



# TECHNICAL MANUAL TRANSDUCER AMPLIFIER TYPE 681

**Doc. Ref CD2006F**

This manual applies to units of mod status 1 ONWARDS



BS EN ISO 9001  
Certificate No. FM13141



Affirmed by Declaration  
of Conformity

**USA & Canada**  
**RDP Electrosense Inc.**

2216 Pottstown Pike  
Pottstown, PA 19465  
U.S.A.

Tel (610) 469-0850  
Fax (610) 469-0852  
E-mail [info@rdpe.com](mailto:info@rdpe.com)  
[www.rdpe.com](http://www.rdpe.com)

**All other countries**  
**RDP Electronics Ltd**

Grove Street, Heath Town,  
Wolverhampton, WV10 0PY  
United Kingdom

Tel: +44 (0) 1902 457512  
Fax: +44 (0) 1902 452000  
E-mail: [sales@rdpe.com](mailto:sales@rdpe.com)  
[www.rdpe.com](http://www.rdpe.com)

# INDEX

|     |  |    |
|-----|--|----|
| 1.  | INTRODUCTION.....                                      | 3  |
| 1.1 | BEFORE POWERING-UP, CHECK.....                         | 3  |
| 1.2 | Information on Conformity to EC Directives.....        | 3  |
| 2.  | CONNECTION DETAILS .....                               | 4  |
| 3.  | FRONT PANEL CONTROLS .....                             | 6  |
| 3.1 | LED 1-4 .....  | 6  |
| 3.2 | Level Potentiometers 1-4.....                          | 6  |
| 3.3 | Level Selector Switch .....                            | 6  |
| 3.4 | Reset Switch.....                                      | 6  |
| 4.  | INTERNAL CONTROLS (FOR LOCATION, REFER TO FIG.2) ..... | 7  |
| 4.1 | Polarity Switches (SW 1-4) .....                       | 7  |
| 4.2 | Hysteresis Links (J1-J4) .....                         | 7  |
| 4.3 | Latching Link (J1-J4) .....                            | 7  |
| 4.4 | Relay Mode Switches (SW 5-8).....                      | 7  |
| 4.5 | Output Links SP 1-4 .....                              | 7  |
| 4.6 | Channel Number (Address) Switch (SW7) .....            | 8  |
| 5.  | SETTING-UP PROCEDURE.....                              | 9  |
| 6.  | SPECIFICATION.....                                     | 10 |
| 7.  | WARRANTY AND SERVICE .....                             | 12 |

## Index of Figures

|        |   |   |
|--------|---|---|
| Fig. 1 | Front Panel.....                                | 3 |
| Fig. 2 | Control Locations.....                          | 5 |
| Fig. 3 | Interfacing with 611, 621 and 626 modules ..... | 5 |

# 1. INTRODUCTION

The 681 is a plug-in module with four separate limit circuits designed to monitor the output signals of transducer amplifiers such as 611, 621, 626.

Each limit may be configured as a high or low (positive- or negative-going) detector with normally open/closed relay or logic 1/0 outputs.

The relays may be operated in normally energised (fail-safe) or de-energised, momentary or latching modes. Latched relay or logic outputs may be reset by either the front panel pushbutton or by an external logic signal.

Various values of hysteresis may be selected to suit the application or reduce the effects of signal noise, etc. Limit status is indicated by front panel LEDs. Limit levels are set by front panel potentiometers which are monitored via the level selector switch and front panel jack, or via the 635/6 monitor.

