

Model 1010A Reference Manual



contrec

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The instructions given herein cover the general description, installation, operation and maintenance of the subject equipment. Contrec Pty.Ltd. reserves the right, without prior notice, to make engineering refinements that may not be reflected in this manual.

Should any questions arise which cannot be answered specifically by this manual, they should be directed to Contrec Pty Ltd for further detailed information and technical assistance.

Contrec Pty. Ltd. will not accept any liability for either direct or consequential damages resulting from the use or misapplication of the contents of this manual.

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Introduction**About this Manual**

In essence this manual is a compilation of the various manuals that describe in detail the operation and functions of the Model 1010.

Application Packs

Reference is made throughout the various manuals to Application Packs. Application Packs are a method of describing the mixture of hardware and software that are specific to a particular application. The Application Pack lists the four main electronic modules, the software modules and provides a terminal listing specific to the application.

Card Descriptions

Card Descriptions give a general description of the four electronic modules that control the basic functions of the Model 1010 Bay Load Controller. Each Card Description gives a brief functional description of the card including a layout of it's main components. All link settings which are required to set up the operation of the card are clearly shown. The Card Description provides a full list of all terminal connections and the technical specifications of the various types of inputs and outputs.

Instrument Data Sheet

The instrument data sheet gives a general overview of the Model 1010A including the model number breakdown, programmable parameters and the instruments technical specification.

Operator Manual

The Operator Manual describes the operator interface, operational prompts and error and alarm messages that may be encountered during the day to day use of the Model 1010A.

Programming Manual

The Programming Manual sets out the various programming steps necessary to configure the Model 1010A for the particular installation. Topics covered are the standard system functions, the setting of the date and time, optional parameters, flowmeter and control valve selection, additive injection details and communication set-up for either printers or host computers.

Software Modules

Provides a description of the various software modules that together make up the operating system of the Model 1010. It should be noted that depending on the manner in which the unit is programmed not all software modules may be installed. The Application Pack lists the applicable software modules.

Software Protocol Manual

The Software Protocol Manual sets out the necessary information to design communication software to link the Model 1010A to a computer system.

01.00

Installation and Commissioning

This manual is to be used as a guide to the installation and commissioning of the Model 1010. Topics range from receipt and unpacking, recommended wiring practices, to the testing of external equipment such as valves and flowmeters etc..

Wiring Diagrams

A selection of wiring diagrams is provided including a standard Model 1010A installation and various communication modes.

About the Model 1010A Bay Load Controller

The 1010A is a powerful and intelligent loading system designed to manage the loading of petroleum and chemical products into road tankers, rail cars and barges.

The Model 1010A is available with a range of Applications Packs, consisting of application software and hardware designed to meet the specific requirements of:

- Standard petroleum loading
- Asphalt, bitumen & emulsions
- Loading aircraft refuelling trucks
- Railcar loading
- Chemical Loading
- LPG loading
- Chinese language characters
- Special 6 arm version

In addition, Contrec has developed a number of special Application Packs to meet the needs of customers in different countries or where special or non-standard requirements exist. The flexibility of the Model 1010A software and the range of input/output boards allows the system to be tailored to meet most customer requirements.

The Model 1010A can operate in a stand-alone mode or be fully integrated with a high level terminal automation system.

Stand-alone

In the Stand-alone mode, the Model 1010A will provide complete control of the loading rack, including:

- Authorising drivers & vehicles
- Prompting the driver to enter arm number, compartment number and preset quantity
- Prompting and checking that the vehicle earth or overfill is connected
- Simultaneous loading of up to 4 arms
- Deadman Timer Operation
- Control of Pumps and Gantry Isolation Valves

The Model 1010A will manage all loading operations for single or multi-compartment vehicles and produce a bill of lading for the entire vehicle.

The last 200 vehicle loads are always stored in memory, allowing tickets to be re-printed or transactions downloaded to a



computer system at a later date.

Integrated System

As the Model 1010A is capable of authorising vehicles and generating prompts without reference to an automation system, the communication workload on the office computer is substantially less than if these functions were fully controlled by the automation system, as is the case with most other presets. As a result the cost of developing software drivers and automation programs is greatly reduced.

The Model 1010A uses a SLIP protocol, originally developed for the internet, it provides a very reliable, secure and efficient method to transfer information to the office computer system. SLIP conforms to the International Standards Organisation OSI recommendations for multi-layered protocols.

Touch Key Technology

Contrec has pioneered the use of Touch Key technology within the petroleum industry as a rugged and secure method of identification for both drivers and vehicles.

The Touch Keys produce a coded number, similar to a magnetic card, that can be read by the Model 1010A. Unlike magnetic cards, however, the Touch Key numbers are not corrupted through heavy use. Each key has a unique identification number laser etched into a microchip that will transmit the number when the key is momentarily pressed against the reader.

Driver or vehicle authorisation can be granted by the Model 1010A via a database of valid key numbers stored internally to the instrument. Alternatively, the key number can be sent to the office automation computer for authorisation.

Touch Keys are available as a key ring tag in a number of colours or as a card, where the actual touch button is mounted on a plastic card or badge, of similar size to a magnetic card and can be in the form of a Photo-ID card.

Standard Touch Keys do not have a battery and have an unlimited life span. The keys receive a very small amount of power from the reader, which is mounted on the front panel of the Model 1010A. An intrinsically safe isolation barrier inside the Model 1010A limits the power to microwatts, and both the keys and the reader are internationally certified for use in hazardous areas.

Functionality

The Model 1010A has all the flow measurement and control functions expected of a leading preset. These include:

- Precision flow measurement, including pulse verification to API and ISO standards.
- Temperature Measurement
- Volume Correction to API tables for most petroleum products and to US and metric standards.
- Digital Valve Control.
- Additive Control outputs
- Pump demand outputs with programmable delays.
- Permissive inputs for overfill, vehicle ground and emergency stop
- Pulse Outputs
- Other digital inputs/outputs specific to user requirements.

The digital control output enables the flow profile to be programmed to ramp up at the start of the load and to ramp down prior to the end of the load.

With our field proven fine-tuning algorithm, accurate control of flowrate is ensured for all major brands of digital control

01.00

valves.

Modular Design

The modular design of the electronics simplifies servicing. Should a fault develop in the electronics, modules can be simply changed over in the field by technicians with minimal training.

The need for highly specialised personnel and/or costly maintenance contracts is eliminated providing terminals and depots with a level of self-sufficiency otherwise not available.

Approvals

To match its worldwide acceptance as a leading bay load controller the Model 1010 has the following approvals :

Metrology

The Model 1010A has international metrology approvals including:

- European approvals to the OIML R117 standards with certification through NMI and PTB
- US NIST approval
- Canadian approval
- South African SABS
- Australian NSC

Hazardous Area

Main Enclosure

European Approval

- Cenelec EEx d IIB T6

USA & Canadian

- CSAUS/C for Class 1, Groups C & D

CE & EMC Standards

- EN50081-1 & EN50081-2,
- EN50082-1 & EN50082-2


Touch Keys, Touch Key Reader and barrier:

European Approval

- Cenelec EEx d [ia] IIB T5

USA & Canadian

- CSAUS/C for Class 1, Groups C & D



DMT

Certificate of Conformity

BVS 00.E.2007 dated 14.02.2000

(9) Certificate of Conformity BVS 00.E.2007

(10) By marking the supplied electrical apparatus, the manufacturer attests on his own responsibility that this electrical apparatus complies with the descriptive documents referred to in the annex to this certificate and has satisfied routine verifications and tests required in the harmonized European Standards referred to in (6) above.


(11) The supplied electrical apparatus is authorized to carry the distinctive Community mark specified in Annex II of the Commission Directive No. 84/47/EEC of 16 January 1984. This mark is reproduced on the first page of this certificate; it shall be affixed to the electrical apparatus in such a way as to be visible, legible and durable.

(12) If the sign X is placed after the certificate number, it indicates that the electrical apparatus is subject to the special conditions for sale use specified in the Annex to this certificate.

44329 Dortmund, dated 14.02.2000
BVS-WfI / Kn. A. 9900463

Deutsche Montan Technologie GmbH
Fachstelle für Sicherheit elektrischer Betriebsmittel
Bergbau-Versuchsstrecke

Signed:
(Wenzel)



DMT

Translation

Certificate of Conformity

BVS 00.E.2007

(1) This certificate is issued for:

Enclosure Type EXE 410 and EXE 810

(4) Manufactured and submitted for certification by:

Contrec Systems Pty. Ltd
AUS 3123 Melbourne

(5) This electrical apparatus and any acceptable variations thereto are specified in the annex to this certificate.

(6) BVS, an approved body in accordance with Article 14 of the Council Directive of the European Communities 76/117/EEC of 18 December 1975, certifies that this electrical apparatus has been found to comply with the following harmonized European Standards:

EN 50014-1992 (VDE 01700171 part 13,94) General requirements
EN 50018-1994 (VDE 01700171 part 53,96) Flameproof enclosure 'd'
and has successfully met the type verification and test requirements of these standards, certifies that a confidential test report has been completed on these verifications and tests.

(7) The code of the electrical apparatus is:

EEEx d IIB T6

(8) This certificate may only be reproduced in its entirety and without change.





3.2 Drawing No.	dated	signed
1361ME (2 sheets)	13.03.99/28.08.99	27.01.00
1380ME (2 sheets)	16.10.98/10.03.99	27.01.00
1381ME (2 sheets)	16.10.98/12.03.99	27.01.00
1382ME (2 sheets)	18.10.98/10.03.99	27.01.00
1384ME	15.03.99/20.04.99	27.01.00
1385ME	16.10.98/02.08.99	27.01.00
1386ME	16.10.98/02.08.99	27.01.00
2023ME	13.03.99	27.01.00
2042ME	06.06.99/01.08.99	27.01.00
2054ME (2 sheets)	24.05.99/20.08.99	27.01.00
2095ME (2 sheets)	20.07.99/20.06.99	27.01.00

(A4) **Electrical parameters**

enclosure type	EXE 410	EXE 810
Supply voltage	AC 240 V DC 28 V	AC 240 V DC 15 V
Maximum power	7,5 W	24 W

(A5) **Marking**

- The marking shall be visible, legible and durable. It shall contain the following:
- 5.1 The name of the manufacturer or his trademark
 Type EXE 410 and EXE 810
 EEX d IIB T6
 Serial number
 BVS 00.E.2007
 Ambient temperature -40°C to 60°C
 - 5.2 Warning label on the enclosure type EXE 410: "Switch off power for 80 seconds before removing cover", with equipped lithium cell. "Do not open while explosive atmosphere is present"
 - 5.3 Warning label on the enclosure type EXE 810: "Do not open while explosive atmosphere is present"
 - 5.4 The regular marking corresponding to the product standards of the electrical apparatus.

