



**Model 682A06**

**Installation and Operating Manual**

**For assistance with the operation of this product,  
contact the PCB Piezotronics, Inc.**

**Toll-free: 800-959-4464**

**24-hour SensorLine: 716-684-0001**

**Fax: 716-684-3823**

**E-mail: [imi@pcb.com](mailto:imi@pcb.com)**

**Web: [www.imi-sensors.com](http://www.imi-sensors.com)**



## Repair and Maintenance

PCB guarantees Total Customer Satisfaction through its “Lifetime Warranty Plus” on all Platinum Stock Products sold by PCB and through its limited warranties on all other PCB Stock, Standard and Special products. Due to the sophisticated nature of our sensors and associated instrumentation, **field servicing and repair is not recommended and, if attempted, will void the factory warranty.**

Beyond routine calibration and battery replacements where applicable, our products require no user maintenance. Clean electrical connectors, housings, and mounting surfaces with solutions and techniques that will not harm the material of construction. Observe caution when using liquids near devices that are not hermetically sealed. Such devices should only be wiped with a dampened cloth—never saturated or submerged.

In the event that equipment becomes damaged or ceases to operate, our Application Engineers are here to support your troubleshooting efforts 24 hours a day, 7 days a week. Call or email with model and serial number as well as a brief description of the problem.

## Calibration

Routine calibration of sensors and associated instrumentation is necessary to maintain measurement accuracy. We recommend calibrating on an annual basis, after exposure to any extreme environmental influence, or prior to any critical test.

PCB Piezotronics is an ISO-9001 certified company whose calibration services are accredited by A2LA to ISO/IEC 17025, with full traceability to SI through N.I.S.T. In addition to our standard calibration services, we also offer specialized tests, including: sensitivity at elevated or cryogenic temperatures, phase response, extended high or low frequency response, extended range, leak testing, hydrostatic pressure testing, and others. For more information, contact your local PCB Piezotronics distributor, sales representative, or factory customer service representative.

## Returning Equipment

If factory repair is required, our representatives will provide you with a Return Material Authorization (RMA) number, which we use to reference any information you have already provided and expedite the repair process. This number should be clearly marked on the outside of all returned package(s) and on any packing list(s) accompanying the shipment.

## Contact Information

PCB Piezotronics, Inc.  
3425 Walden Ave.  
Depew, NY14043 USA  
Toll-free: (800) 828-8840  
24-hour SensorLine: (716) 684-0001  
General inquiries: [info@pcb.com](mailto:info@pcb.com)  
Repair inquiries: [rma@pcb.com](mailto:rma@pcb.com)

For a complete list of distributors, global offices and sales representatives, visit our website, [www.pcb.com](http://www.pcb.com).

## Safety Considerations

This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the precautions required to avoid injury. While our equipment is designed with user safety in mind, the protection provided by the equipment may be impaired if equipment is used in a manner not specified by this manual.

Discontinue use and contact our 24-Hour Sensorline if:

- Assistance is needed to safely operate equipment
- Damage is visible or suspected
- Equipment fails or malfunctions

For complete equipment ratings, refer to the enclosed specification sheet for your product.

## Definition of Terms and Symbols

The following symbols may be used in this manual:



### **DANGER**

Indicates an immediate hazardous situation, which, if not avoided, may result in death or serious injury.

**CAUTION**

Refers to hazards that could damage the instrument.

**NOTE**

Indicates tips, recommendations and important information. The notes simplify processes and contain additional information on particular operating steps.

**The following symbols may be found on the equipment described in this manual:**



This symbol on the unit indicates that high voltage may be present. Use standard safety precautions to avoid personal contact with this voltage.



This symbol on the unit indicates that the user should refer to the operating instructions located in the manual.



This symbol indicates safety, earth ground.



PCB工业监视和测量设备 - 中国RoHS2公布表

PCB Industrial Monitoring and Measuring Equipment - China RoHS 2 Disclosure Table

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
住房	0	0	0	0	0	0
PCB板	X	0	0	0	0	0
电气连接器	0	0	0	0	0	0
压电晶体	X	0	0	0	0	0
环氧	0	0	0	0	0	0
铁氟龙	0	0	0	0	0	0
电子	0	0	0	0	0	0
厚膜基板	0	0	X	0	0	0
电线	0	0	0	0	0	0
电缆	X	0	0	0	0	0
塑料	0	0	0	0	0	0
焊接	X	0	0	0	0	0
铜合金/黄铜	X	0	0	0	0	0
本表格依据 SJ/T 11364 的规定编制。						
0：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。						
X：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。						
铅是欧洲RoHS指令2011/65/ EU附件三和附件四目前由于允许的豁免。						

CHINA RoHS COMPLIANCE

Component Name	Hazardous Substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Chromium VI Compounds (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	O	O	O	O	O	O
PCB Board	X	O	O	O	O	O
Electrical Connectors	O	O	O	O	O	O
Piezoelectric Crystals	X	O	O	O	O	O
Epoxy	O	O	O	O	O	O
Teflon	O	O	O	O	O	O
Electronics	O	O	O	O	O	O
Thick Film Substrate	O	O	X	O	O	O
Wires	O	O	O	O	O	O
Cables	X	O	O	O	O	O
Plastic	O	O	O	O	O	O
Solder	X	O	O	O	O	O
Copper Alloy/Brass	X	O	O	O	O	O

This table is prepared in accordance with the provisions of SJ/T 11364.

O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

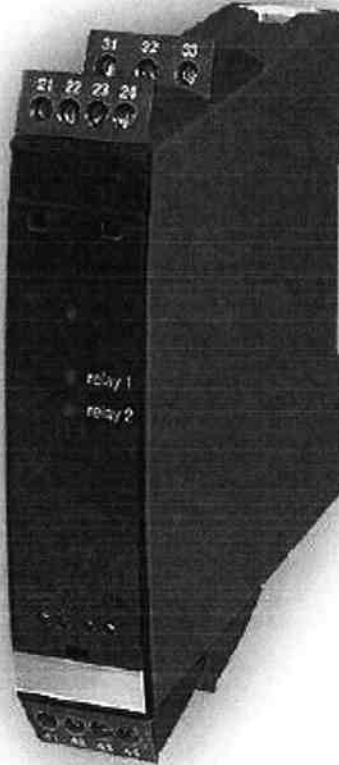
X: Indicates that said hazardous substance contained in at least one of the homogeneous materials for this part is above the limit requirement of GB/T 26572.

Lead is present due to allowed exemption in Annex III or Annex IV of the European RoHS Directive 2011/65/EU.

***Model 682A06 Series Universal Transmitter***

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CE



***Operating Guide with Enclosed Warranty Information***

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***3425 Walden Avenue, Depew, New York 14043-2495***

***Phone (716) 684-0003***

***Fax (716) 684-3823***

***Toll Free Line 1-800-959-4IMI***

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## Safety Instructions and Warnings

### Symbol Identification:



**Triangle with an Exclamation Mark:** Warning/demand. Potentially lethal situations.



The **CE Mark** proves the compliance of the module with the essential requirements of the directives.



The **Double Insulation** symbol shows that the module is protected by double or reinforced insulation.

### Definitions:

**Hazardous Voltages:** 75 to 1500 Vdc, and 50 to 1000 Vac.

**Technicians:** Qualified persons educated or trained to mount, operate, and also troubleshoot technically correct and in accordance with safety regulations.

**Operators:** Persons familiar with the contents of this manual who make adjustments to the module during normal operation.

### Warnings:



#### **GENERAL**

This module is designed for connection to hazardous electric voltages. Ignoring this warning can result in severe personal injury or mechanical damage. To avoid risk of electric shock and fire, the safety instructions in this manual must be observed and the guidelines followed. The specifications must not be exceeded, and the module must only be used as described in the following. Prior to the commissioning of this module, this manual must be examined carefully. Only qualified personnel (technicians) should install this module. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.





**HAZARD-  
OUS  
VOLTAGE**



Until the module is installed, do not connect hazardous voltages to the module. The following operations should only be carried on a disconnected module and under ESD safe conditions:

- General mounting, connection, and disconnection of wires.
- Troubleshooting the module.

**Repair of the module and replacement of circuit breakers must be done by IMI Sensors only.**



**INSTAL-  
LATION**

To keep the safety distances, the relay contacts on the module must not be connected to both hazardous and non-hazardous voltages at the same time. The 682A06 must be mounted on a DIN rail according to DIN 46277.

### **Environment:**

Avoid direct sunlight, dust, high temperatures, mechanical vibrations, shock, rain, and heavy moisture. If necessary, heating in excess of the stated limits for ambient temperatures should be avoided by way of ventilation. All modules fall under Category II, Pollution Degree I, and Insulation Class II.

### **Cleaning:**

When disconnected, the module may be cleaned with a cloth moistened with distilled water or ethyl alcohol.

## Features and Applications of the 682A06

### General Features:

- *Universal AC or DC Supply*
- *Input for RTD, TC, Ohm, Potentiometer, mA and Volts*
- *Provides DC Loop Power (> 16Vdc) for 2-Wire 4-20mA Sensors*
- *Din Rail Mounting*
- *Output for Current, Voltage, and 2 Form A Relays*

### Advanced Features:

- Programmable via detachable display, process calibration, signal and relay simulation, password protection, error diagnostics, and selection of help test in several languages.

### Application:

- Linearized, electronic temperature measurement with RTD or TC sensor.
- Conversion of linear resistance variation to a standard analog current/voltage signal., i.e. from solenoids and butterfly valves or linear movements with attached potentiometers.
- Power supply and signal isolator for 2-wire transmitters.
- Process control with 2 pairs of potential-free relay contacts and analog output.
- Galvanic separation of analog signals and measurement of floating signals.
- The 682A06 is designed according to strict safety requirements and is thus suitable for application in SIL 2 installations.

### Technical Characteristics:

- When the 682A06 is used in combination with the 070A80 display/programmer front, all operational parameters can be modified to suit any application. As the 682A06 is designed with electronic hardware switches, it is not necessary to open the module for setting of DIP switches.
- A green/red front LED indicates normal operation and malfunction. A yellow LED is On for each active output relay.
- Continuous check of vital stored data for safety reasons.