## 1.1 BEFORE POWERING-UP, CHECK...

|   |   |
|---|---|
| 1 | The supply voltage is correct to suit the 631/632 unit fitted and input range selected  |
| 2 | The various plug-in modules are in the correct positions in the housing.  |
| 3 | The input and output plugs are in the correct sockets. Note that on the housing back-plane all input sockets and all output sockets are of the same type. |
| 4 | That each module has a unique address. (section 4.6 for this module)  |

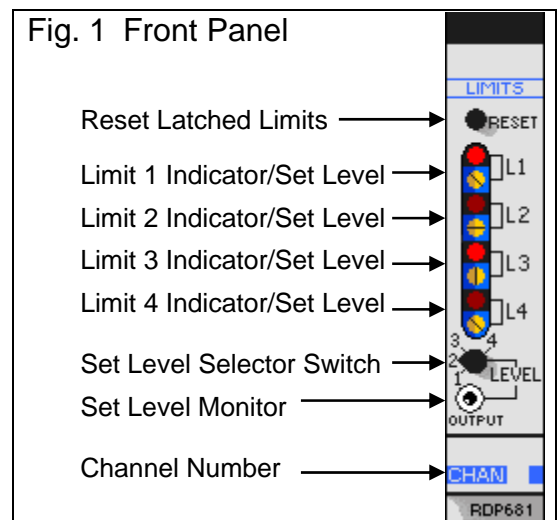
Note: Ensure system is switched OFF when removing or replacing modules. Failure to do so may cause damage to modules.

## 1.2 Information on Conformity to EC Directives.

This module is not CE marked because it is intended for use as a component of a larger system. RDP CE mark full modular 600 systems that includes a 60X housing and a 63X power supply where the system is fully populated with either 600 series amplifier/display modules or blank panels.

If the module is part of a full 600 system, refer to the system manual (CD2010) for CE certification.

If the module is not part of the full 600 system, it is the responsibility of the organization/ individual producing the system to assess and/or test EMC compatibility.



## 2. CONNECTION DETAILS

(Refer also to Fig.2 and Fig.3)

When plugged into an RDP 600 module rack, connections to the 681 are made via three backplane-mounted circular DIN connectors as shown overleaf.

Input connections may be made either via the circular DIN connectors or via four backplane solder links labelled L1, 2, 3, 4 (accessed on removing the backplane cover plate).

Front panel jack connections for monitoring limit level settings in systems without a 635/6 are:

1. Inner contact - level output high.
2. Middle contact - no connection.
3. Outer contact - level output common (0v).

| 32-way Pin | 7-way DIN A Pin        | Function                    |
|------------|------------------------|-----------------------------|
| 1          | 1                      | Limit 1 Signal Input        |
| 2          | 2                      | Limit 2 Signal Input        |
| 3          | 3                      | Limit 3 Signal Input        |
| 4          | 4                      | Limit 4 Signal Input        |
| 5          | 5                      | Signal Common/0V/Ground     |
| 6          | 6                      | No connection               |
| 7          | 7                      | No connection               |
|            | <b>5-way DIN C Pin</b> |                             |
| 8          | 1                      | Limit 1 Relay/Logic Output  |
| 9          | 2                      | Logic Common/0V/Ground      |
| 10         | 3                      | Limit 1 Relay Common Output |
| 23         | 4                      | Reset (see Note)            |
|            | 5                      | No connection               |
|            | <b>7-way DIN B Pin</b> |                             |
| 11         | 1                      | Limit 2 Relay/Logic Output  |
| 12         | 2                      | Limit 2 Relay Common Output |
| 13         | 3                      | Limit 3 Relay/Logic Output  |
| 14         | 4                      | Limit 3 Relay Common Output |
| 15         | 5                      | No connection               |
| 16         | 6                      | Limit 4 Relay/Logic Output  |
| 17         | 7                      | Limit 4 Relay Common Output |
| 18         | Level Output           | Used with 635/6 only        |
| 24-27      | Address                |                             |
| 28, 29     | 0/5V Supply            |                             |
| 30         | +15V                   |                             |
| 31         | -15V                   |                             |
| 32         | 0VA                    |                             |

**Note:** for optimum EMC the reset signal should be applied via the Opto-Isolated Option 600 IO. Refer also to Section 3.4.