(A6) **Routine tests**

The individual tests shall be achieved by the manufacturer in accordance with 24 of EN 50014-1992 (VDE 01700171 part 13.64)
 For the routine test as specified in 16.1.1 of EN 50018-1994 (VDE 01700171 Teil 53.65) a test pressure of at least 13,3 bar is to be applied.



Annex of Certificate of Conformity
BVS 00.E.2007

(A1) **Enclosures Type EXE 410 and EXE 810**


(A2) **Description**

The enclosures are designed for electronic devices to analyse and display signals e. g. of flow sensors.
 The enclosures may be equipped with a heater with a self-limiting characteristic (maximum surface temperature of the heater 65 °C).
 The front panel may be equipped with a touch key reader. An intrinsically safe circuit connects the reader with the electronic devices inside the enclosure via a bushing. This intrinsically safe circuit, as well as the necessary components inside the enclosure are certified separately, if the reader is not installed a blanking element is used instead of the bushing.

(A3) **Descriptive Documents**

3.1 Description (6 pages) dated 01.02.00 signed 01.02.00	dated	signed
3.2 Drawing No.	dated	signed
1915ME	15.03.99/11.08.99	27.01.00
1920ME	21.07.98/02.08.99	27.01.00
1922ME	17.12.98	27.01.00
1923ME	13.03.99/06.09.99	27.01.00
1924ME	13.03.99	27.01.00
1925ME	13.03.99	27.01.00
1926ME	21.07.98/02.08.99	27.01.00
1927ME	20.07.98	27.01.00
1928ME	22.07.98/25.08.98	27.01.00
1929ME	20.07.98	27.01.00
1930ME	10.05.99/11.05.99	27.01.00
1931ME	20.03.99	27.01.00
1932ME	10.12.98	27.01.00
1933ME	13.03.99	27.01.00
1934ME	20.03.99	27.01.00
1935ME	20.03.99	27.01.00
1936ME	13.03.99	27.01.00
1937ME	13.03.99	27.01.00
1938ME	13.03.99	27.01.00
1939ME (4 sheets)	01.07.99/06.09.99	27.01.00
1940ME (4 sheets)	01.07.99/06.09.99	27.01.00
1941ME	18.09.99	27.01.00
1946FA	14.03.99/20.03.99	27.01.00
1949ME	13.03.99	27.01.00
1953ME	13.03.99/11.08.99	27.01.00
1955ME	20.03.99	27.01.00
1956ME	13.03.99	27.01.00
1957ME (4 sheets)	13.03.99/20.07.99	27.01.00
1958ME (3 sheets)	13.03.99/09.08.99	27.01.00
1958ME	13.03.99/11.08.99	27.01.00





(A7) Special conditions for safe operation
none

44329 Dortmund, dated 14.02.2000
BVS-W0/Kn. A 9900463

Deutsche Montan Technologie GmbH
Fachstelle für Sicherheit elektrischer Betriebsmittel
Bergbau-Versuchsstrecke

The Testing Officer


Signed: (Wienzel) Signed: (Wittler)


We confirm the correctness of the translation


44329 Dortmund, dated 14.02.2000
BVS-W0 / Kn. A 9900463

Deutsche Montan Technologie GmbH
Fachstelle für Sicherheit elektrischer Betriebsmittel
Bergbau-Versuchsstrecke

The Testing Officer



(Wittler)


(Wienzel)



Certificate of Conformity BVS 00.E 2007 dated 14.02.2000 Page 5/5







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Certificate of Compliance

Certificate: 162527-0001003223 (L.R. 104840) **Date Issued:** April 26th, 2000
Project: 0001003223
Issued to: Contrec Systems Pty. Ltd
 22 Hill St.
 Hawthorn, East Victoria 3123
 Australia


The products listed below are eligible to bear the CSA Mark shown, with adjacent indicator "C" and "US".
OR
The products listed below are eligible to bear the CSA Mark shown, with adjacent indicator NRTL/C.
Issued by: Darryl Boyko, C.E.T.


 Signature:



C US

OR



NRTL/C

CLASS

2258 02 PROCESS CONTROL EQUIPMENT - FOR HAZARDOUS LOCATIONS
 2258 82 PROCESS CONTROL EQUIPMENT - FOR HAZARDOUS LOCATIONS - For U.S. Locations

PRODUCTS

Part A:
 Class I, Div. 1, Groups C and D, T6


Model EXE410-c, Explosion Proof Enclosure, Rated at 12 Vdc or 120/240 Vac, 50 Watts Max, Operating Temperature Ambient -40°C to +60 °C, Encl. Type 4/AX

Notes:


(1) Where the Suffix "c" represents size of cable/conduit entry.

¹The "C" and "US" indicator adjacent to the CSA Mark signifies that the product has been evaluated to the applicable ANSI/UL and CSA Standards, for use in the U.S. and Canada. This includes products eligible to bear the NRTL indicator. NRTL, i.e. Nationally Recognized Testing Laboratory, is a designation granted by the U.S. Occupational Safety and Health Administration (OSHA) to laboratories which have been recognized to perform certification to U.S. Standards.

²The "NRTL/C" indicator adjacent to the CSA Mark signifies that the product has been evaluated to the applicable ANSI/UL and CSA Standards, for use in the U.S. and Canada. This includes products eligible to bear the NRTL/C indicator. NRTL/C, i.e. Nationally Recognized Testing Laboratory, is a designation granted by the U.S. Occupational Safety and Health Administration (OSHA) to laboratories which have been recognized to perform certification to U.S. Standards.



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Certificate: 162527-0001003223 (L.R. 104840) **Date:** April 26th, 2000
Project: 0001003223

Part B:
 Class I, Div. 1, Groups C and D, T6

Model EXE810-X-a-b, Explosion Proof Enclosure, Rated at 12 Vdc or 120/240 Vac, 50 Watts Max Operating Temperature Ambient -40°C to +60 °C, Encl. Type 4/AX

Notes:

(1) Where the Suffix "X" represents "Five (5)" or "Eighteen (18)" push button combinations options
 Where the Suffix "a" is the IS wiring feed through fitting
 Where the Suffix "b" is the size of cable/conduit entry

APPLICABLE REQUIREMENTS

The product, as described in this Report, complies with:

CSA Standard C22.2 No.


- 0-M91 - General Requirements, Canadian Electrical Code, Part II.
- 0.4-M1982 - Bonding and Grounding of Electrical Equipment (Protective Grounding).
- 0.5-M1982 - Threaded Conduit Entries
- 30-M1986 - Explosion-Proof Enclosures for Use in Class I Hazardous Locations.
- 94-M91 - Special Purpose Enclosures
- 142-M1987 - Process Control Equipment.

UL Standard

- 50 - Enclosures for Electrical Equipment
- 508 - Industrial Control Equipment.
- 1203 - Explosion-Proof and Dust-Ignition-Proof Electrical equipment for use in Hazardous (Classified Locations)

¹The "C" and "US" indicator adjacent to the CSA Mark signifies that the product has been evaluated to the applicable ANSI/UL and CSA Standards, for use in the U.S. and Canada. This includes products eligible to bear the NRTL indicator. NRTL, i.e. Nationally Recognized Testing Laboratory, is a designation granted by the U.S. Occupational Safety and Health Administration (OSHA) to laboratories which have been recognized to perform certification to U.S. Standards.

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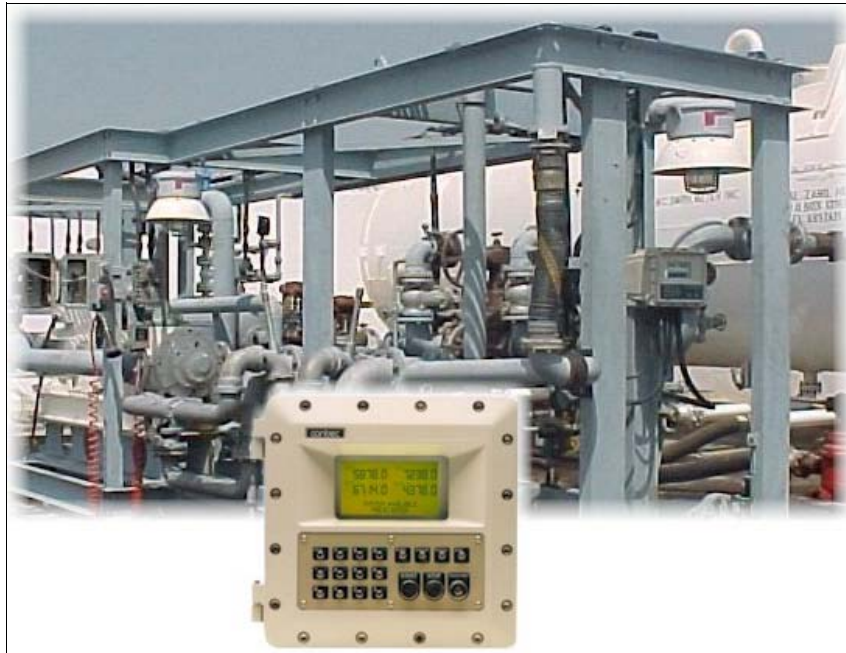
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Model 1010A Application Pack



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Should any questions arise which cannot be answered specifically by this manual, they should be directed to Contrec Pty Ltd for further detailed information and technical assistance.

Contrec Pty. Ltd. will not accept any liability for either direct or consequential damages resulting from the use or misapplication of the contents of this manual.

Description

The **2-BA** Application Pack is the standard version of the 1010A that can handle 1 or 2 arm loading simultaneously. The 2-BA version has full dot matrix display and alphanumeric keyboard.