## Installation and Wiring

### **Mounting:**

The Model 682A06 is designed to be mounted on a 35mm Din Rail. Do not install in a harsh area where it can be exposed to cleaning fluids or machine oils. IMI Sensors recommends mounting the 682A06 in a type NEMA 4 enclosure to protect the electronics from contamination.

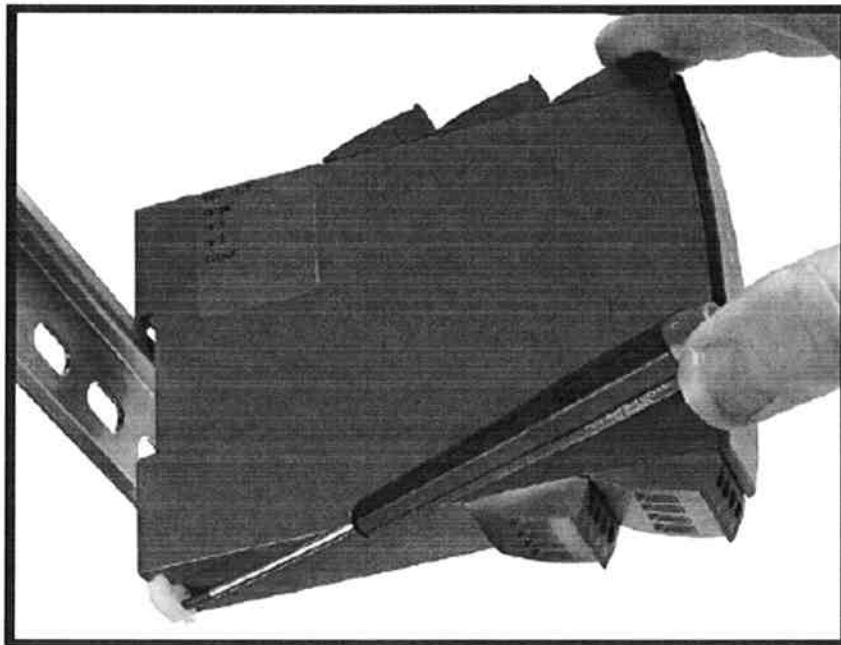
Only technicians who are familiar with the technical terms, warnings, and instructions in this manual should perform mounting. Mounting and connection of the module should comply with standards as defined by the national and local governing body.

The following apply to fixed hazardous voltages-connected modules:

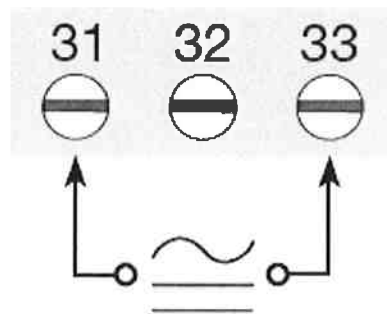
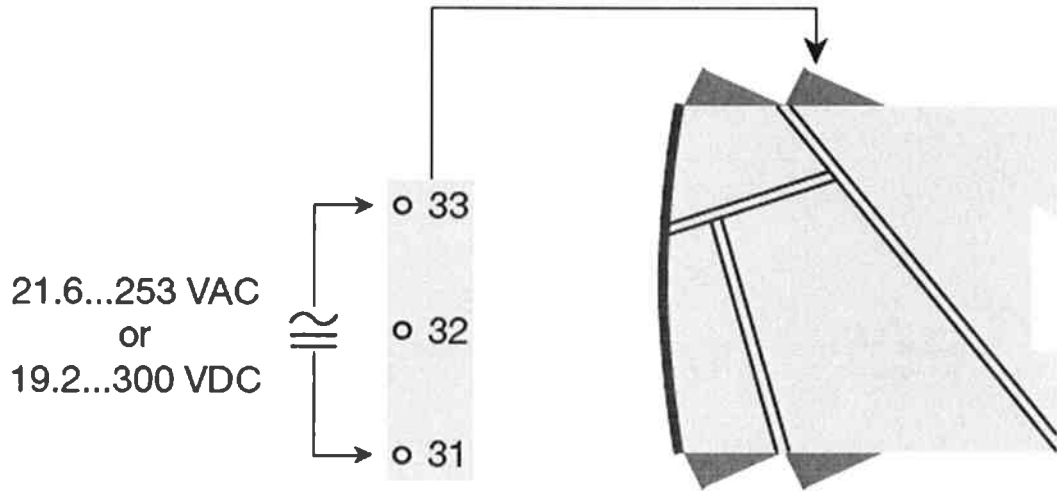
- A protection fuse with a maximum rating of 10A, together with a power switch, should be located close to the module and be easily accessible. The power switch should be marked with a label indicating that it will switch off the voltage to the module.

### **Demounting:**

- Disconnect all hazardous voltages from the 682A06.
- Detach the module from the DIN Rail by lifting the bottom lock.

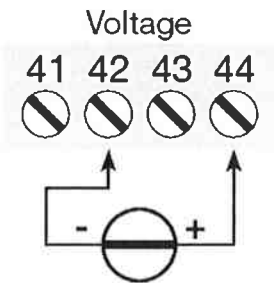
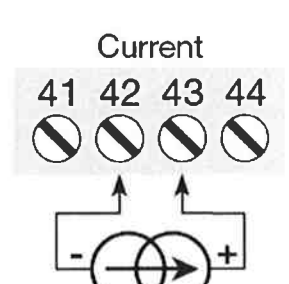
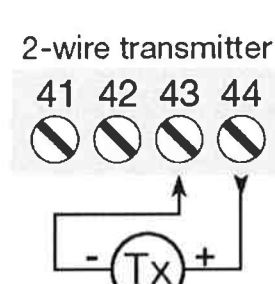
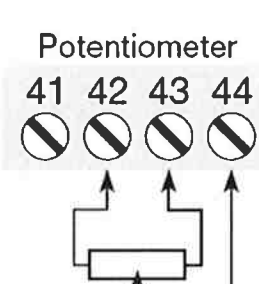
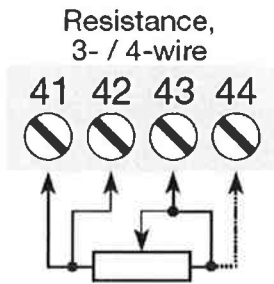
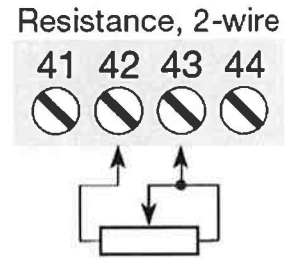
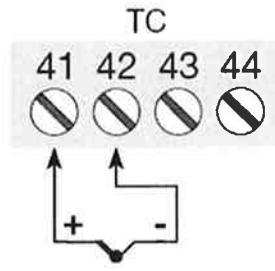
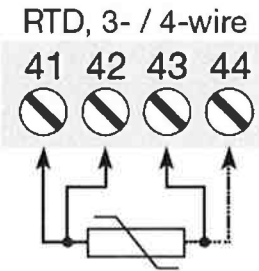
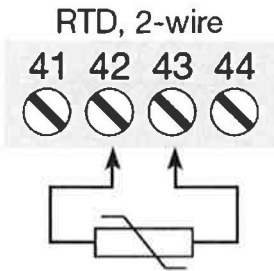
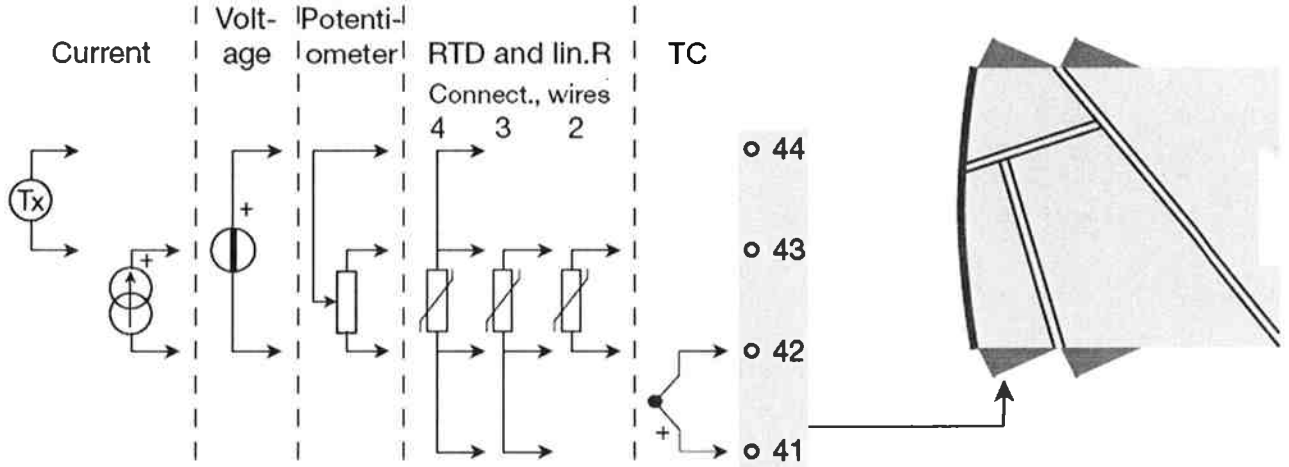


Power Supply Wiring and Terminal Block Locations:

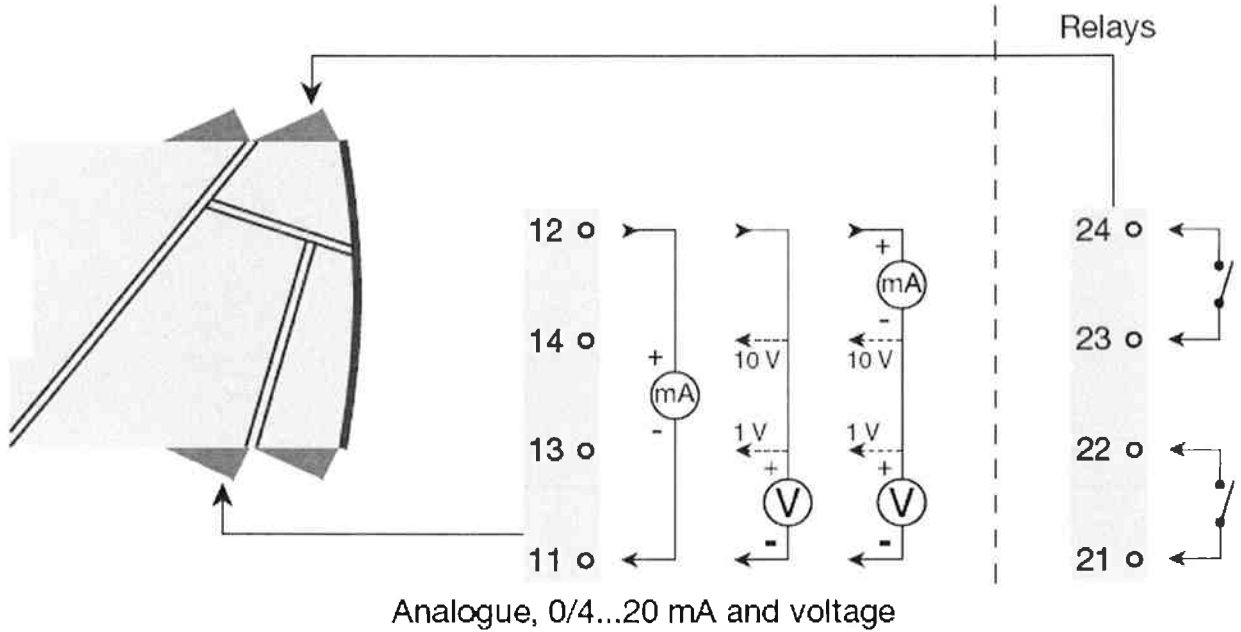


**Power Supply Connection is Non-Polar**

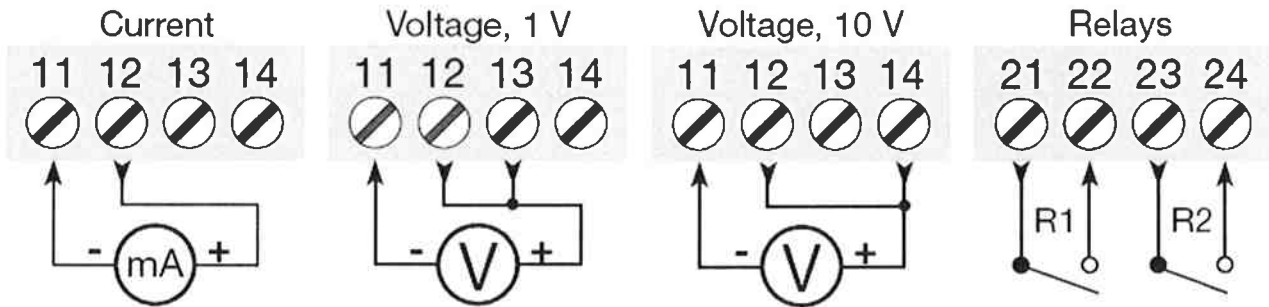
**Input Signal Wiring and Terminal Block Locations:**



**Output Signal Wiring and Terminal Block Locations:**



\*\*\*\* If Analogue Output is not used, pins 11 and 12 must be shorted together. \*\*\*\*



## 070A80 Front Display/Programmer



### **Functionality:**

The simple and easily understandable menu structure and the explanatory help text guide you effortlessly and automatically through the configuration steps, thus making the product easy to use. Functions and configuration options are described in the section "Programming the 682A06."

### **Application:**

- Communications interface for modification of operational parameters.
- Can be moved from one 682A06 to another and download the configuration of the first transmitter to subsequent transmitters.
- Fixed display for visualization of process data and status.

### **Technical Characteristics:**

- LCD display with 4 lines; Line 1 shows input signal, Line 2 shows units, Line 3 shows analog output or tag number, and Line 4 shows communication and relay status.
- Programming access can be blocked by assigning a password. The password is saved in the transmitter in order to insure a high degree of protection against unauthorized modifications to the configuration.

### **Mounting/Installation:**

Connect the 070A80 into the front of the 682A06. Installation is indicated by an audible click.

## Programming the 682A06

### Function Key Operation/Programming:

When configuring the 682A06, you will be guided through all parameters via the front panel display and you can choose the settings that best fit the application. For each menu there is a scrolling help text that is automatically shown in line 3 on the display.

Configuration is carried out by using the 3 function keys:

- ⤴ Will increase the numerical value or choose the next parameter.
- ⤵ Will decrease the numerical value or choose the previous parameter.
- OK Enter configuration mode, save the chosen value, and proceed to the next menu.

When configuration is completed, the display will return to the default state 1.0.

- Pressing and holding the OK button will return to the previous menu or return to the default state (1.0) without saving the changed values or parameters.

- If no key is activated for 1 minute, the display will return to the default state (1.0) without saving the changed values or parameters.

### Additional Programming Notes:

**Fast setpoint adjustment and relay test:** These menus allow you to make a quick setpoint change and relay test when the FastSet menu is activated. This function can only be activated when the relays are set for setpoint function and are controlled by a setpoint.

- Pressing the UP and DOWN button simultaneously will activate a relay test and change the state of the relay.
- Pressing the OK button will save the setpoint change.
- Holding down the OK button for more than 1 second will return the unit to the default state without saving the setpoint change.

**Password Protection:** Assigning a password can block programming access. The password is saved in the transmitter in order to insure a high degree of protection against unauthorized modifications to the configuration. Default password 2008 allows access to all configuration menus.

**Selection of Units:** After choosing the input signal type you can choose which process units should be displayed in text line 2 (see table). By selection of temperature input the process value is always displayed in Celsius or Fahrenheit degrees. This is selected in the menu point after selection of temperature input.

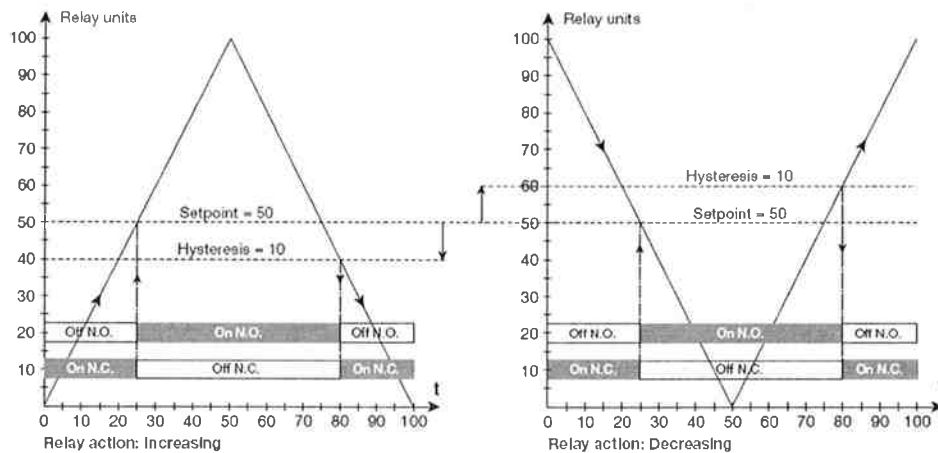


## Relay Functions:

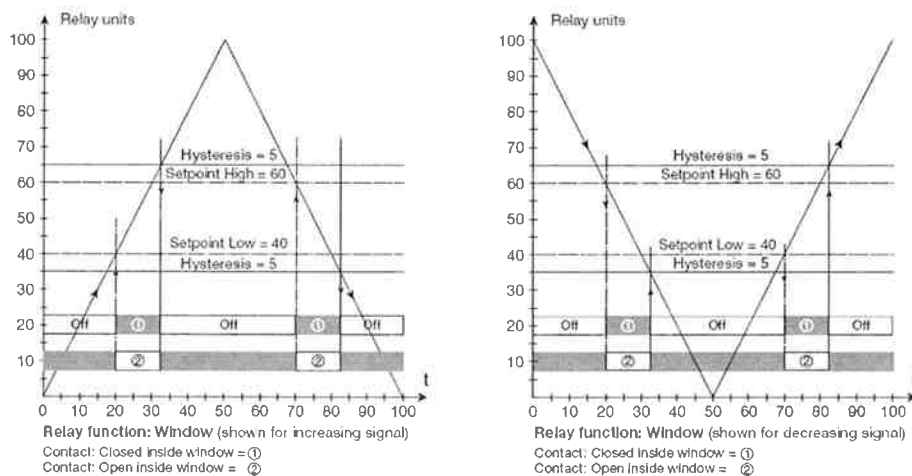
Up to 5 different settings of relay function can be selected.

- Setpoint:** The unit works as a single trip amplifier.
- Window:** The relay has a window that is defined by a low and a high setpoint. On both sides of the window the relay has the same status.
- Error Function:** The relay is activated by sensor error.
- Power:** The relay is activated as long as the power is on.
- Off:** The relay is deactivated.
- Increase/Decrease:** The relays can be set to activate at increasing or decreasing input signal.
- Delay:** Both an ON and OFF time delay can be set on both relays in the range of 0 – 3600 seconds.
- Hysteresis:** Hysteresis can be set at 0.1 to 25% of the span or between 1 and 2999 counts.

### Graphic Depiction of Relay Action Setpoint:



### Graphic Depiction of Relay Action Window:



### **Advanced Functions:**

The unit gives access to a number of advanced functions which can be reached by answering 'Yes' to the point "adv.set".

**Display Setup:** Here you can adjust the brightness contrast and the backlight. Setup of TAG numbers with 6 alphanumeric characters. Selection of functional readout in line 3 of the display – choose between readout of analog output or TAG number.

**Two Point Process Calibration:** The unit can be process-calibrated in 2 points to fit a given input signal. A low input signal (not necessarily 0%) is applied and the actual value is entered. Then a high signal (not necessarily 100%) is applied and the actual value is entered. If this calibration is acceptable then the unit will work according to the new adjustment. If you later reject this menu point or choose another type of input signal the unit will return to factory calibration.

**Process Simulation Function:** If you agree to the point "EN.SIM" it is possible to simulate an input signal by means of the arrow buttons and thus control the output up or down. When you finalize the point with the OK button, the unit returns to normal operation. The following point allows you to activate Relay 1 and Relay 2 by means of the arrow keys. You must exit the menu by pressing the OK button (no time-out).