Fig. 2 Control Locations

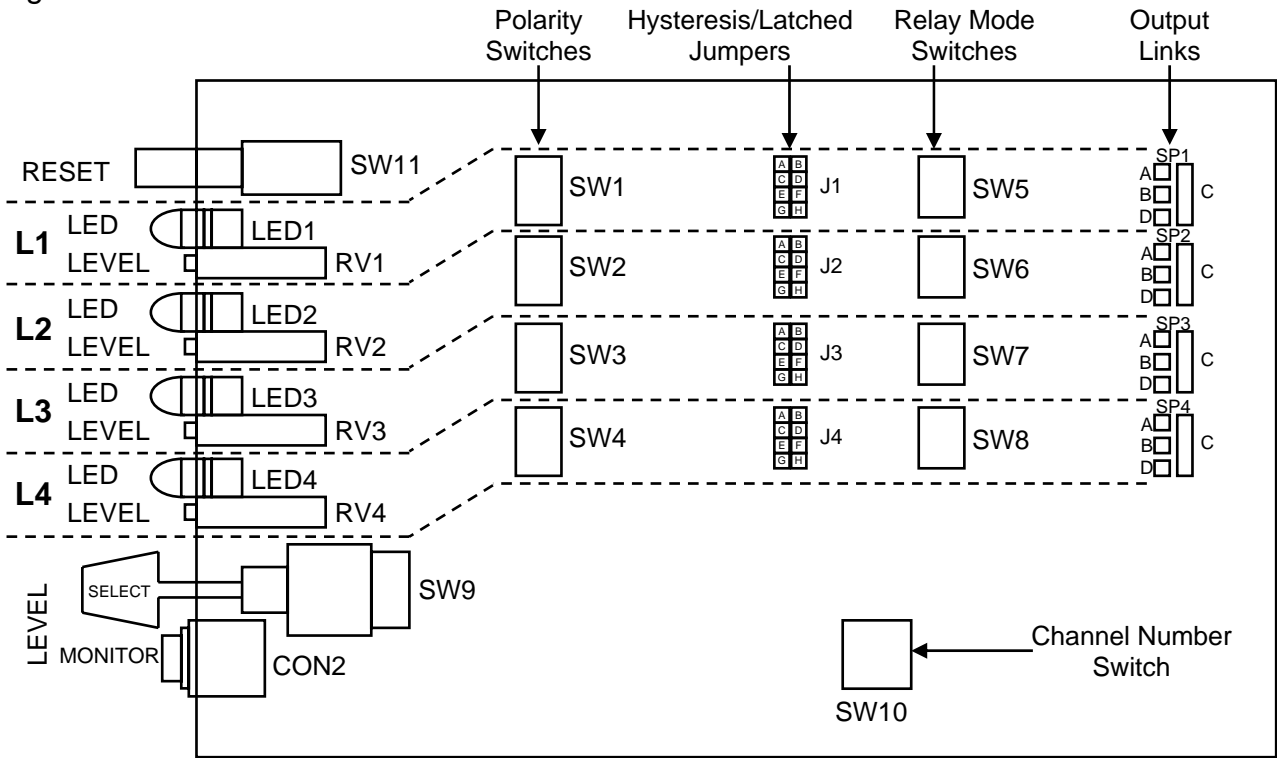
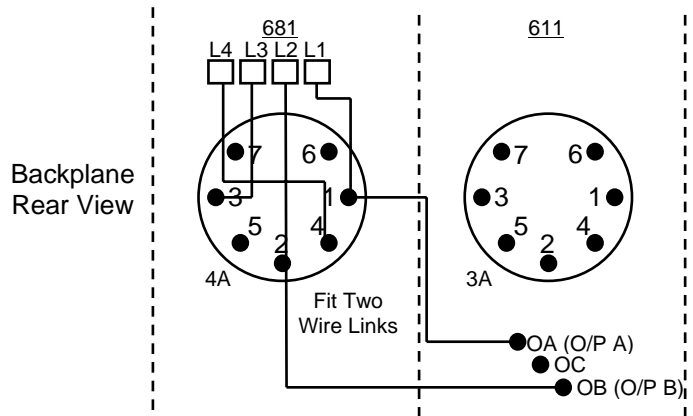