Software Functions (see Software & Programming Manuals for further details on individual functions)

- | | |
|--------------------------------------|---|
| Dual/Single Pulse Input per channel | Intelligent Injector Interface (Model 1020) |
| Non-linearity Correction for flow | Date & Time |
| Temperature Compensation to API | Transaction Log (200 transactions stored) |
| Digital Valve Control | Initial Message Programmable |
| Auto High Flow Selection | Driver Authorisation (Touch/Pin/None) |
| On-off Valve Control | Truck Authorisation (Touch/Pin/None) |
| Pump Demand with delay time | Local or Remote Authorisation |
| Additive Pulse Output (programmable) | Ask Compartment No (enable/disable) |
| Overfill/Ground Input & Control | Ask Return Quantity (enable/disable) |
| Emergency Stop | Ask Load No. (enable/disable) |
| Batch Control on Gross/Net | Ask Preset Quantity |
| Alarm Output | Deadman Timer (enable/disable) |
| Password Access | Illegal Access lockout (enable/disable) |
| SLIP Protocol | Programmable Units (litres/liters/gallons/kg/lbs) |
| Load Scheduling (enable/disable) | Programmable Product Name (alphanumeric) |
| Printer Output | Diagnostics Program |
| Additive Pulse Output | |

Number of Arms per 1010A: 1 or 2 arms

Product: Gasoline, diesel, crude oil, jet fuel

Temperature Inputs: 4 wire RTD

Temperature Compensation: as per API tables

Communications:

Main Port:	Isolated RS485 (standard) or non-isolated RS485/422/232
Auxillary Port:	Non-isolated RS485/422/232

Both ports are configurable via links on the CPU card. The Main Port is normally isolated RS485 and the Auxillary Port is non-isolated RS422 unless otherwise specified.

Part Number: 1010 A 2-BA - abcNe
 where a designates the authorisation options
 b designates the glands and heater options
 c designates the power supply input
 N is for the dot matrix display
 e designates the metrology approvals



Hardware Description

The 2-BA version of the 1010 is mounted in a single **Style A** enclosure and Touch Key identification may be included.

Boards:	Slot A - Power Supply Board	S800PS4-6
	Slot B - Output Board	S800RSS
	Slot C - Input Board	S800Q2T2C2
	Slot D - CPU Card	S810CPU-FI

Terminal Designation (Main Enclosure)

A1	0 Vdc supply out	C3	Arm 1 RTD Current (+)
A2	+24 Vdc supply out	C4	Arm 1 RTD Signal (+)
A3	+12 Vdc supply out	C5	Arm 1 RTD Signal (-)
A9	Relay	C6	Arm 1 RTD Current (-)
A10	Relay	C7	Arm 2 RTD Current (+)
A11	Relay Alarm	C8	Arm 2 RTD Signal (+)
A12	Relay Alarm	C9	Arm 2 RTD Signal (-)
A13	Relay Arm 1 – Pump Demand	C10	Arm 2 RTD Current (-)
A14	Relay Arm 2 – Pump Demand	C11	Switch Input Common
A17	Relay Common for A13 – A14	C12	Additive Alarm Input
B1	Additive Pulse Common	C13	Overfill Input
B2	Additive Pulse Arm 1 – Low Voltage	C14	Emergency Stop
B3	Additive Pulse Arm 2 – Low Voltage	C17	Signal Ground
B6	Relay 1 Arm 1 – DCV Inlet	C18	Flow Input Arm 1A
B7	Relay 1 Arm 1 – DCV Inlet	C19	Flow Input Arm 1B
B8	Relay 2 Arm 1 – DCV Outlet	C20	Signal Ground
B9	Relay 2 Arm 1 – DCV Outlet	C21	Flow Input Arm 2A
B10	Relay 3 Arm 2 – DCV Inlet	C22	Flow Input Arm 2B
B11	Relay 3 Arm 2 – DCV Inlet		
B12	Relay 4 Arm 2 – DCV Outlet		
B13	Relay 4 Arm 2 – DCV Outlet		
B14	Relay 5 Additive Pulse Arm 1 – AC		
B15	Relay 5 Additive Pulse Arm 1 – AC		
B16	Relay 6 Additive Pulse Arm 2 – AC		
B17	Relay 6 Additive Pulse Arm 2 – AC		

Standard Configuration

D0	Main Port		
D1	Common	0V	RS422
D2	Aux Port	Rx-	RS422
D3	Aux Port	Rx+	RS422
D4	Aux Port	Tx-	RS422
D5	Aux Port	Tx+	RS422
D6	Main Port	Isolated	RS485 0V
D7	Main Port	Isolated	RS485(-)
D8	Main Port	Isolated	RS485(+)

For other port configurations refer to the Card Description.

Description

The **4-BA** Application Pack is the standard version of the 1010A that can handle 3 or 4 arm loading simultaneously. The 4-BA version has full dot matrix display and alphanumeric keyboard.

Software Functions (see Software & Programming Manuals for further details on individual functions)

Dual/Single Pulse Input per channel	Intelligent Injector Interface (Model 1020)
Non-linearity Correction for flow	Date & Time
Temperature Compensation to API	Transaction Log (200 transactions stored)
Digital Valve Control	Initial Message Programmable
Auto High Flow	Driver Authorisation (Touch/Pin/None)
On-off Valve Control	Truck Authorisation (Touch/Pin/None)
Pump Demand with delay time	Local or Remote Authorisation
Additive Pulse Output (programmable)	Ask Compartment No (enable/disable)
Overfill/Ground Input & Control	Ask Return Quantity (enable/disable)
Emergency Stop	Ask Load No. (enable/disable)
Batch Control on Gross/Net	Ask Preset Quantity
Alarm Output	Deadman Timer (enable/disable)
Password Access	Illegal Access lockout (enable/disable)
SLIP Protocol	Programmable Units (litres/liters/gallons/kg/lbs)
Load Scheduling (enable/disable)	Programmable Product Name (alphanumeric)
Printer Output	Diagnostics Program
Additive Pulse Output	

Number of Arms per 1010A: 3 or 4 arms

Product: Gasoline, diesel, crude oil, jet fuel

Temperature Inputs: 4-20 mA

Temperature Compensation: as per API tables

Communications:

Main Port:	Isolated RS485 (standard) or non-isolated RS485/422/232
Auxillary Port:	Non-isolated RS485/422/232

Both ports are configurable via links on the CPU card. The Main Port is normally isolated RS485 and the Auxillary Port is non-isolated RS422 unless otherwise specified.

Part Number: **1010 A 4 – BA - abcNe**
where a designates the authorisation options
b designates the glands and heater options
c designates the power supply input
N is for the dot matrix display
e designates the metrology approvals



Hardware Description

The 4-BA version of the 1010A is mounted in a single **Style A** enclosure and Touch Key identification may be included.

Boards:	Power Supply Board	S800PS4-6
	Output Board	S800SS8
	Input Board	S800I4C4Q4T
	CPU Card	S810CPU-FI

Terminal Designation (Main Enclosure)

A1	0 Vdc supply out	C1	Flow Input Arm 3A
A2	+24 Vdc supply out	C2	Arm 1 Temp. 4-20mA
A3	+12 Vdc supply out	C3	Arm 2 Temp. 4-20mA
A9	Relay Three minute timer out	C4	Flow Input Arm 3B
A10	Relay Three minute timer out	C5	Flow Input Arm 4A
A11	Relay Alarm	C6	Arm 3 Temp. 4-20mA
A12	Relay Alarm	C7	Arm 4 Temp. 4-20mA
A13	Relay Arm 1 – Pump Demand	C8	Flow Input Arm 4B
A14	Relay Arm 2 – Pump Demand	C9	Switch Input Common
A15	Relay Arm 3 – Pump Demand	C10	Additive Alarm Input
A16	Relay Arm 4 – Pump Demand	C11	Overflow Input
A17	Relay Common for A13 – A16	C12	Spare Input
B1	Additive Pulse Common	C13	Emergency Stop
B2	Additive Pulse Arm 1 – Low Voltage	C14	Signal Ground
B3	Additive Pulse Arm 2 – Low Voltage	C15	Signal Ground
B4	Additive Pulse Arm 3 – Low Voltage	C16	Flow Input Arm 1A
B5	Additive Pulse Arm 4 – Low Voltage	C17	Flow Input Arm 1B
B6	Relay 1 Arm 1 – DCV Inlet	C18	Signal Ground
B7	Relay 1 Arm 1 – DCV Inlet	C19	Flow Input Arm 2A
B8	Relay 2 Arm 1 – DCV Outlet	C20	Flow Input Arm 2B
B9	Relay 2 Arm 1 – DCV Outlet		
B10	Relay 3 Arm 2 – DCV Inlet		
B11	Relay 3 Arm 2 – DCV Inlet		
B12	Relay 4 Arm 2 – DCV Outlet		
B13	Relay 4 Arm 2 – DCV Outlet		
B14	Relay 5 Arm 3 – DCV Inlet		
B15	Relay 5 Arm 3 – DCV Inlet		
B16	Relay 6 Arm 3 – DCV Outlet		
B17	Relay 6 Arm 3 – DCV Outlet		
B18	Relay 7 Arm 4 – DCV Inlet		
B19	Relay 7 Arm 4 – DCV Inlet		
B20	Relay 8 Arm 4 – DCV Outlet		
B21	Relay 8 Arm 4 – DCV Outlet		