**Password:** Here you can choose a password between 0000 and 9999 in order to protect the unit against unauthorized modifications to the configuration. The unit is delivered default without a password. If you have locked the unit with a password by mistake, you can always open the menu by using the master password 2008.

**Language:** In the menu "lang.setup" you can choose from 7 different language versions of help text that will appear in the menu. You can choose between UK, DE, FR, IT, ES, SE, DK.

**Auto Diagnosis:** The unit performs advanced auto diagnosis of the internal circuits. The following possible error can be displayed on the front panel:

- HW.ER – Permanent Error in the A/D Converter
- CJ.ER – CJC Sensor Error
- RA.ER – Ram Error
- FL.ER – Flash Error
- AO.ER – Analog Output Error
- TY.ER – Configuration in the 682A06 does not match this product type
- NO.CO – Connection Error

**Signal and Sensor Error info via the Front Display:**

Sensor error (see limits in the table) is displayed as SE.BR (sensor break) or SE.SH (sensor short)). Signals outside the selected range (not sensor error, see table for limits) are displayed as IN.LO indicating low input signal or IN.HI indicating a high input signal. The error indication is displayed in line 3 as text and at the same time the backlight flashes. Line 4 of the display is a status line, which displays the status of Relay 1 and Relay 2. COM (flashing bullet) indicates the correct functioning of the 682A06 and an up/down arrow indicates tendency readout of the input signal. If the number 1 or number 2 flashes, the unit has detected that a setpoint has been exceeded and that the associated relay is in 'time delay' mode. When the time delay time has passed and the relay makes/breaks, the relay sign either appears or disappears from the display.

**Signal and Sensor Error info without the Front Display:**

Status of the transmitter can also be read from the red and green LED's on the front of the module.

- Green flashing LED at 13Hz indicates normal operation. (Fast Flash)
- Green flashing LED at 1Hz indicates sensor error. (Slow Flash)
- Steady green LED indicates internal error.
- Steady red LED indicates fatal error.
- Relay activation is indicated via two independent LED's located below the status LED.

### Parameters for Sensor Error Detection and Input Signal Outside of Range:

Sensor error check:		
Module:	Configuration	Sensor error detection:
682A06	R1, ERR.ACT=NONE - R2, ERR.ACT=NONE, OUT.ERR=NONE.	OFF
	Else:	ON

Outside range readout (IN.LO, IN.HI): If the valid range of the A/D converter or the polynomial is exceeded			
Input	Range	Readout	Limit
VOLT	0...1 V / 0.2...1 V	IN.LO	< -25 mV
		IN.HI	> 1.2 V
	0...10 V / 2...10 V	IN.LO	< -25 mV
		IN.HI	> 12 V
CURR	0...20 mA / 4...20 mA	IN.LO	< -1.05 mA
		IN.HI	> 25.05 mA
LIN.R	0...800 Ω	IN.LO	< 0 Ω
		IN.HI	> 1075 Ω
	0...10 kΩ	IN.LO	< 0 Ω
		IN.HI	< 110 kΩ
POTM	-	IN.LO	< -0.5 %
		IN.HI	> 100.5 %
TEMP	TC / RTD	IN.LO	< temperature range -2°C
		IN.HI	> temperature range +2°C

Sensor error detection (SE.BR, SE.SH):			
Input	Range	Readout	Limit
CURR	Loop break (4..20 mA)	SE.BR	<= 3.6 mA; > = 21 mA
POTM	All, SE.BR on all 3-wires	SE.BR	> ca. 126 kΩ
LIN.R	0...800 Ω	SE.BR	> ca. 875 Ω
	0...10 kΩ	SE.BR	> ca. 11 kΩ
TEMP	TC	SE.BR	> ca. 750 kΩ / (1.25 V)
	RTD, 2-wire	SE.BR	> ca. 15 kΩ
	No SE.SH for Pt10, Pt20 and Pt50	SE.SH	< ca. 15 Ω
	RTD, 3-wire	SE.BR	> ca. 15 kΩ
	No SE.SH for Pt10, Pt20 and Pt50	SE.SH	< ca. 15 Ω
	RTD, 4-wire	SE.BR	> ca. 15 kΩ
	No SE.SH for Pt10, Pt20 and Pt50	SE.SH	< ca. 15 Ω

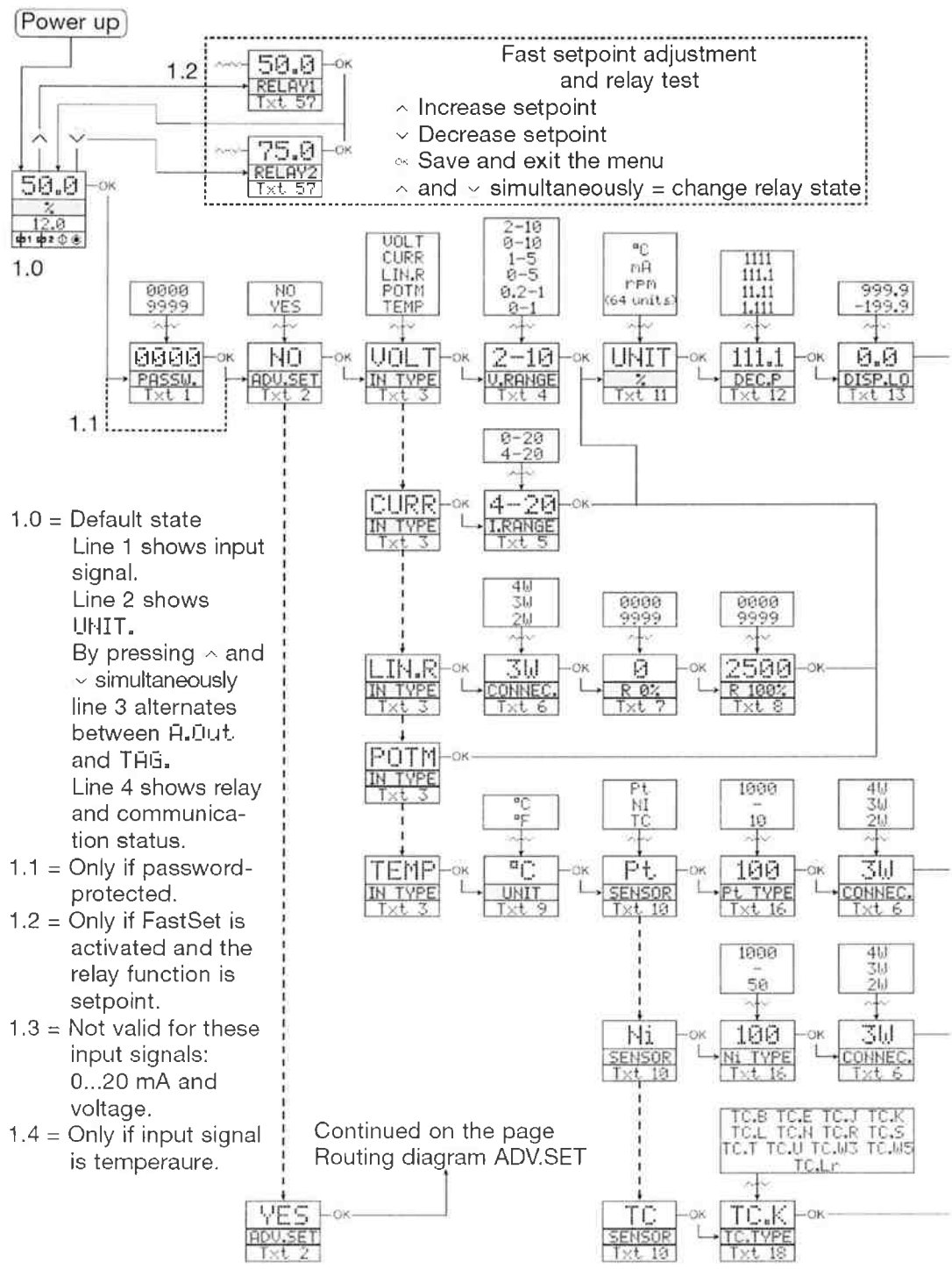
Display readout below min.- / above max. (-1999, 9999):			
Input	Range	Readout	Limit
All	All	-1999	Display readout <-1999
		9999	Display readout >9999

Readout at hardware error		
Error search	Readout	Error cause
Test of internal communication uC / ADC	HW.ER	Permanent error in ADC
Test of internal CJC sensor	CJ.ER	CJC sensor defect
Checksum test of the configuration in RAM	RA.ER	Error in RAM
Checksum test of the configuration in FLASH	FL.ER	Error in FLASH
Check measurement of analogue output	AO.ER	Error on analogue output
Check that saved configuration in 4501 match module	TY.ER	Configuration is not 4116
Communications test 4501 / 4116	NO.CO	Connection error

! Error indications in the display blink once a second. The help text explains the error.