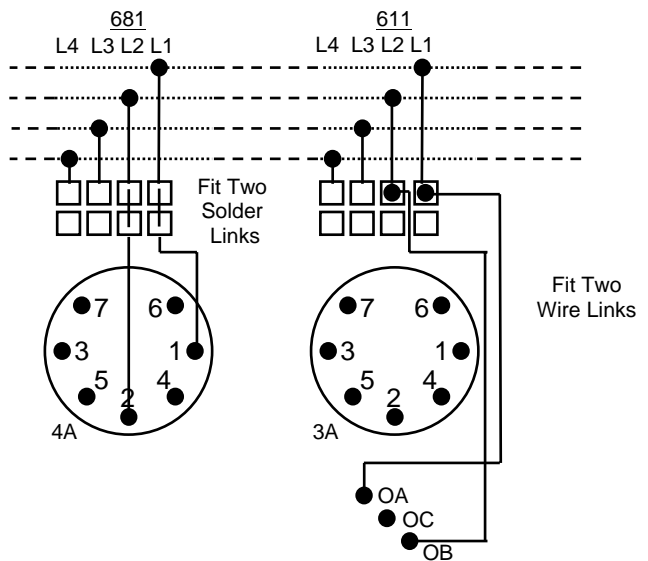
Fig. 3 Interfacing with 611, 621 and 626 modules

- a) When 681 is adjacent or near to 611 (e.g. in channels 3 & 4)

Two wire links may be connected via 7 way DIN or soldered directly to solder pads L1, L2.



- b) When 681 is remote from 611, the L1-L4 bus and solder links may be used to reduce wiring.



### **3. FRONT PANEL CONTROLS**

#### **3.1 LED 1-4**

Four lamps which indicate the state of the relays or logic output. As they are internally connected in series with the relay coils, when the LED is ON then the relay is ON (energised).

The relationship between LED state and relay/logic outputs will vary according to the settings of the polarity and mode switches. This is detailed in Tables 1 and 2.

#### **3.2 Level Potentiometers 1-4**

Four twenty-turn screwdriver-adjusted controls which are used to set the limit levels over the range  $\pm 10v$ .

#### **3.3 Level Selector Switch**

A four-position rotary switch connecting the potentiometer levels in turn to the front panel jack and 635/6 monitor.

#### **3.4 Reset Switch**

A pushbutton which, when pressed, resets all limits which are configured in a latching mode.

**Note:** Limits can also be reset by applying a logic 0 to the rear panel reset (Pin 4 of DIN C connector). To apply a common reset to a system containing several 681s, fit the solder links "R" on the backplane and connect the logic signal to pin 2 of the system rear panel 8-way DIN socket. Refer also to system Manual CD2010, Section 7.6.

## 4. INTERNAL CONTROLS (FOR LOCATION, REFER TO FIG.2)

### 4.1 Polarity Switches (SW 1-4)

These are 2-position slide switches which determine whether the limits are high (positive-going) or low (negative-going). Set in the UP position for high and DOWN for low. Refer also to Tables 1 and 2 for more details.

### 4.2 Hysteresis Links (J1-J4)

|  |       |                         |
|--|-------|-------------------------|
| These are 3-position jumper links which determine the amount of hysteresis in the limit comparator circuit as shown. | Link  | Hysteresis              |
|  | A – B | Low                     |
|  | C – D | Medium (normal setting) |
|  | E – F | High                    |
|  | B – D | None                    |

The 681 is normally supplied with the links in the medium position. If noise signals are being monitored and relay chatter, etc. is a problem, then the high position may be used to advantage.

The hysteresis setting does not affect the accuracy of the limit.

Hysteresis is not used when the limit is in latching mode. Refer to 4.3.