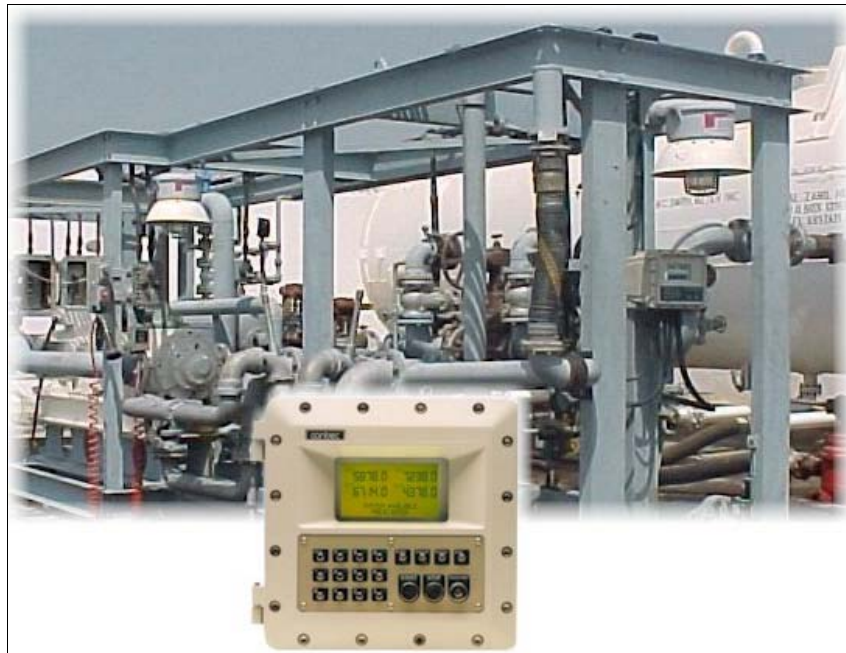
Standard Configuration

D0	Main Port		
D1	Common	0V	RS422
D2	Aux Port	Rx-	RS422
D3	Aux Port	Rx+	RS422
D4	Aux Port	Tx-	RS422
D5	Aux Port	Tx+	RS422
D6	Main Port	Isolated	RS485 0V
D7	Main Port	Isolated	RS485(-)
D8	Main Port	Isolated	RS485(+)

For other port configurations refer to the Engineering manual.



Model 1010A Card Descriptions



contrec

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The instructions given herein cover the general description, installation, operation and maintenance of the subject equipment. Contrec Pty.Ltd. reserves the right, without prior notice, to make engineering refinements that may not be reflected in this manual.

Should any questions arise which cannot be answered specifically by this manual, they should be directed to Contrec Pty Ltd for further detailed information and technical assistance.

Contrec Pty. Ltd. will not accept any liability for either direct or consequential damages resulting from the use or misapplication of the contents of this manual.

Power Supply Card - S800PS4-6

03.01

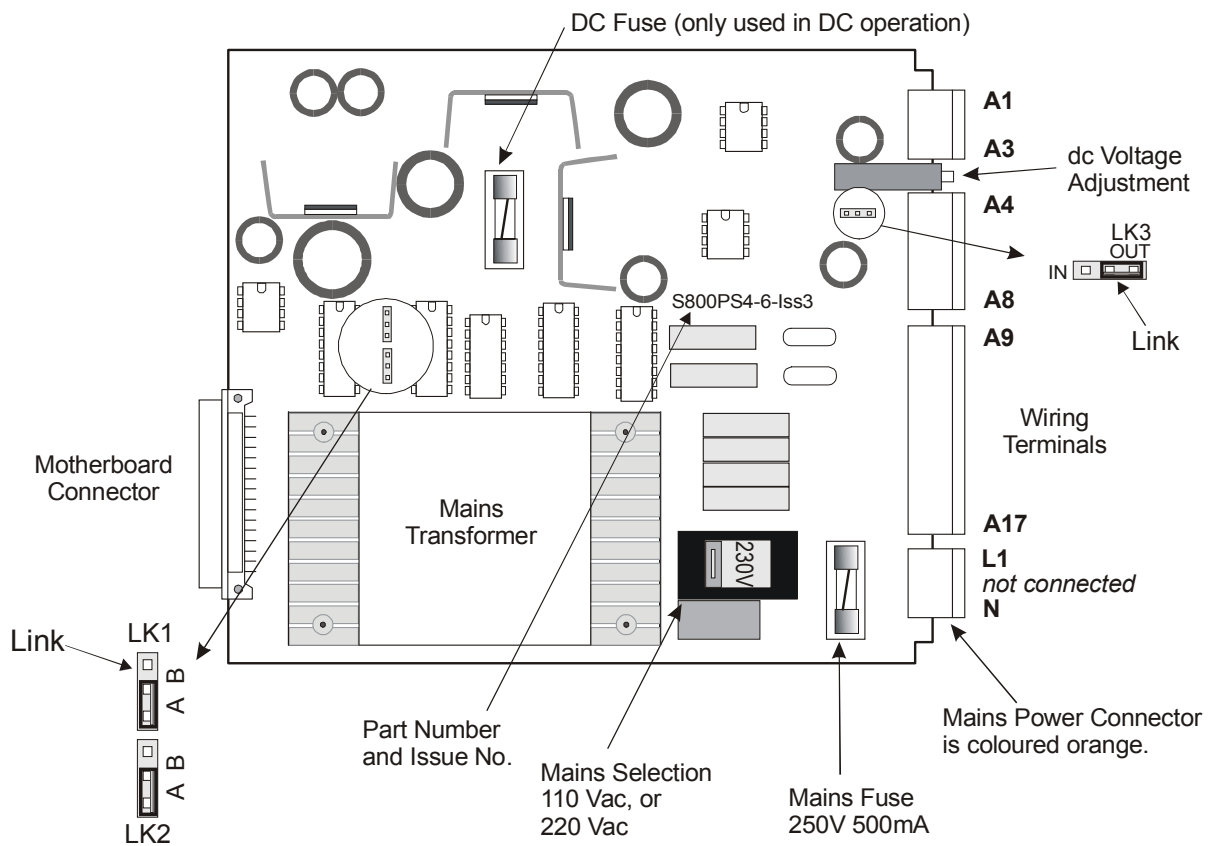
This card is a general purpose power supply card and comprises of:

- 110/220 Vac mains input
- 6 Electromechanical Relay outputs
- 5 to 30 Vdc power out (100 mA max.)
- 12 Vdc power out (250mA max.)

A 500 mA fuse and varistor provide protection on the mains inputs against power spikes and short term overvoltage connection.

The 5 to 30 Vdc power output is adjustable by means of a trim potentiometer adjacent to terminal A3. This should be adjusted with a screwdriver while monitoring the resultant voltage on terminal A2 with a voltmeter. The default value when shipped from the factory is 24V.

Mains voltage is selected a switch on the board and can be either 110 Vac (95 to 135 Vac) or 220 Vac (190 to 260 Vac)



<p>Link 1 & 2 must always be set with the link in position A.</p>	<p>Link 3 should always be set in the OUT position (as shown).</p>	<p>Mains Fuse Type: 250 Vac, 500mA Slo-Blo Size: 20 x 5 mm</p>
<p>These links determine if the serial clock is output to terminals A7. Terminals A4 to A8 are used for the auxiliary displays.</p>	<p>Link 3 determines whether terminal A3 provides a 12 Volt (250 mA) output or a 12-24 Vdc input to power the instrument. The 12-24 Vdc input is only selected if the board is loaded as a S800PS4-2-24 version.</p>	<p>DC Input Fuse Type: 250 Vac, 1.5 A Slo-Blo Size: 20 x 5 mm</p>



03.01

Power Supply Card - S800PS4-6

Terminals Designation

Terminal	Description	Comments
A1	dc Ground	For A2 & A3
A2	5-30 Vdc output (100 mA)	For powering sensors
A3	12 V out (250mA max.)	For powering sensors
A4	Display Select 1	Auxiliary display module
A5	Display Select 1	Auxiliary display module
A6		Not used - don't connect
A7	Display Clock	Auxiliary display module
A8	Display Data	Auxiliary display module
A9	Relay 1	
A10	Relay 1	
A11	Relay 2	
A12	Relay 2	
A13	Relay 3	Relays 3 - 6 have a common Rail
A14	Relay 4	
A15	Relay 5	
A16	Relay 6	
A17	Common Rail	For relays 3 - 6
L1	ac Mains	110/220 Vac switch
n.c.	not connected	
N	ac Mains	110/220 Vac switch

Notes:

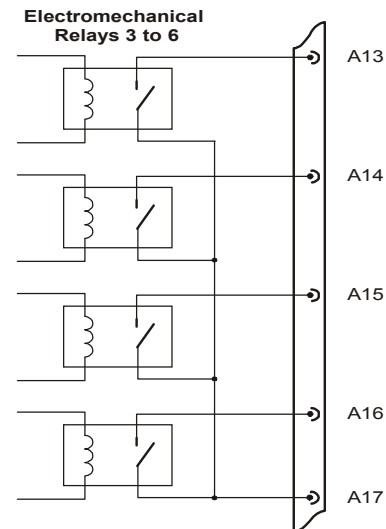
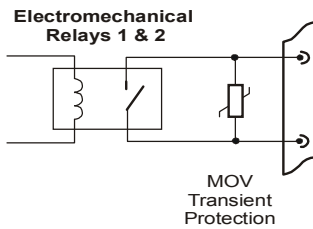
- Mains voltages must be wired in accordance with local safety standards.