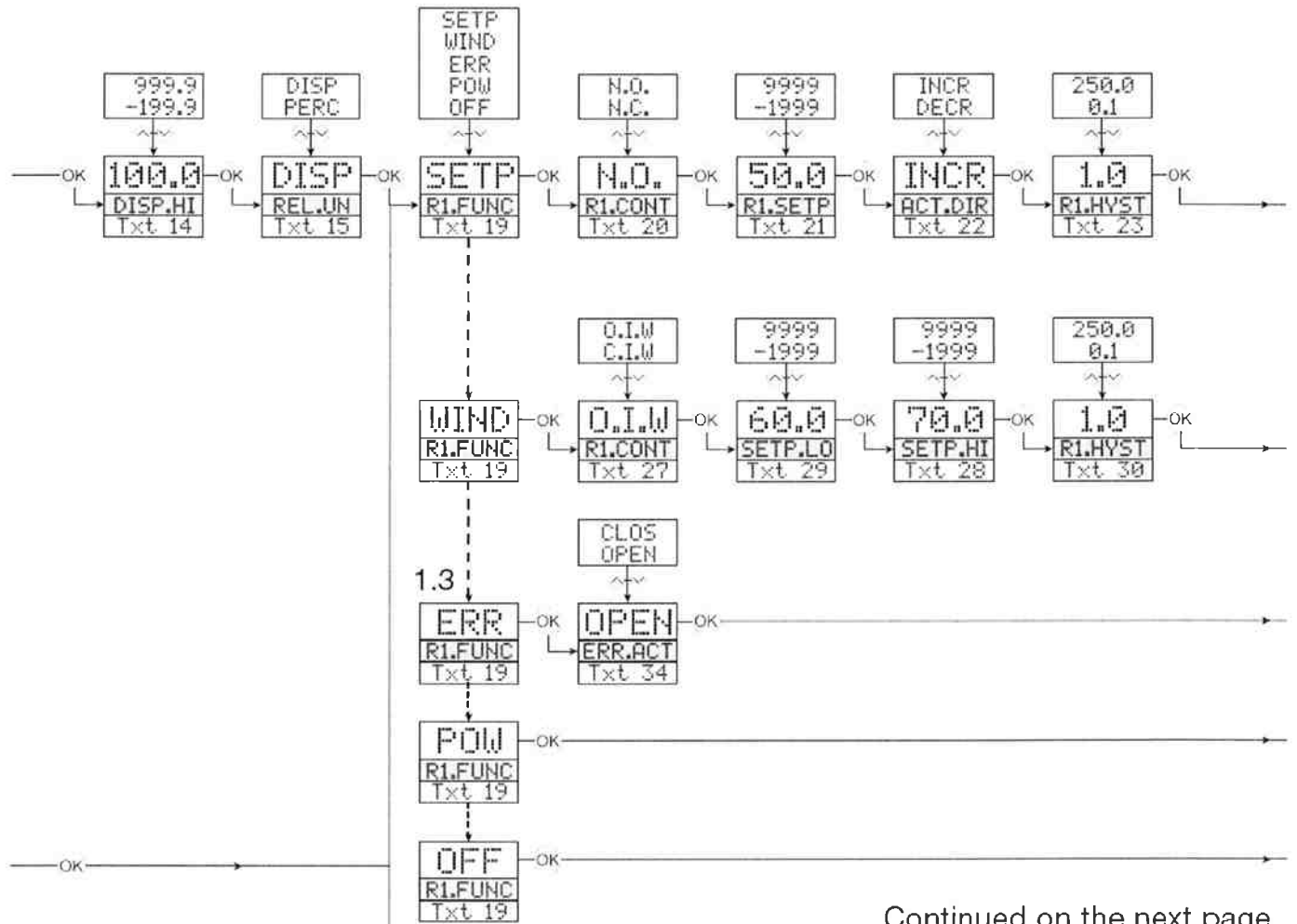
## Software Logic Tree

If no key is activated for 1 minute, the display will return to the default state 1.0 without saving configuration changes.  
 ^ Increase value / choose next parameter  
 v Decrease value / choose previous parameter  
 o Save the chosen value and proceed to the next menu  
 Hold = Back to previous menu / return to menu 1.0 without saving



- 1.0 = Default state  
Line 1 shows input signal.  
Line 2 shows UNIT.  
By pressing ^ and v simultaneously line 3 alternates between A.Out. and TAG.  
Line 4 shows relay and communication status.
- 1.1 = Only if password-protected.
- 1.2 = Only if FastSet is activated and the relay function is setpoint.
- 1.3 = Not valid for these input signals:  
0...20 mA and voltage.
- 1.4 = Only if input signal is temperature.

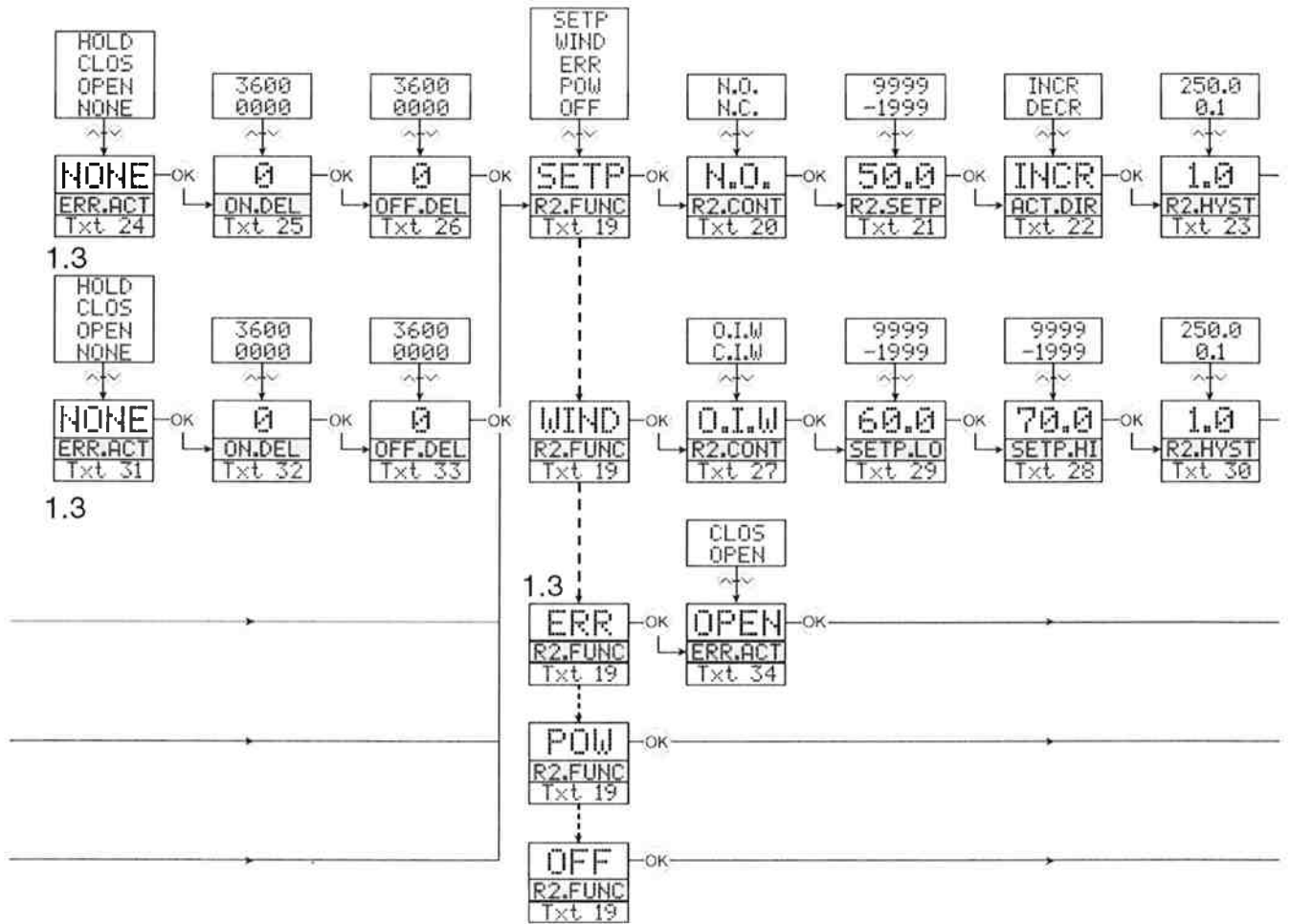
Continued on the page  
Routing diagram ADV.SET

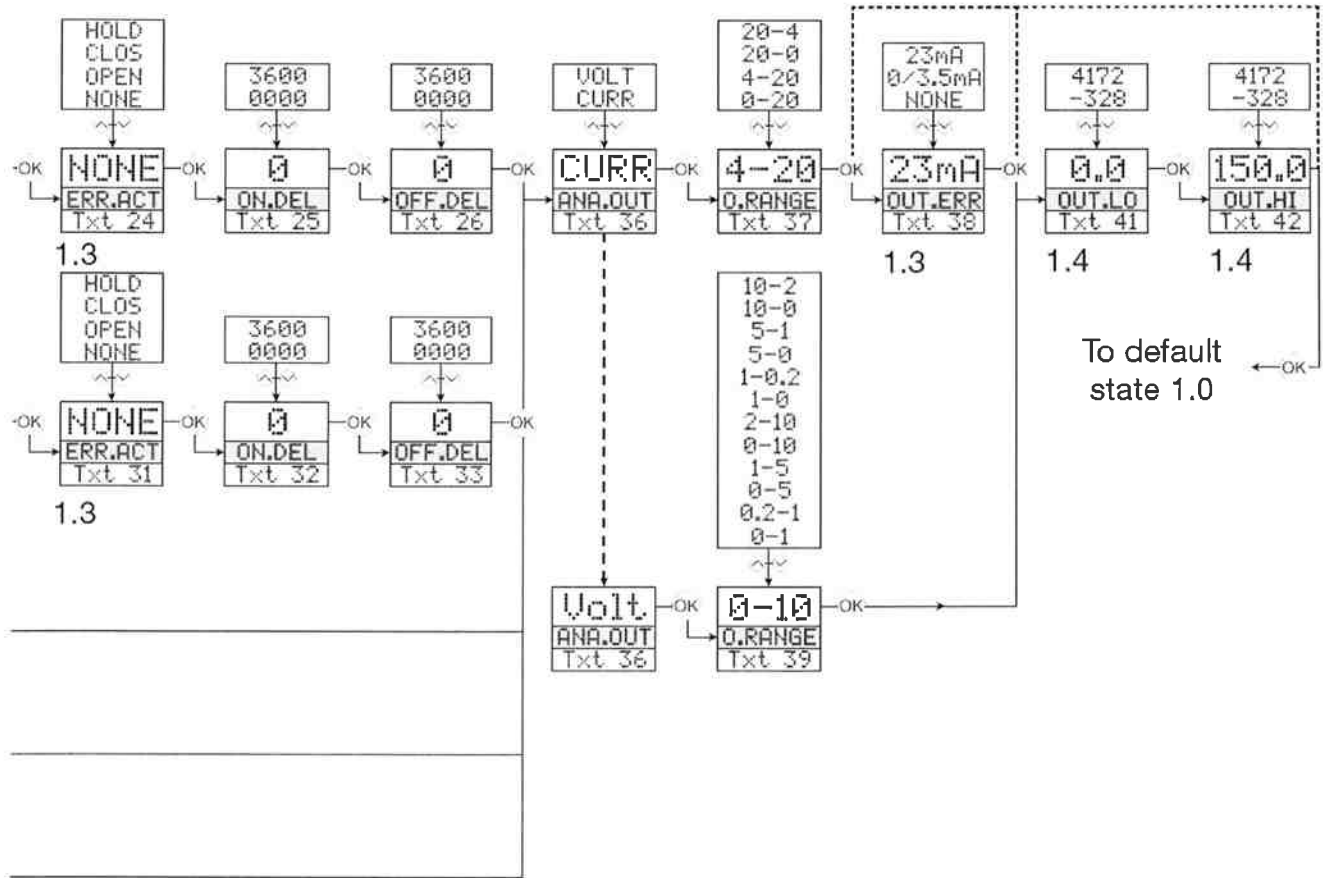


Continued on the next page

Selectable Units:

°C	m/s	g	GW	μS
°F	m/min	N	MW	%
°K	m/h	Pa	kW	m3/min
m	in/s	MPa	hp	m3/h
cm	ft/s	kPa	A	L/s
mm	in/min	hPa	kA	L/min
ft	ft/min	bar	mA	L/h
in	in/h	mbar	μA	gal/min
yd	ft/hr	kJ	V	gal/h
m3	rpm	Wh	kV	t/h
L	Hz	MWh	mV	mol
s	t	kWh	Ohm	pH
min	kg	W	S	mils
mm/s	μm	mm/s2	ips	

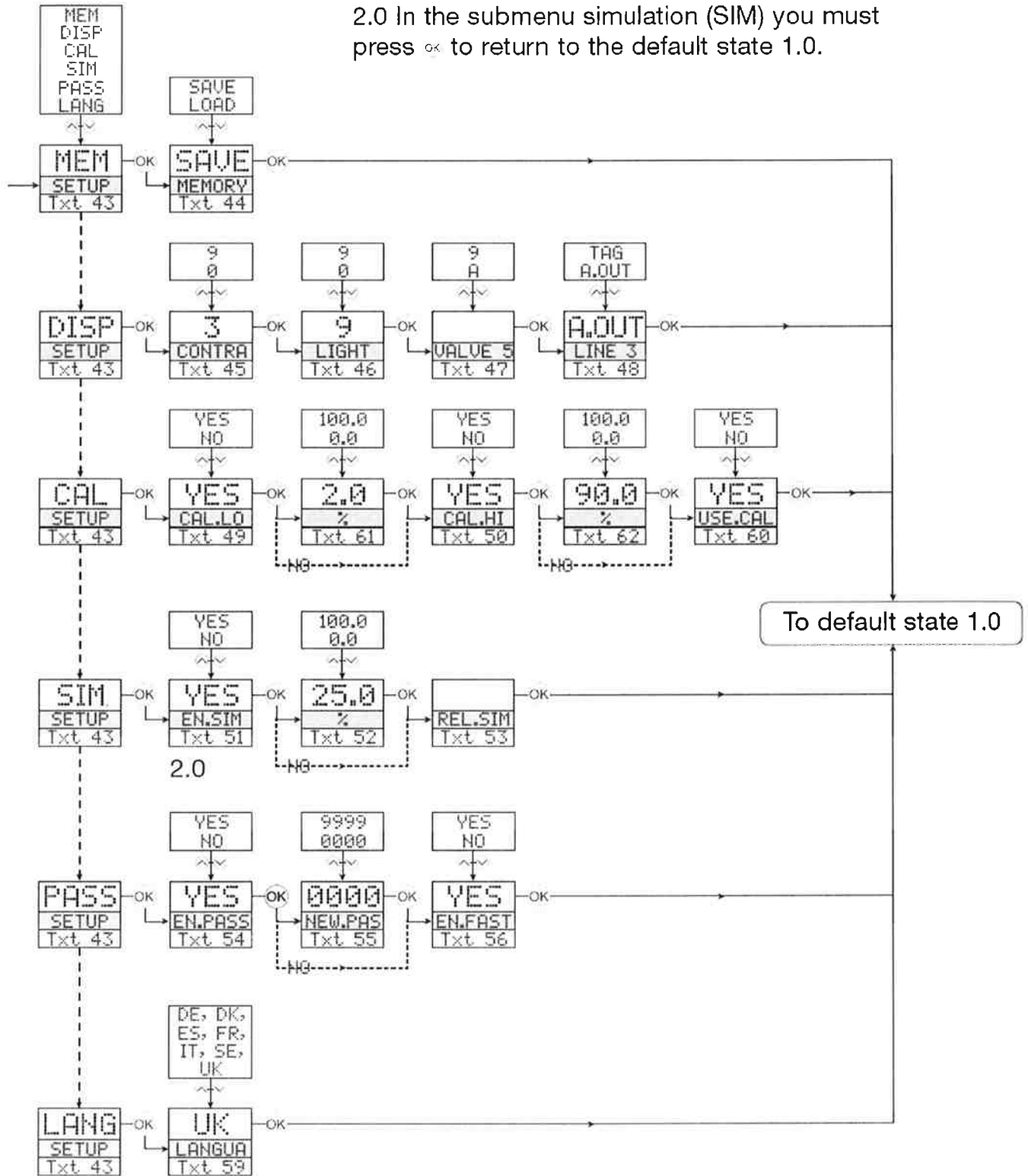






### Advanced Settings (ADV.SET):

2.0 In the submenu simulation (SIM) you must press **OK** to return to the default state 1.0.





# IMI SENSORS

## A PCB PIEZOTRONICS DIV.

### Scrolling Help Text in Display Line 3:

- |   |   |
|---|---|
| [01] Set correct password                                 | Close relay contact at error                                |
| [02] Enter advanced setup menu?                           | Hold relay status at error                                  |
| [03] Select temperature input                             | [25] Set relay ON delay in seconds                          |
| Select potentiometer input                                | [26] Set relay OFF delay in seconds                         |
| Select linear resistance input                            | [27] Relay contact is Closed Inside Window                  |
| Select current input                                      | Relay contact is Open Inside Window                         |
| Select voltage input                                      | [28] Set relay window setpoint high                         |
| [04] Select 0.0-1 V input range                           | [29] Set relay window setpoint low                          |
| Select 0.2-1 V input range                                | [30] Set relay window hysteresis                            |
| Select 0-5 V input range                                  | [31] No error action - undefined status at error            |
| Select 1-5 V input range                                  | Open relay contact at error                                 |
| Select 0-10 V input range                                 | Close relay contact at error                                |
| Select 2-10 V input range                                 | Hold relay status at error                                  |
| [05] Select 0-20 mA input range                           | [32] Set relay ON delay in seconds                          |
| Select 4-20 mA input range                                | [33] Set relay OFF delay in seconds                         |
| [06] Select 2-wire sensor connection                      | [34] Open relay contact at error                            |
| Select 3-wire sensor connection                           | Close relay contact at error                                |
| Select 4-wire sensor connection                           | [36] Select current as analogue output type                 |
| [07] Set resistance value low                             | Select voltage as analogue output type                      |
| [08] Set resistance value high                            | [37] Select 0-20 mA output range                            |
| [09] Select Celsius as temperature unit                   | Select 4-20 mA output range                                 |
| Select Fahrenheit as temperature unit                     | Select 20-0 mA output range                                 |
| [10] Select TC sensor type                                | Select 20-4 mA output range                                 |
| Select Ni sensor type                                     | [38] Select no error action - output undefined at error     |
| Select Pt sensor type                                     | Select downscale at error                                   |
| [11] Select display unit                                  | Select NAMUR NE43 downscale at error                        |
| [12] Select decimal point position                        | Select NAMUR NE43 upscale at error                          |
| [13] Set display range low                                | [39] Select 0.0-1 V output range                            |
| [14] Set display range high                               | Select 0.2-1 V output range                                 |
| [15] Set relays in % of input range                       | Select 0-5 V output range                                   |
| Set relays in display units                               | Select 1-5 V output range                                   |
| [16] Select Pt10 as sensor type                           | Select 0-10 V output range                                  |
| Select Pt20 as sensor type                                | Select 2-10 V output range                                  |
| Select Pt50 as sensor type                                | Select 1-0.0 V output range                                 |
| Select Pt100 as sensor type                               | Select 1-0.2 V output range                                 |
| Select Pt200 as sensor type                               | Select 5-0 V output range                                   |
| Select Pt400 as sensor type                               | Select 5-1 V output range                                   |
| Select Pt500 as sensor type                               | Select 10-0 V output range                                  |
| Select Pt1000 as sensor type                              | Select 10-2 V output range                                  |
| [17] Select Ni50 as sensor type                           | [41] Set temperature for analogue output low                |
| Select Ni100 as sensor type                               | [42] Set temperature for analogue output high               |
| Select Ni120 as sensor type                               | [43] Enter password setup                                   |
| Select Ni1000 as sensor type                              | Enter simulation mode                                       |
| [18] Select TC-B as sensor type                           | Perform process calibration                                 |
| Select TC-E as sensor type                                | Enter display setup   |
| Select TC-J as sensor type                                | Perform memory operations                                   |
| Select TC-K as sensor type                                | [44] Load saved configuration into 4116                     |
| Select TC-L as sensor type                                | Save 4116 configuration in 4501                             |
| Select TC-N as sensor type                                | [45] Adjust LCD contrast                                    |
| Select TC-R as sensor type                                | [46] Adjust LCD backlight                                   |
| Select TC-S as sensor type                                | [47] Write a 6-character device TAG                         |
| Select TC-T as sensor type                                | [48] Analogue output value is shown in display line 3       |
| Select TC-U as sensor type                                | Device TAG is shown in display line 3                       |
| Select TC-W3 as sensor type                               | [49] Calibrate input low to process value?                  |
| Select TC-W5 as sensor type                               | [50] Calibrate input high to process value?                 |
| Select TC-Lr as sensor type                               | [51] Enable simulation mode?                                |
| [19] Select OFF function - relay is permanently off       | [52] Set the input simulation value                         |
| Select POWER function - relay indicates power status OK   | [53] Relay simulation - use ^ and v to toggle relay 1 and 2 |
| Select ERROR function - relay indicates sensor error only | [54] Enable password protection?                            |
| Select WINDOW function - relay controlled by 2 setpoints  | [55] Set new password                                       |
| Select SETPOINT function - relay controlled by 1 setpoint | [56] Enable Fastset functionality?                          |
| [20] Select Normally Closed contact                       | [57] Relay setpoint - press ← to save                       |
| Select Normally Open contact                              | [58] Relay setpoint - Read only                             |
| [21] Set relay setpoint                                   | [59] Select language  |
| [22] Activate relay on decreasing signal                  | [60] Use process calibration values?                        |
| Activate relay on increasing signal                       | [61] Set value for low calibration point                    |
| [23] Set relay hysteresis                                 | [62] Set value for high calibration point                   |
| [24] No error action - undefined status at error          |   |
| Open relay contact at error                               |   |