### 4.3 Latching Link (J1-J4)

The 681 is normally supplied with all limits set for momentary operation. To make any limit latch, link the relevant jumper G-H (as hysteresis is not required, the same jumper link is used as in 4.2).

### 4.4 Relay Mode Switches (SW 5-8)

These four switches, similar to the polarity switches, are used to determine whether the relays are in a normally energised or normally de-energised mode. For normally de-energised, set the switches in the UP position, and for normally energised (e.g. fail-safe mode), set the switches in the DOWN position.

Refer also to Table 1 for more details.

### 4.5 Output Links SP 1-4

|  |          |                |
|--|----------|----------------|
| These are 3-way solder pad links which select the type of output required as shown.. | SP 1 – 4 | Output         |
|  | A – B    | Logic          |
|  | B – C    | Relay Contacts |
|  | D - C    | Relay Contacts |

The state of the relay contacts (i.e. normally open or normally closed) will depend on the polarity and mode switch settings. Refer to Table 1 for details.

#### 4.6 Channel Number (Address) Switch (SW7)

This is a 16-way (hexadecimal), screwdriver-adjusted rotary switch scaled 0 to F. When the module is used in a system with a backplane, the individual card address number must be set on this switch.

Each module must have a different number set to avoid signal contention on the A, B and E (excitation) output busses to the monitor.

For example, if the switch is set to 1 then, when the monitor switch is set to 1, only the outputs of No.1 are enabled and connected to the monitor. similarly, for numbers 2-9. For modules 10-15, the switch positions A-F are used as shown below:

|                         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|-------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| <b>Card No.</b>         | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| <b>Switch Position.</b> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A  | B  | C  | D  | E  | F  |

**TABLE 1 1 RELAY OUTPUT OPERATION**

Note 1: A HIGH limit monitors positive-going signals.  
 A LOW limit monitors negative-going signals  
 < means more negative than: > means more positive than.  
 N means normal (as despatched) settings

| Limit Type | POL. SW 1-4 | MODE SW 5-8 | SIGNAL wrt LIMIT | LED/ RELAY | CONTACTS WITH SP 1-4 SET |        | COMMENTS  |
|------------|-------------|-------------|------------------|------------|--------------------------|--------|-----------|
|            |             |             |                  |            | B-C(N)                   | D-C    |           |
| 1.HIGH     | UP (N)      | UP (N)      | <                | OFF        | CLOSED                   | OPEN   |           |
|            |             |             | >                | ON         | OPEN                     | CLOSED |           |
| 2.HIGH     | UP          | DOWN        | <                | ON         | OPEN                     | CLOSED | FAIL SAFE |
|            |             |             | >                | OFF        | CLOSED                   | OPEN   |           |
| 3.LOW      | DOWN        | UP          | <                | ON         | OPEN                     | CLOSED |           |
|            |             |             | >                | OFF        | CLOSED                   | OPEN   |           |
| 4.LOW      | DOWN        | DOWN        | <                | OFF        | CLOSED                   | OPEN   | FAIL SAFE |
|            |             |             | >                | ON         | OPEN                     | CLOSED |           |

Note 2: In fail safe mode the relay is OFF (de-energised) when limit is exceeded or power is removed.

**TALE 2 681 LOGIC OUTPUT OPERATION (SP 1-4 SET TO A-C)**

| LIMIT TYPE | POL.SW 1-4 | SIGNAL wrt LIMIT | LED | LOGIC OUTPUT |
|------------|------------|------------------|-----|--------------|
| HIGH       | UP (N)     | <                | OFF | H            |
|            |            | >                | ON  | L            |
| LOW        | DOWN       | <                | ON  | L            |
|            |            | >                | OFF | H            |

## **5. SETTING-UP PROCEDURE**

- 5.1 Connect signal inputs and relay/logic outputs as detailed in Section 2.
- 5.2 Unplug the 681 and set the polarity and mode switches, hysteresis, latching and output links as required, as detailed in Section 4. Note Tables 1 and 2 provide a quick reference check for most control settings.