Specifications

Electromechanical Relays

Rating: 240 Vac, 30 Vdc Max
1 Amp max.
Protection: 275 Vac MOV transient protection

Relay Outputs



Output Relay Card - S800RSS

03.02

This card is a general purpose relay output card and comprises of:

- 4 x 100-240 Vac solid state relay outputs
- 4 x Electromechanical relay outputs
- 4 x Digital Input/Outputs

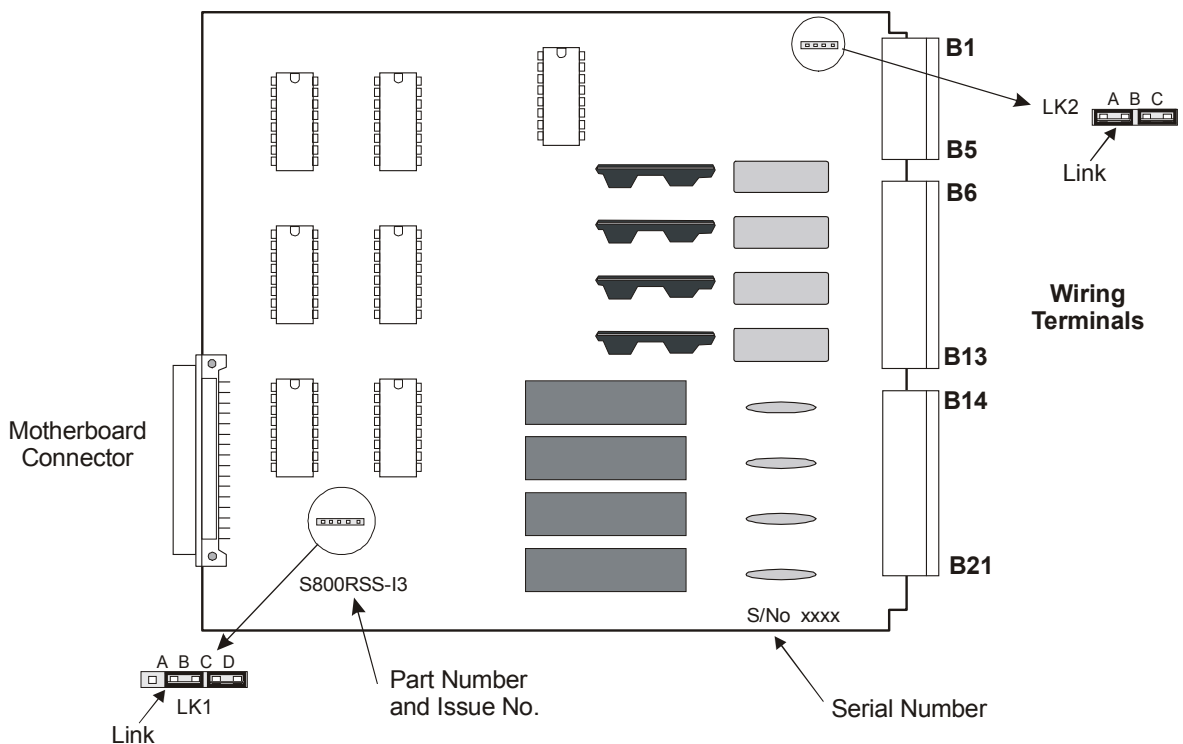
The solid state relay outputs are suitable for driving digital control valves where continual switching of the outputs would otherwise wear out a mechanical relay. The outputs are fully isolated and capable of driving A.C. voltages only. The outputs have a snubber network across the output to minimise voltage spikes when switching inductive loads such as coils.

outputs used to drive alarms, pump demand and PLC inputs etc. The outputs are individually transient protected with metal oxide varistors.

Four Digital input/output terminals can be programmed to function as either open collector outputs for driving additive injection systems or as scaled pulse outputs; or as permissive inputs from voltage free switches. The selection is under software control and all lines must be in the same direction. Each input has transient protection.

The S800RSS card is a general purpose card designed for 1 or 2 arm systems.

The electromechanical relays are general purpose



Link 1 provides addressing for the board so that it may be mounted in slot B or C. The normal position is **SLOT B**.

Card Mounted in Slot B (Default)
Links in positions B & D (as shown above)

Card Mounted in Slot C
Links in positions A & C

Link 2 must be set with Links A & C connected.



03.02

Output Relay Card - S800RSS

Terminal Designation

Terminal	Output	Arm/Line
B1	Signal Ground	see note for Link 2
B2	Input/Output	
B3	Input/Output	
B3	Input/Output	
B5	Input/Output	
B6	Solid State Relay 1	1 - DCV Inlet *
B7	Solid State Relay 1	1 - DCV Inlet
B8	Solid State Relay 2	1 - DCV Outlet
B9	Solid State Relay 2	1 - DCV Outlet
B10	Solid State Relay 3	2 - DCV Inlet
B11	Solid State Relay 3	2 - DCV Inlet
B12	Solid State Relay 4	2 - DCV Outlet
B13	Solid State Relay 4	2 - DCV Outlet
B14	E/mechanical Relay 1	
B15	E/mechanical Relay 1	
B16	E/mechanical Relay 2	
B17	E/mechanical Relay 2	
B18	E/mechanical Relay 3	
B19	E/mechanical Relay 3	
B20	E/mechanical Relay 4	
B21	E/mechanical Relay 4	

* when used with a digital control valve.

Notes:

1. Mains voltages must be wired in accordance with local safety standards.
2. All inputs must be shielded. For CE compliance, shields should be connected at one end only and wired to the chassis earth.
3. Terminals are numbered B1 to B21 only when mounted in the "B" slot of the card cage. If mounted in slot C they would be numbered C1 - C21.

Specifications

Solid State Relay Outputs

Switching Voltage: AC Only
90 - 240 Vac
1 Amp max.
Transient Protection: Snubber Network
47 nF, 47R

Electromechanical Relays

Rating: 240 Vac, 30 Vdc Max
1 Amp max.
Protection: 275 Vac MOV transient protection

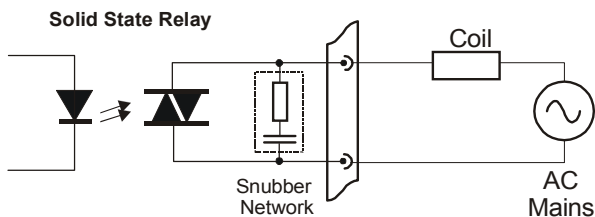
Digital Inputs

Type: Voltage free contacts only

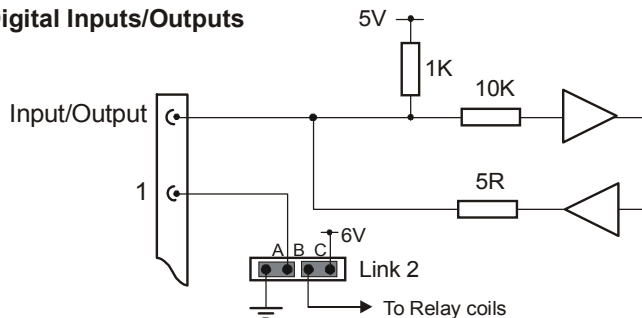
Digital Outputs

Type: Open Collector Transistors
Voltage: 5 Vdc. only
Current: 100 mA max.

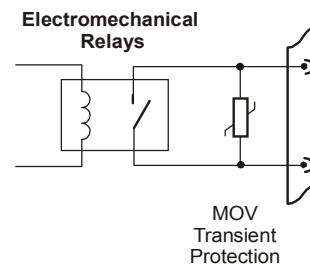
Solid State Relay Outputs



Digital Inputs/Outputs



Relay Outputs



contrec

Output Relay Card - S800SS8

03.03

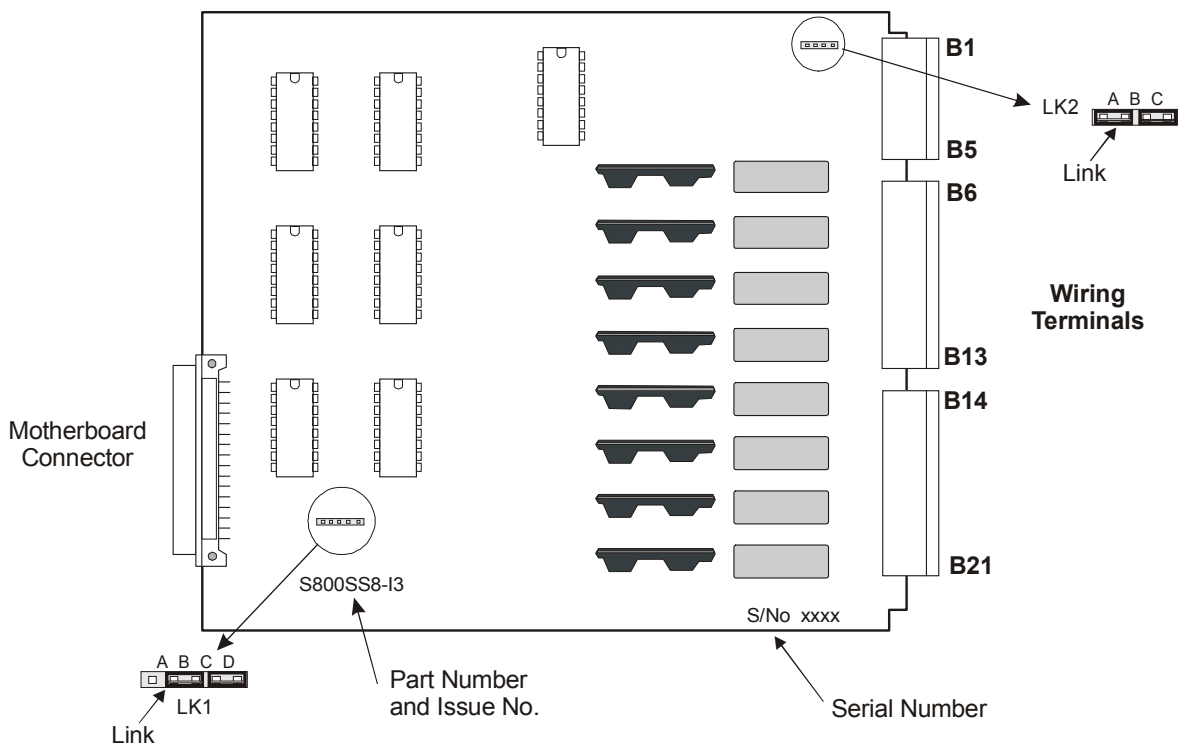
This card is a general purpose relay output card and comprises of:

- 8 x 100-240 Vac solid state relay outputs
- 4 x Digital Input/Outputs

The solid state relay outputs are suitable for driving digital control valves where continual switching of the outputs would otherwise wear out a mechanical relay. The outputs are fully isolated and capable of driving A.C. voltages only. The outputs have a snubber network across the output to minimise voltage spikes when switching inductive loads such as coils.

Four Digital input/output terminals can be programmed to function as either open collector outputs for driving the Model 1020 Additive Injection systems or as scaled pulse outputs; or as permissive inputs from voltage free switches. The selection is under software control and all 4 lines must be either inputs or outputs. Each input has transient protection.

The S800SS8 card is a general purpose card designed for 3 or 4 arm systems.



Link 1 provides addressing for the board so that it may be mounted in slot B or C. The normal position is **SLOT B**.