## Electrical Specifications

Operating Temperature Range:	-20°C to +60°C.
Supply Voltage:	21.6 to 253Vac / 19.2 to 300Vdc
Maximum Power Consumption:	2.5W
Fuse:	400mA SB / 250Vac
Isolation voltage/operation	2.3kVac / 250Vac
Communication Interface:	Model 070A80
SNR:	60dB minimum, 0-100kHz
Response Time (0-90%):	Temperature: ≤ 1 second mA / V: ≤ 400ms
Calibration Temperature:	20 to 28°C
Accuracy, the greater of the general and basic values:	

General values		
Input type	Absolute accuracy	Temperature coefficient
All	≤ ±0.1% of span	≤ ±0.01% of span / °C

Basic values		
Input type	Basic accuracy	Temperature coefficient
mA	≤ ±4 μA	≤ ±0.4 μA / °C
Volt	≤ ±20 μV	≤ ±2 μV / °C
Pt100	≤ ±0.2°C	≤ ±0.01°C / °C
Lin. R	≤ ±0.1 Ω	≤ ±0.01 Ω / °C
Potentiometer	≤ ±0.1 Ω	≤ ±0.01 Ω / °C
TC type: E, J, K, L, N, T, U	≤ ±1°C	≤ ±0.05°C / °C
TC type: B, R, S, W3, W5, LR	≤ ±2°C	≤ ±0.2°C / °C

EMC immunity influence ..... <  $\pm 0.5\%$  of span  
 Extended EMC immunity:  
 NAMUR NE 21, A criterion, burst ..... <  $\pm 1\%$  of span

Auxiliary 2 – wire supply (terminals 43 and 44): 25 to 16Vdc / 0 to 20mA  
 Maximum Wire Size: 1 x 2.5mm<sup>2</sup>  
 Screw Terminal Torque: 0.5Nm  
 Relative humidity: <95% (non-condensing)  
 Dimensions without front display (HxBxD): 102 x 23.5 x 104 mm  
 Dimensions with front display (HxBxD): 109 x 23.5 x 116 mm  
 Tightness (enclosure/terminals): IP50 / IP20  
 Weight: 170grams / 185 grams with display

**RTD, Linear Resistance and Potentiometer Input:**

Input type	Min. value	Max. value	Norm
Pt100	-200°C	+850°C	IEC60751
Ni100	-60°C	+250°C	DIN 43760
Lin. R	0 $\Omega$	10000 $\Omega$	-
Potentiometer	10 $\Omega$	100 k $\Omega$	-

RTD Types: Pt10, Pt20, Pt50, Pt100, Pt200, Pt400, PT500, Pt1000, Ni50, Ni100, Ni120, Ni1000  
 Cable Resistance per wire (max.), RTD: 50 $\Omega$   
 Sensor Current, RTD: 0.2mA nominal  
 Cable resistance effect (3/4 wire), RTD: < 0.002  $\Omega/\Omega$   
 Sensor Error Detection, RTD: Yes  
 Short Circuit Detection, RTD: < 15 $\Omega$

**Thermocouple Input:**

Type	Min. value	Max. value	Norm
B	+400°C	+1820°C	IEC 60584-1
E	-100°C	+1000°C	IEC 60584-1
J	-100°C	+1200°C	IEC 60584-1
K	-180°C	+1372°C	IEC 60584-1
L	-200°C	+900°C	DIN 43710
N	-180°C	+1300°C	IEC 60584-1
R	-50°C	+1760°C	IEC 60584-1
S	-50°C	+1760°C	IEC 60584-1
T	-200°C	+400°C	IEC 60584-1
U	-200°C	+600°C	DIN 43710
W3	0°C	+2300°C	ASTM E988-90
W5	0°C	+2300°C	ASTM E988-90
LR	-200°C	+800°C	GOST 3044-84

Cold Junction compensation (CJC) via an internal mounted sensor: <math>\lt; \pm 1^\circ\text{C}</math>

Sensor Error Detection, all TC types: Yes

Sensor Error Current:  
 when detecting: 2 $\mu\text{A}$  nominal  
 else: 0 $\mu\text{A}$

**Current Input:**

Measurement Range: -1 to 25mA

Programmable Measurement Range: 0 to 20mA and 4 to 20mA

Input Resistance: Nominal 20 $\Omega$  + PTC 50 $\Omega$

Sensor Error Detection (loop break): Yes

**Voltage Input:**

Measurement Ranges: -20mV to 12Vdc

Programmable measurement ranges: 0-1 / 0.2-1 / 0- 5 / 1-5 / 0-10 / 2-10 Vdc

**Current Output:**

Signal Range (span):	0 to 20mA
Programmable signal ranges:	0-20 / 4-20 / 20-0 / 20-4 mA
Load (max.):	20mA / 800Ω / 16Vdc
Load Stability:	≤ 0.01% of span / 100Ω
Sensor Error Detection:	0 / 3.5 / 23 mA / None
Current Limit:	≤ 28mA

**Voltage Output:**

Signal Range:	0 to 10Vdc
Programmable Signal Ranges:	0-1 / 0.2-1 / 0-10 / 0-5 / 1-5 / 2-10 / 1-0 / 1-0.2 / 5-0 / 5-1 / 10-0 / 10-2 Vdc
Load (minimum):	500kΩ

**Relay Outputs:**

Relay Functions:	Setpoint, Window, Sensor Error, On/Off
Hysteresis in % / counts:	0.1 to 25% / 1-2999
On/Off Time Delay	0 to 3600 seconds
Sensor Error Detection	Break/Make/Hold
Max. Voltage:	250Vrms
Max. Current:	2A / AC or 1A / DC
Max. AC Power:	500 VA

**Observed Authority Requirements:**

EMC 2004/108/EC (Emissions and Immunity):	EN 61326
LVD 73/23/EEC:	EN 61010-1
UL Safety Standard (Pending):	UL 508

## **Warning 1 – ESD sensitivity**

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**The power supply/signal conditioner should not be opened by anyone other than qualified service personnel.** This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the safety precautions required to avoid injury.

## **Warning 2 – ESD sensitivity**

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This equipment is designed with user safety in mind; however, the protection provided by the equipment may be impaired if the equipment is used in a manner not specified by PCB Piezotronics, Inc.

## **Caution 1 – ESD sensitivity**

---

**Cables can kill your equipment.** High voltage electrostatic discharge (ESD) can damage electrical devices. Similar to a capacitor, a cable can hold a charge caused by triboelectric transfer, such as that which occurs in the following:

- *Laying on and moving across a rug,*
- *Any movement through air,*
- *The action of rolling out a cable, and/or*
- *Contact with a non-grounded person.*

**The PCB solution for product safety:**

- *Connect the cables only with the AC power off.*
- *Temporarily “short” the end of the cable before attaching it to any signal input or output.*

## **Caution 2 – ESD sensitivity**

---

**ESD considerations should be made prior to performing any internal adjustments on the equipment.** Any piece of electronic equipment is vulnerable to ESD when opened for adjustments. Internal adjustments should therefore be done ONLY at an ESD-safe work area. Many products have ESD protection, but the level of protection may be exceeded by extremely high voltage.



Model Number  
**682A06**

# Universal Transmitter/Controller

Revision: A  
ECN #: 32083

**Electrical specifications:**

**Specifications range:**

-20°C to +60°C

**Common specifications:**

Supply voltage, universal ..... 21.6...253 VAC, 50...60 Hz  
or 19.2...300 VDC  
Max. consumption..... ≤ 2.5 W  
Fuse..... 400 mA SB / 250 VAC  
Isolation voltage, test / operation..... 2.3 kVAC / 250 VAC  
Communications interface ..... Programming front 4501  
Signal / noise ratio..... Min, 60 dB (0...100 kHz)  
Response time (0...90%, 100...10%):  
Temperature input ..... ≤ 1 s  
mA / V input..... ≤ 400 mA  
Calibration temperature..... 20...28°C  
Accuracy, the greater of the general and basic values:

General values		
Input type	Absolute accuracy	Temperature coefficient
All	≤ ±0.1% of span	≤ ±0.01% of span / °C

Basic values		
Input type	Basic accuracy	Temperature coefficient
mA	≤ ±4 µA	≤ ±0.4 µA/°C
Volt	≤ ±20 µV	≤ ±2 µV/°C
RTD	≤ ±0.2°C	≤ ±0.01°C/°C
Lin. R	≤ ±0.1 Ω	≤ ±0.01 Ω/°C
Potentiometer	≤ ±0.1 Ω	≤ ±0.01 Ω/°C
TC type: E, J, K, L, N, T,	≤ ±1°C	≤ ±0.05°C/°C
TC type: B, R, S, W3, W5, LR	≤ ±2°C	≤ ±0.2°C/°C

EMC immunity influence .....	≤ ±0.5% of span
Extended EMC immunity: NAMUR NE 21, A criterion, burst.....	≤ ±1% of span

Auxiliary supplies:  
2-wire supply (terminal 44...43) ..... 25...16 VDC / 0...20 mA  
Max. wire size..... 1x2.5 mm² stranded wire  
Screw terminal torque ..... 0.5 Nm  
Relative humidity..... < 95% RH (non-cond.)  
Dimen., without display front (HxBxD), 109 x 23.5 x 104 mm  
Dimensions, w. display front (HxBxD), 109 x 23.5 x 116 mm  
Tightness (enclosure / terminals)..... IP50 / IP20  
Weight ..... 170 g / 185 g with 4501