Check the channel address switch setting is correct.

- 5.3 Plug the 681 into the rack, switch on power and allow 20 minutes warm-up for maximum accuracy.
- 5.4 Select the 681 Channel No. on the 635/6 monitor (if fitted, otherwise connect a voltmeter to the front panel jack).

Select A on the 635 and set the 681 level switch to 1. The 635/6 or voltmeter will now indicate the level of limit 1.

- 5.5 Adjust potentiometer L1 for the desired value. Set up limits 3-4 in a similar manner using the level switch and relevant potentiometer.
- 5.6 Press reset if necessary to reset any latching outputs.

## 6. SPECIFICATION

|   |   |
|---|---|
| Channels  | 4 Independent   |
| Signal Range                                    | $\pm 10V$   |
| Signal Input Resistance                         | $> 10M\Omega$   |
| Accuracy (Note 1)                               | $\pm 2mV$ typical (0.01% FS)  |
| Response Speed:<br>Logic Output<br>Relay Output | 0.2mS for 0.1% accuracy<br>6mS  |
| Tempco  | 0.1mV/ $^{\circ}C$ (0.0005% FS/ $^{\circ}C$ ) typical   |
| Outputs:  | Relay<br>Normally open or closed (selectable) 1A, 30V dc/0.5A, 125V ac<br>5 x 10 <sup>5</sup> operations at 1A, 30V dc<br>2 x 10 <sup>5</sup> operations at 0.5A, 125V ac |
|   | Logic<br>TTL normally high or low (selectable), source 0.4mA, sink 8mA  |
| Hysteresis (Note 2)                             | Three levels selectable, 30/100/300mV typical   |
| Power   | $\pm 15V$ at 100mA typical (4 relays ON)  |
| Operating Temperature                           | 0 $^{\circ}C$ to 60 $^{\circ}C$   |
| Dimensions                                      | 160 x 100 x 14mm (Eurocard)   |
| Front Panel                                     | 128 x 25mm (5 x 1 inches)   |

Note 1: With signal noise < 1mV

Note 2: Varies with signal level.

## Notes

## 7. WARRANTY AND SERVICE

### WARRANTY.

R.D.P. Electronics products are warranted against defects in materials or workmanship. This warranty applies for one year from the date of delivery. We will repair or replace products that prove to be defective during the warranty period provided they are returned to R.D.P. Electronics.

This warranty is in lieu of all other warranties, expressed or implied, including the implied warranty of fitness for a particular purpose to the original purchaser or to any other person. R.D.P. Electronics shall not be liable for consequential damages of any kind.

If the instrument is to be returned to R.D.P. Electronics for repair under warranty, it is essential that the type and serial number be quoted, together with full details of any fault.

### SERVICE.

We maintain comprehensive after-sales facilities and the instrument can, if necessary be returned to our factory for servicing.

Equipment returned to us for servicing, other than under warranty, must be accompanied by an official order as all repairs and investigations are subject to at least the minimum charge prevailing at the date of return.

The type and serial number of the instrument should always be quoted, together with full details of any fault and services required.

### IMPORTANT NOTES.

1. No service work should be undertaken by the customer while the unit is under warranty except with the authorisation of RDP Electronics.
2. If the instrument is to be returned to R.D.P. Electronics for repair, (including repair under warranty) it is essential that it is suitably packed and that carriage is insured and prepaid. R.D.P. Electronics can accept no liability whatsoever for damage sustained during transit.
3. It is regretted that the above warranty only covers repairs carried out at our factory. Should the instrument have been incorporated into other equipment that requires our engineers to perform the repair on site, a charge will be made for the engineer's time to and from the site, plus any expenses incurred.

The aforementioned provisions do not extend the original warranty period of any product that has been either repaired or replaced by R.D.P. Electronics.

**THIS WARRANTY MAY BE NULL AND VOID SHOULD  
THE CUSTOMER FAIL TO MEET OUR TERMS OF PAYMENT.**