Card Mounted in Slot B (Default)
Links in positions B & D (as shown above)

Card Mounted in Slot C
Links in positions A & C

Link 2 must be set with Links A & C connected



03.03

Output Relay Card - S800SS8

Terminal Designation

Terminal	Output	Arm/Line
B1	Signal Ground	see note for Link 2
B2	Input/Output	
B3	Input/Output	
B3	Input/Output	
B5	Input/Output	
B6	Solid State Relay 1	1 - DCV Inlet *
B7	Solid State Relay 1	1 - DCV Inlet
B8	Solid State Relay 2	1 - DCV Outlet
B9	Solid State Relay 2	1 - DCV Outlet
B10	Solid State Relay 3	2 - DCV Inlet
B11	Solid State Relay 3	2 - DCV Inlet
B12	Solid State Relay 4	2 - DCV Outlet
B13	Solid State Relay 4	2 - DCV Outlet
B14	Solid State Relay 5	3 - DCV Inlet
B15	Solid State Relay 5	3 - DCV Inlet
B16	Solid State Relay 6	3 - DCV Outlet
B17	Solid State Relay 6	3 - DCV Outlet
B18	Solid State Relay 7	4 - DCV Inlet
B19	Solid State Relay 7	4 - DCV Inlet
B20	Solid State Relay 8	4 - DCV Outlet
B21	Solid State Relay 8	4 - DCV Outlet

* when used with a digital control valve.

Notes:

1. Mains voltages must be wired in accordance with local safety standards.
2. All inputs must be shielded. For CE compliance, shields should be connected at one end only and wired to the chassis earth.
3. Terminals are numbered B1 to B21 only when mounted in the "B" slot of the card cage. If mounted in slot C they would be numbered C1 - C21.

Specifications

Solid State Relay Outputs

Switching Voltage: AC Only
90 - 240 Vac
1 Amp max.
Transient Protection: Snubber Network
47 nF, 47R

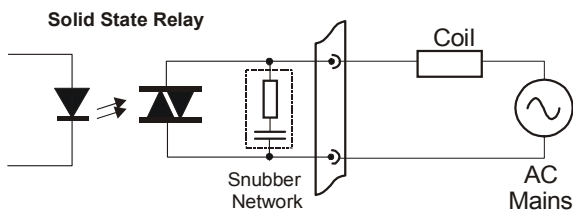
Digital Inputs

Type: Voltage free contacts only

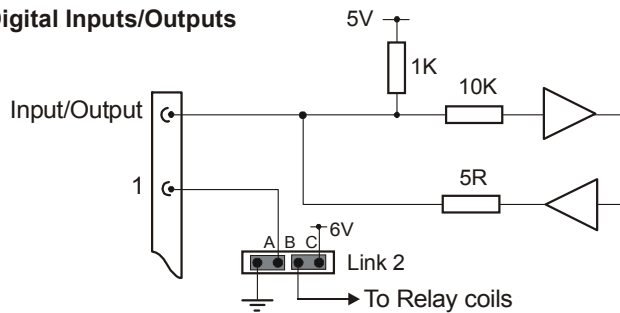
Digital Outputs

Type: Open Collector Transistors
Voltage: 5 Vdc. pullup only
Current: 100 mA max.

Solid State Relay Outputs



Digital Inputs/Outputs



Input Card - S800Q2C2T2

03.04

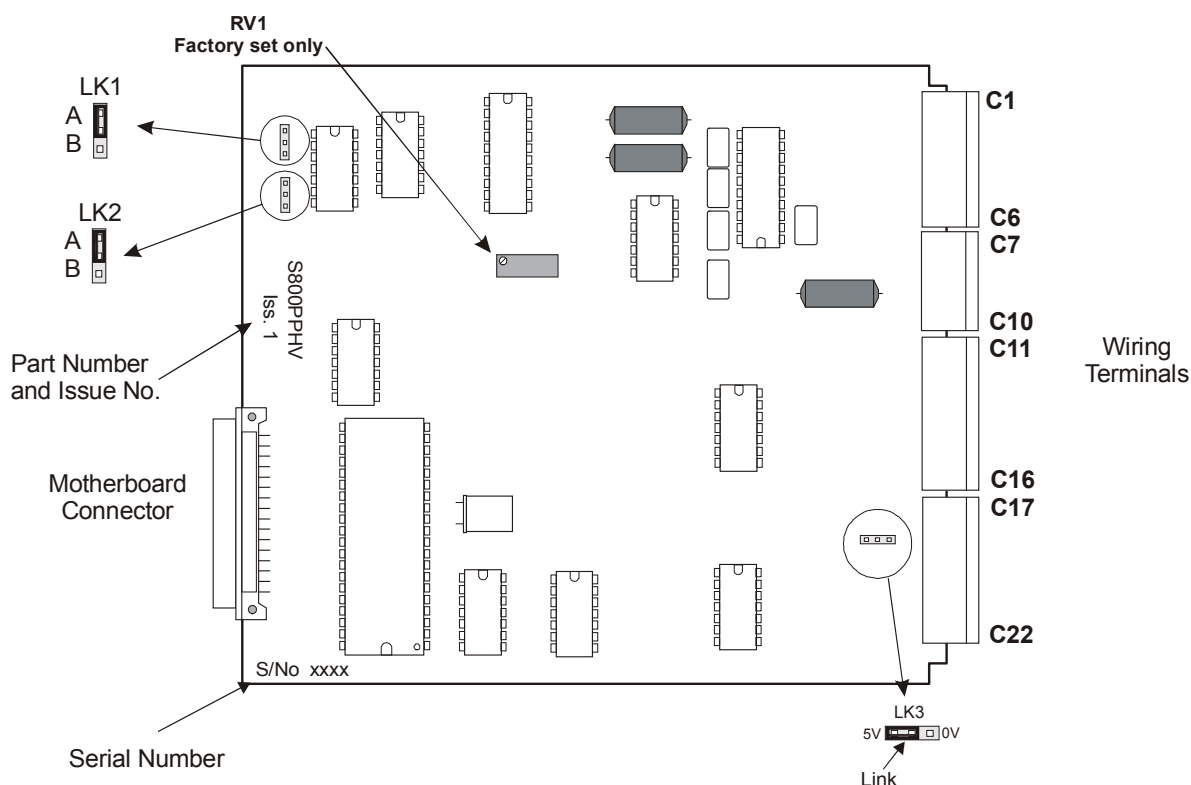
This card is a general purpose input card and comprises of:

- 5 x digital inputs
- 2 x flowmeter inputs (dual inputs on each channel)
- 2 x RTD Temperature Probes (4 wire PT 100)
- 2 x 4-20mA inputs which can be used for pressure or density..

The S800Q2T2C2 card is a general purpose card designed for 1 or 2 arm systems. Uses include the following projects:

- Foxboro India
- Tata Honeywell India

Each input has transient protection.



Links 1 & 2 are addressing for the board and depend on which card slot the board mounted in. The normal position is **SLOT C**.

Card Mounted in Slot C (Default)

- Link 1 Connect to position A
- Link 2 Connect to position A

Card Mounted in Slot B

- Link 1 Connect to position B
- Link 2 Connect to position B

Links 3 provides a pull-up resistors for the flowmeter inputs.

- Position 5V inputs pullup tied to 5volts
- Position 0V input pullup tied to 0 volts
- No Link input floating

Link 3 provides a common pullup for Arms/Lines 1A, 1B, 2A & 2B



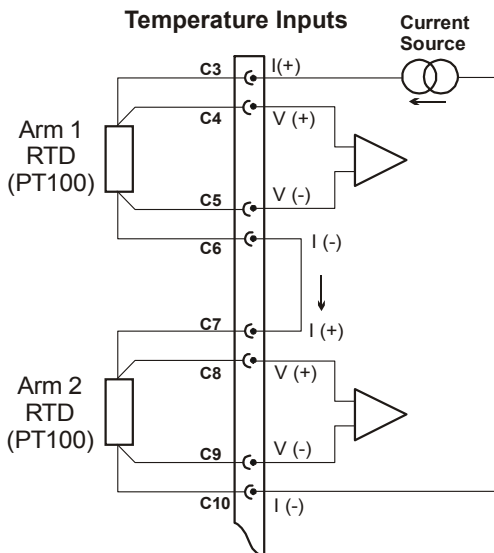
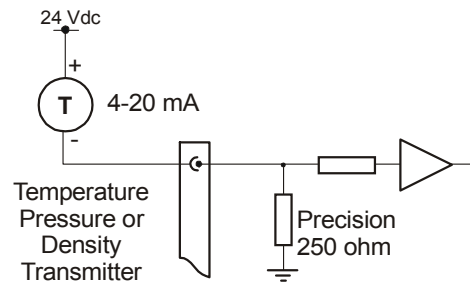
Terminals Designation

Terminal	Input	Arm/Line
C1	4-20 mA	1
C2	4-20 mA	2
C3	RTD Current (+)	1
C4	RTD Signal (+)	1
C5	RTD Signal (-)	1
C6	RTD Current (-)	1
C7	RTD Current (+)	2
C8	RTD Signal (+)	2
C9	RTD Signal (-)	2
C10	RTD Current (+)	2
C11	Ground	For C12 to C16
C12	Switch Input 1	
C13	Switch Input 2	
C14	Switch Input 3	
C15	Switch Input 4	
C16	Switch Input 5	
C17	Signal Ground	For flow signals
C18	Flowmeter	1A
C19	Flowmeter	1B
C20	Signal Ground	For flow signals
C21	Flowmeter	2A
C22	Flowmeter	2B

Notes:

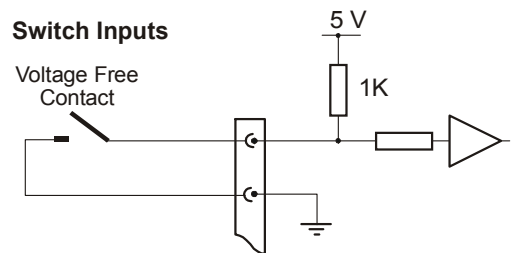
- Flow inputs provide for dual pulse signals from each flowmeter as a pulse integrity check of the flow signal. Flowmeter 1, therefore has two inputs, 1A and 1B.
- For Single arm operation terminals C7 and C10 must be linked.
- All switch inputs on C12 to C16 must be voltage free switch contacts from a relay or switch.
- All inputs must be shielded. For CE compliance, shields should be connected at one end only and wired to the chassis earth.

