

*3 For 10 seconds

■ Electro-optical Characteristics

(Ta = 25°C)

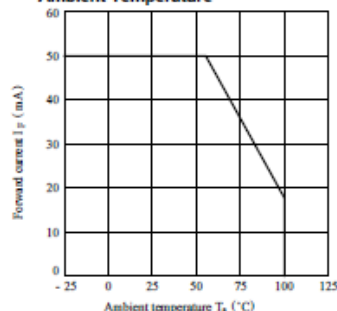
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V _F I _F = 20mA	-	1.2	1.4	V
	Peak forward voltage	V _{FM} I _{FM} = 0.5A	-	-	3.0	V
	Reverse current	I _R V _R = 4V	-	-	10	μA
	Terminal capacitance	C _i V = 0, f = 1kHz	-	30	250	pF
Output	Collector dark current	I _{CDO} V _{CE} = 20V	-	-	10 ⁻⁷	A
	*Current transfer ratio	CTR I _F = 5mA, V _{CE} = 5V	50	-	600	%
Transfer characteristics	Collector-emitter saturation voltage	V _{CE(sat)} I _F = 20mA, I _C = 1mA	-	0.1	0.2	V
	Isolation resistance	R _{iso} DC500V, 40 to 60% RH	5 × 10 ¹⁰	10 ¹¹	-	Ω
	Floating capacitance	C _f V = 0, f = 1MHz	-	0.6	1.0	pF
	Cut-off frequency	f _c V _{CE} = 5V, I _C = 2mA, R _L = 100 Ω, 3dB	-	80	-	kHz
	Response time	V _{CE} = 2V, I _C = 2mA, R _L = 100 Ω	-	4	18	μs
			-	3	18	μs

*4 Classification table of current transfer ratio is shown below.

Model No.	Rank mark	CTR (%)
PC817A	A	80 to 160
PC817B	B	130 to 260
PC817C	C	200 to 400
PC817D	D	300 to 600
PC8*7AB	A or B	80 to 260
PC8*7BC	B or C	130 to 400
PC8*7CD	C or D	200 to 600
PC8*7AC	A, B or C	80 to 400
PC8*7BD	B, C or D	130 to 600
PC8*7AD	A, B, C or D	80 to 600
PC8*7	A, B, C, D or No mark	50 to 600

* : 1 or 2 or 3 or 4

Fig. 1 Forward Current vs. Ambient Temperature



■ FEATURES

- 2 Form C Contact
- DIL Pinch Terminals
- High Reliability Bifurcated Contact
- Conforms to FCC Part 68 1500V Surge and Dielectric Strength 1000VAC
- Fully sealed
- UL File No. E147052



■ COIL RATING (at 20 °C)

Nominal Voltage (VDC)	Coil Resistance (Ω±10%)	Nominal Current (mA)	Pick-Up Voltage (VDC)	Drop-Out Voltage (VDC)	Maximum Allowable Voltage(VDC)	Power Consumption (mW)
5	167	30	3.5	0.5	6.0	150
6	240	25	4.2	0.6	7.2	150
9	540	16.6	6.3	0.9	10.8	150
12	960	12.5	8.4	1.2	14.4	150
24	2880	8.3	16.8	2.4	28.8	200
48	7680	6.25	33.6	4.8	57.6	300

■ ORDERING INFORMATION

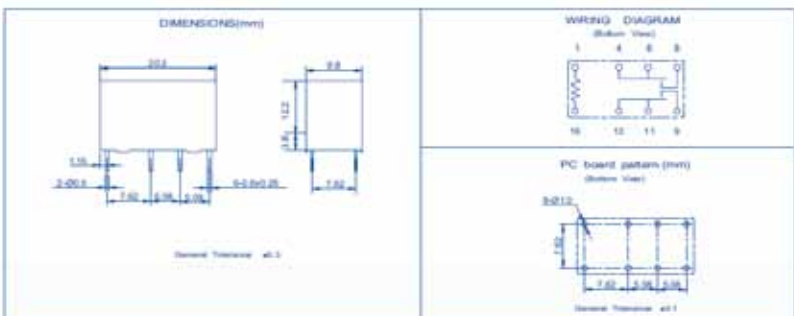
RT-12 S

Coil Voltage	Coil Sensitivity*
See Coil Rating	S : 150-300mW low consumption type

*Nil : Power Consumption up to 560mW available upon request

SPECIFICATIONS

Model No.		BT
Contact Arrangement		2 Form C
Contact Type		Bifurcated
Contact Material		AgPd+Au Clad
Contact Resistance		Max. 60mΩ (initial)
Contact Rating (at Resistive Load)	Max. Switching Voltage	220VAC, 150VDC
	Max. Switching Current	2A
	Max. Switching Power	30W(DC), 50VA(AC)
	Rated Load	1.25A 24VDC/0.5A 100VAC
Dielectric Strength		
Between Coil & Contacts		1000VAC(1 minute)
Between Contacts		1000VAC(1 minute)
Surge Strength		1500V
Operate Time		Max. 6m Sec
Release Time		Max. 4m Sec
Ambient Temperature		-30°C~+80°C
Insulation Resistance		Min. 1000MΩ at 500VDC
Vibration Resistance		1.5mm D.A. 10-55HZ.
Shock	Functional	10G
	Destruction	100G
Mechanical Life		2 x 10 ⁷ operations (at no load)
Electrical Life (Resistive Load)		2 x 10 ⁶ operations at 1mA 20m VAC
		2 x 10 ⁶ operations at 20mA 20 VDC
		1 x 10 ⁶ operations at 1.25A 24 VDC
		1 x 10 ⁶ operations at 0.5A 100 VAC
Weight		Approx. 6g



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A.2 Warranty Information

SmartLab warrants that for a period of one year from the date of purchase (unless otherwise specified in the warranty card) that the goods supplied will perform according to the specifications defined in the user manual. Furthermore that the SmartLab product will be supplied free from defects in materials and workmanship and be fully functional under normal usage.

In the event of the failure of a SmartLab product within the specified warranty period, SmartLab will, at its option, replace or repair the item at no additional charge. This limited warranty does not cover damage resulting from incorrect use, electrical interference, accident, or modification of the product.

All goods returned for warranty repair must have the serial number intact. Goods without serial numbers attached will not be covered by the warranty.

The purchaser must pay transportation costs for goods returned. Repaired goods will be dispatched at the expense of SmartLab.

To ensure that your SmartLab product is covered by the warranty provisions, it is necessary that you return the Warranty card.

Under this Limited Warranty, SmartLab's obligations will be limited to repair or replacement only, of goods found to be defective as specified above during the warranty period. SmartLab is not liable to the purchaser for any damages or losses of any kind, through the use of, or inability to use, the SmartLab product.

SmartLab reserves the right to determine what constitutes warranty repair or replacement.

Return Authorization: It is necessary that any returned goods are clearly marked with an RA number that has been issued by SmartLab. Goods returned without this authorization will not be attended to.