**RTD, linear resistance and potentiometer input:**

Input type	Min. value	Max. value	Norm
Pt100	-200°C	+850°C	IEC60751
Ni100	-60°C	+250°C	DIN 43760
Lin. R	0 Ω	10000 Ω	-
Potentiometer	10 Ω	100 kΩ	-

Cable resistance p. wire (max.), RTD... 50 Ω  
Sensor current, RTD ..... Nom, 0.2 mA

**Effect of sensor cable resistance**

(3- / 4-wire), RTD ..... < 0.002 Ω / Ω  
Sensor error detection, RTD..... Yes  
Short circuit detection, RTD ..... < 15 Ω

**TC input:**

Type	Min. value	Max. value	Norm
B	+400°C	+1820°C	IEC 60584-1
E	-100°C	+1000°C	IEC 60584-1
J	-100°C	+1200°C	IEC 60584-1
K	-180°C	+1372°C	IEC 60584-1
L	-200°C	+900°C	DIN 43710
N	-180°C	+1300°C	IEC 60584-1
R	-50°C	+1760°C	IEC 60584-1
S	-50°C	+1760°C	IEC 60584-1
T	-200°C	+400°C	IEC 60584-1
U	-200°C	+600°C	DIN 43710
W3	0°C	+2300°C	ASTM E988-90
W5	0°C	+2300°C	ASTM E988-90
LR	-200°C	+800°C	GOST 3044-84

Cold junction compensation (CJC):  
via internally mounted sensor ..... < ±1.0 °C  
Sensor error detection, all TC types, Yes

Sensor error current:  
when detecting..... Nom. 2 µA  
else..... 0 µA

**Current input:**

Measurement range ..... -1...25 mA  
Programmable measurement ranges 0...20 and 4...20 mA  
Input resistance ..... Nom. 20 Ω + PTC 50 Ω

**Voltage input:**

Measurement ranges..... -20 mV...12 VDC  
Programmable measurement ranges 0/0.2...1; 0/1...5; 0/2...10 V  
Input resistance ..... Nom. 10 MΩ

**Current output:**

Signal range (span)..... 0...20 mA  
Programmable signal ranges..... 0/4...20 and 20...4/0 mA  
Load (max.)..... 20 mA / 800 Ω / 16 VDC  
Load stability..... ≤ 0.01% of span / 100 Ω  
Sensor error detection..... 0 / 3.5 / 23 mA / none  
NAMUR NE 43 Upscale / Downscale 23 mA / 3.5 mA  
Current limit ..... ≤ 28 mA

**Voltage output:**

Signal range ..... 0...10 VDC  
Programmable signal ranges..... 0/0.2...1; 0/1...5; 0/2...10;  
1...0.2/0; 5...1/0; 10...2/0 V  
Load (min.)..... 500 kΩ

**Relay outputs:**

Relay functions..... Setpoint, Window, Sensor error, Power and Off  
Hysteresis, in % / display counts..... 0.1...25% / 1...2999  
On and Off delay ..... 0...3600 s  
Max. voltage..... 250 VRMS  
Max. current ..... 2 A / AC or 1 A / DC  
Max. AC power..... 500 VA  
Sensor error detection..... Break / Make / Hold

**Observed authority requirements:**

Standard:  
EMC 2004/108/EC:  
Emission and immunity ..... EN 61326  
LVD 73/23/EEC ..... EN 61010-1  
UL, Standard for Safety ..... UL 508

**OPTIONAL VERSIONS**

Optional versions have identical specifications and accessories as listed for the standard model except where noted below. More than one option may be used.

**682A16**

Instead of "Voltage input" 682A16 has "ICP Voltage Input/Output"

ICP sensor sensitivity..... 8mV/g to 120 mV/g  
with 100mV/g nominal

Programmable measurement ranges:

0-1/0, 2-1/0-5/0-10/2-10 Vdc

ICP mode Output: proportional  
vibration velocity in IPS or mm/s  
with 1.0 IPS pk nominal

**NOTES:**



See PCB Declaration of Conformance PS057 for details.

*All specifications are at room temperature unless otherwise specified.*

ICP® is a registered trademark of PCB Group, Inc.

*In the interest of constant product improvement, we reserve the right to change specifications without notice.*

Form DD030 Rev.F 2/23/99

Drawn: LH	Engineer: GVZ	Sales: JMS	Approved: EB	Spec Number:
Date: 1/26/10	Date: 12/17/09	Date: 1/11/10	Date: 1/4/10	<b>33025</b>



3425 Walden Avenue, Depew, NY 14043 800-959-4464 Fax (716) 684-3823 E-Mail: imisales@pcb.com



2

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REVISIONS

REV	DESCRIPTION	DIN
A	REPLACED 070A80 WITH 070B80	55673

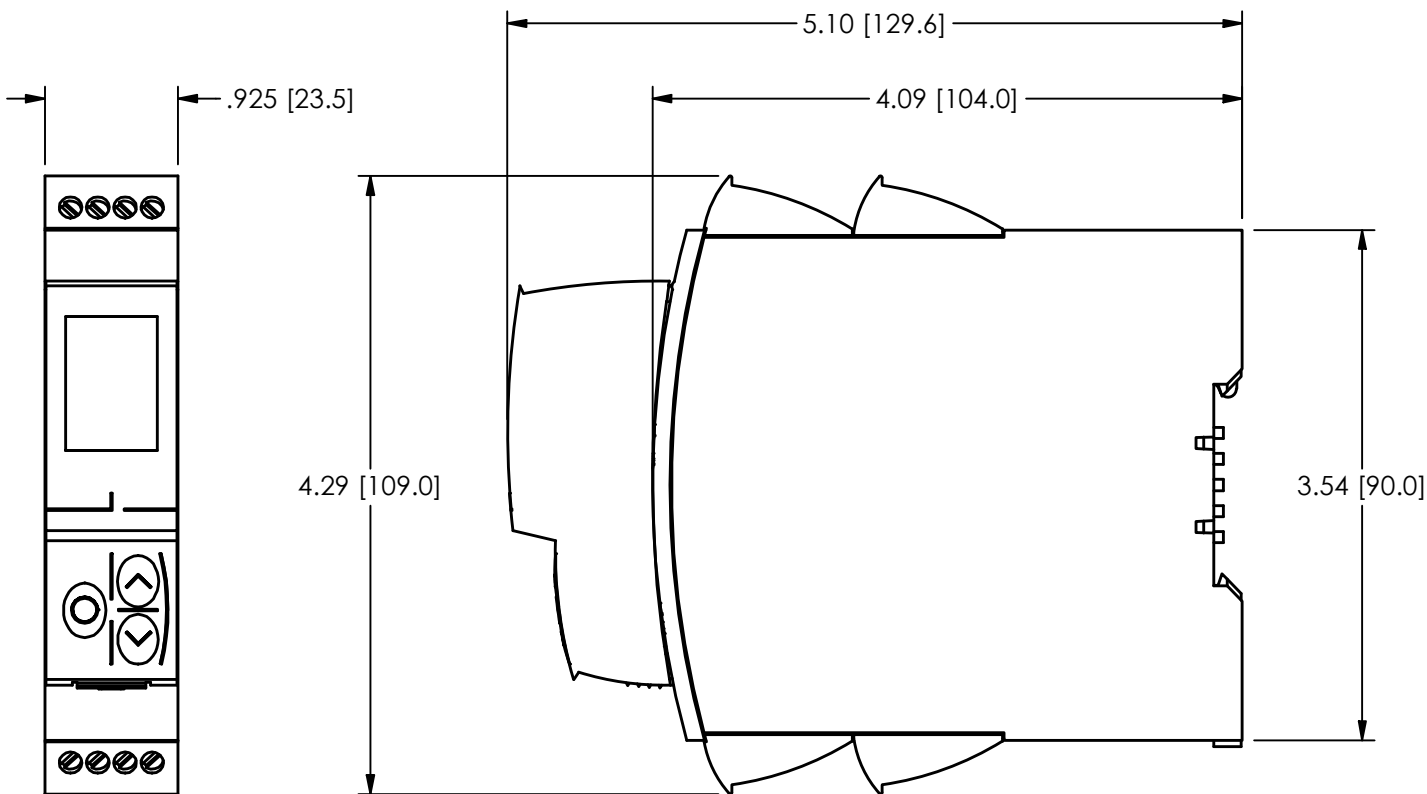
33026

B

B

A

A



1.) SHOWN WITH MODEL 070B80 DISPLAY/PROGRAMMER

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		DRAWN		CHECKED		ENGINEER		<b>PCB PIEZOTRONICS</b> AN AMPHENOL COMPANY 3425 WALDEN AVE. DEPEW, NY 14043 (716) 684-0001 E-MAIL: sales@pcb.com
DIMENSIONS IN INCHES	DIMENSIONS IN MILLIMETERS [IN BRACKETS]	AME	4/11/25	JDM	4/11/25	NF	4/11/25	
DECIMALS XX ±.03 XXX ±.010 ANGLES ± 2 DEGREES	DECIMALS X ± 0.8 XX ± 0.25 ANGLES ± 2 DEGREES	TITLE						
CABLE TOLERANCES IN ENGLISH 1" ≤ LENGTH < 1' = +1" / - 0 1' ≤ LENGTH < 5' = +2" / - 0 5' ≤ LENGTH < 100' = +6" / - 0 100' ≤ LENGTH = +1' / - 0	CABLE TOLERANCES IN METRIC 2.54cm ≤ LENGTH < 30.5cm = +2.54cm / - 0 30.5cm ≤ LENGTH < 1.5m = +5.1cm / - 0 1.5m ≤ LENGTH < 30.5m = +15.2cm / - 0 30.5m ≤ LENGTH = +30.5cm / - 0	OUTLINE DRAWING MODEL 682A06 UNIVERSAL TRANSMITTER						
FILLETS AND RADII .003 - .005	FILLETS AND RADII 0.07 - 0.13	CODE IDENT. NO. 52681		SIZE A		DWG. NO. 33026		SCALE: .75X
						SHEET 1 OF 1		

2

1