4-20 mA Inputs

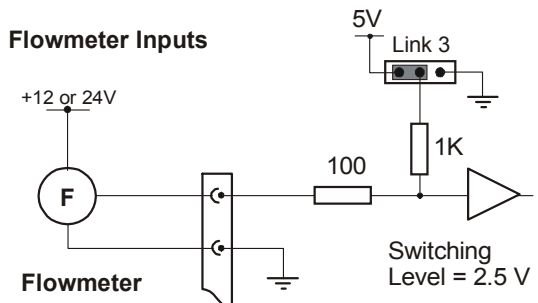


Note: For Single arm operation terminals C7 and C10 must be linked to ensure continuity of current loop.

Switch Inputs



Flowmeter Inputs



Open Collector (Pullup to 5V)
Pulse (Pullup not connected)
Namur (Pullup to 0V)

Input Card - S800I4C4Q4T

03.05

This card is a general purpose input card and comprises of:

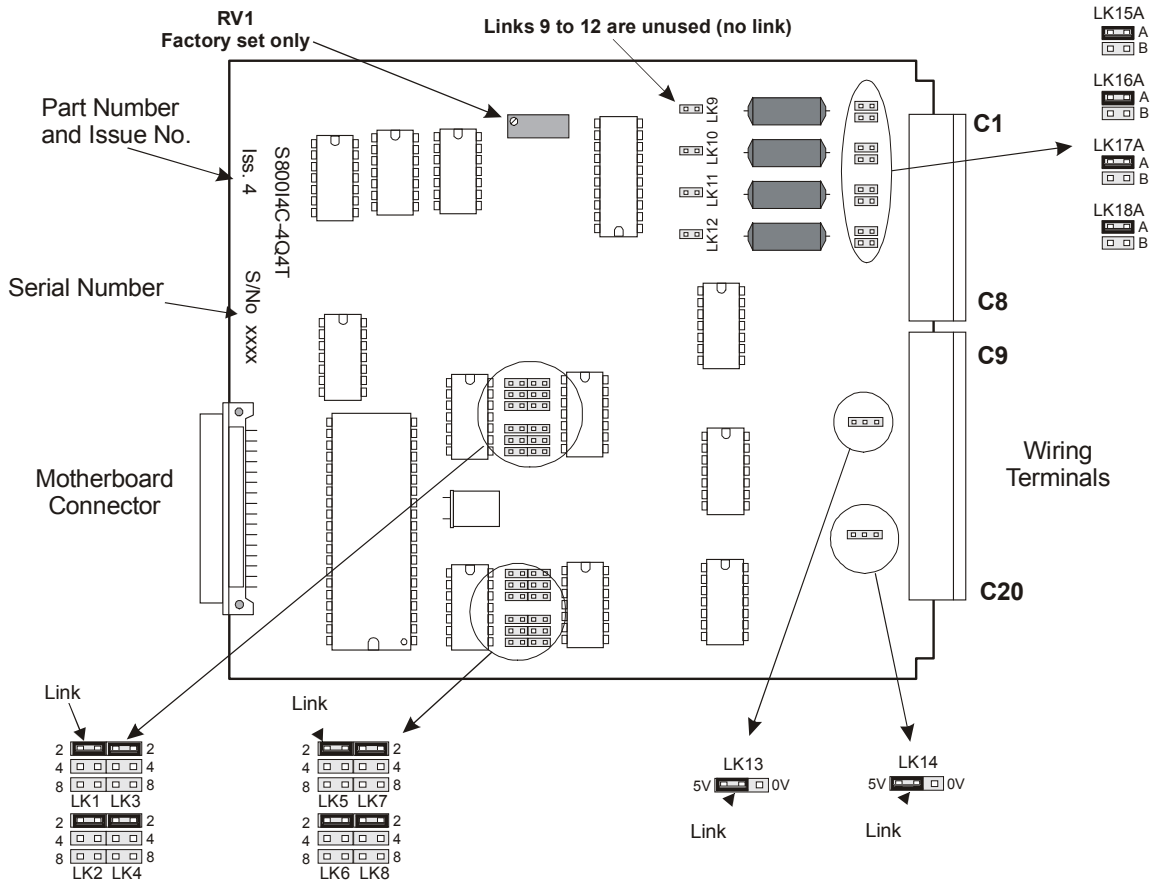
- 4 x digital inputs
- 4 x flowmeter inputs (dual inputs on each channel)
- 4 x 4-20mA inputs which can be used for temperature, pressure or density.

Each input has transient protection.

The S800IDV4Q4T card has a number of links which are used to change the functionality of the card.

This card is used in most loading systems where direct RTD input is not required. The card can not be used for OIML applications.

Mains units are 1010-1 to 1010-4



Links 1 to 8 set the input frequency range.

Position 2 for 0 to 2000 Hz. Input
 Position 8 for 0 to 8000 Hz. Input

- Link 1 Arm/Line 1A
- Link 2 Arm/Line 1B
- Link 3 Arm/Line 2A
- Link 4 Arm/Line 2B
- Link 5 Arm/Line 3A
- Link 6 Arm/Line 3B
- Link 7 Arm/Line 4A
- Link 8 Arm/Line 4B

Links 13 and 14 provide pull-up resistors for the flowmeter inputs.

Position 5V inputs pullup tied to 5volts
 Position 0V input pullup tied to 0 volts
 No Link input floating

- Link 13 provides a common pullup for Arms/Lines 1A, 1B, 2A & 2B
- Link 14 provides a common pullup for Arms/Lines 3A, 3B, 4A & 4B

Other Links when S800I4C4Q4T boards is used on the Model 1010 and Trac Units.

- Links 9 - 12 No links installed
- Links 15 - 18 Always link the A position

No link in the B position



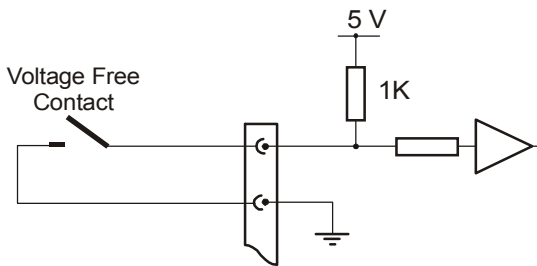
Terminal Designation

Terminal	Input	Arm/Line
C1	Flowmeter	3A
C2	Temperature 4-20 mA	1
C3	Temperature 4-20 mA	2
C4	Flowmeter	3B
C5	Flowmeter	4A
C6	Temperature 4-20 mA	3
C7	Temperature 4-20 mA	4
C8	Flowmeter	4B
C9	Signal Ground	For flow signals
C10	Switch Input 1	Overfill/Truck Earth
C11	Switch Input 2	
C12	Switch Input 3	
C13	Switch Input 4	
C14	Signal Ground	Emergency Stop For C10 to C13
C15	Signal Ground	For flow signals
C16	Flowmeter	1A
C17	Flowmeter	1B
C18	Signal Ground	For flow signals
C19	Flowmeter	2A
C20	Flowmeter	2B

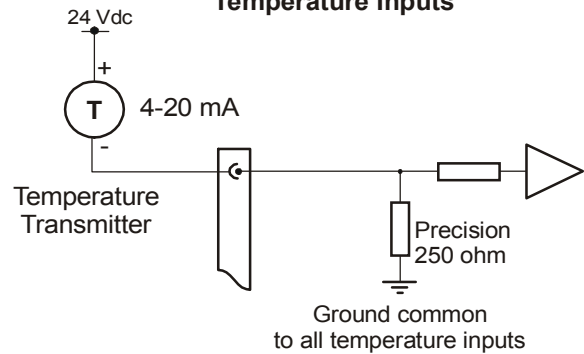
Notes:

1. Flow inputs provide for dual pulse signals from each flowmeter as a pulse integrity check of the flow signal. Flowmeter 1, therefore has two inputs, 1A and 1B.
2. Temperature Input share a common ground.
3. All switch inputs on C10 to C13 must be voltage free switch contacts from a relay or switch.
4. All inputs must be shielded. For CE compliance, shields should be connected at one end only and wired to the chassis earth.

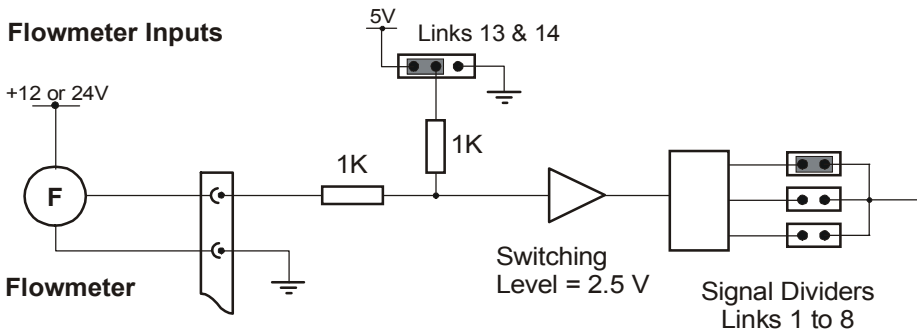
Switch Inputs



Temperature Inputs



Flowmeter Inputs



Open Collector (Pullup to 5V)
 Pulse (Pullup not connected)
 Namur (Pullup to 0V)



CPU/COMMS Card - S810CPU-FI

03.06

This CPU card is designed to work with instruments which feature a large dot matrix display. These board have a special Novram necessary to support the dot matrix display.

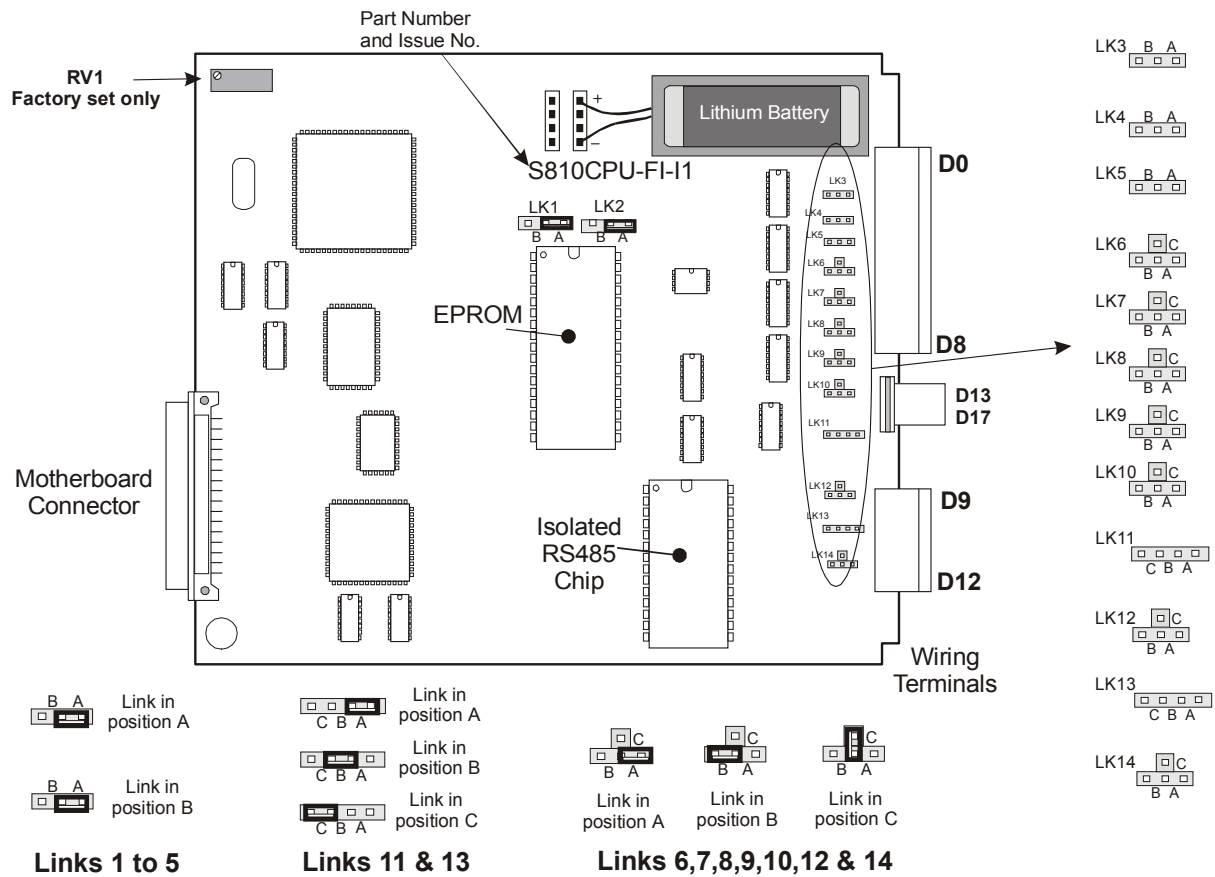
The Card has two communication ports which can be set up by links on the card as follows:

- Main Port: Non-isolated RS422, RS232 or Isolated RS485
- Auxiliary Port: Non-isolated RS485, RS422 or RS232

The card also has inputs which are link selectable as:

1. Touch Key using the Contrec Isolation Barrier
2. Magnetic Card Input
3. Touch Key (2 key inputs) using MTL zener barrier
4. Touch Key (2 key inputs) without barrier
5. Two logic inputs
6. Touch Key via MTL zener barrier and one logic input
7. Touch Key without barrier and one logic input

These input will be set according to the instrument type in which the board is installed. When re-to-fitting boards, ensure these inputs are set correctly.



MAIN COMMUNICATIONS PORT	AUXILIARY COMMUNICATIONS PORT	
<p>Isolated RS485 (standard configuration) Connect links 6, 7, 8 & 9 to position C</p>	<p>RS485 (non-isolated) Connect links 3, 4 & 5 to position B</p>	<p>Links 1 & 2 are normally in position A. Connect link 2 to B only when flash memory is installed.</p>
<p>RS422 (non-isolated) Connect links 6, 7, 8 & 9 to position B</p>	<p>RS422 (non-isolated) (standard) Connect links 3, 4 & 5 to position B</p>	<p>Replacement Batteries Use only 3.6 volt lithium batteries</p>
<p>RS232 (non-isolated) Connect links 6, 7, 8 & 9 to position A</p>	<p>RS232 (non-isolated) Connect links 3, 4 & 5 to position A</p>	<p>Two parallel connectors are provided so that a second battery may be connected before disconnecting the first battery.</p>



Communication Port - Terminal Designations

Terminal	Port	Isolated RS485	Non-isolated		
			RS485	RS422	RS232
D0	Main	Common RS485- RS485+	0 V	Rx+	0 V
D1	Common		0 V	0 V	0 V
D2	Auxiliary		RS485+	Rx+	
D3	Auxiliary		RS485-	Rx-	Tx
D4	Auxiliary		Link to D2	Tx+	
D5	Auxiliary		Link to D3	Tx-	Rx
D6	Main			Rx-	Tx
D7	Main			Tx+	CTS
D8	Main		Tx-	Rx	

Notes:

1. All switch inputs on D9 & D10 must be voltage free switch contacts from a relay or switch.
2. All inputs must be shielded. For CE compliance, shields should be connected at one end only and wired to the chassis earth.
3. The second Touch Key input (#2) is only permissible if the Main Port is set to RS232.

Input Circuits - Terminal Designations

1. Touch Key with Contrec Isolated Barrier

Terminals		Link Positions	
D9	IS Data Out	Link 10	to B
D10	IS Data In	Link 11	to A
D11	0 Volts	Link 12	to A
D12	5 Volts	Link 13	to A
		Link 14	to C

Barrier supplied with a matching connector

2. Magnetic Card Reader

Terminals		Link Positions	
D13	Card Present	Link 10	to A
D14	Card Interrupt	Link 11	to B
D15	Card Data	Link 12	to C
D16	0 Volts	Link 13	to B
D17	5 Volts to reader	Link 14	to C

See engineering manual for connection details.

3. Two Touch Keys with MTL Zener Barrier

Terminals		Link Positions	
D9	Touch Key #1 Data	Link 10	to C
D10	Touch Key #2 Data	Link 11	to A
D11	Common for both	Link 12	to A
		Link 13	to A
		Link 14	to A

Touch Key # 1 is the default input. See Engineering manual for connection details.

4. Two Touch Keys without barriers

Terminals		Link Positions	
D9	Touch Key #1 Data	Link 10	to C
D10	Touch Key #2 Data	Link 11	to B
D11	Common for both	Link 12	to A
		Link 13	to B
		Link 14	to A

Touch Key # 1 is the default input. See Engineering manual for connection details.

5. Two Logic Inputs

Terminals		Link Positions	
D9	Logic Input #1	Link 10	to C
D10	Logic Input # 2	Link 11	to C
D11	0 Volts	Link 12	to B
		Link 13	to C
		Link 14	to B

See circuit below for input specifications

6. Touch Key with MTL Barrier and a logic input

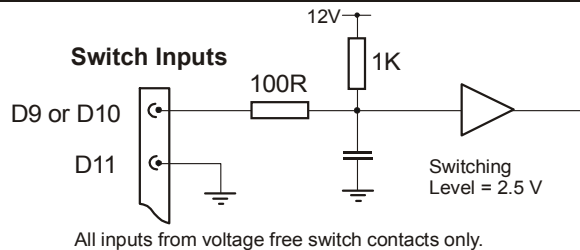
Terminals		Link Positions	
D9	Touch Key #1 Data	Link 10	to C
D10	Logic Input	Link 11	to A
D11	Common for both	Link 12	to A
		Link 13	to C
		Link 14	to B

See circuit below for input specifications

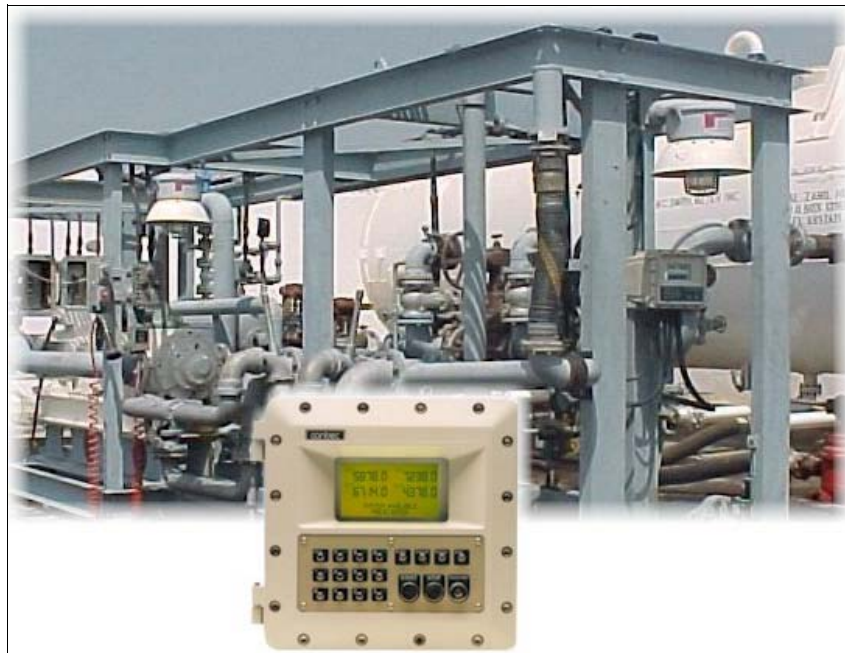
7. Touch Key without barrier and a logic input

Terminals		Link Positions	
D9	Touch Key #1 Data	Link 10	to C
D10	Logic Input	Link 11	to B
D11	Common for both	Link 12	to A
		Link 13	to C
		Link 14	to B

See circuit for input specifications



Model 1010A Instrument Data Sheet



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The instructions given herein cover the general description, installation, operation and maintenance of the subject equipment. Contrec Pty.Ltd. reserves the right, without prior notice, to make engineering refinements that may not be reflected in this manual.

Should any questions arise which cannot be answered specifically by this manual, they should be directed to Contrec Pty Ltd for further detailed information and technical assistance.

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