



Model 682A16

Universal Transmitter w/ICP Power

Installation and Operating Manual

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

**Toll-free: 800-959-4464
24-hour SensorLine: 716-684-0001
Fax: 716-684-3823
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Web: www.imi-sensors.com**





Warranty, Service, Repair, and Return Policies and Instructions
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The information contained in this document supersedes all similar information that may be found elsewhere in this manual.

Total Customer Satisfaction – PCB Piezotronics guarantees Total Customer Satisfaction. If, at any time, for any reason, you are not completely satisfied with any PCB product, PCB will repair, replace, or exchange it at no charge. You may also choose to have your purchase price refunded in lieu of the repair, replacement, or exchange of the product.

Service – Due to the sophisticated nature of the sensors and associated instrumentation provided by PCB Piezotronics, user servicing or repair is not recommended and, if attempted, may void the factory warranty. Routine maintenance, such as the cleaning of electrical connectors, housings, and mounting surfaces with solutions and techniques that will not harm the physical material of construction, is acceptable. Caution should be observed to insure that liquids are not permitted to migrate into devices that are not hermetically sealed. Such devices should only be wiped with a dampened cloth and never submerged or have liquids poured upon them.

Repair – In the event that equipment becomes damaged or ceases to operate, arrangements should be made to return the equipment to PCB Piezotronics for repair. User servicing or repair is not recommended and, if attempted, may void the factory warranty.

Calibration – Routine calibration of sensors and associated instrumentation is recommended as this helps build confidence in measurement accuracy and acquired data. Equipment calibration cycles are typically established by the users own quality regimen. When in doubt about a calibration cycle, a good “rule of thumb” is to recalibrate on an annual basis. It is also good practice to recalibrate after exposure to any severe temperature extreme, shock, load, or other environmental influence, or prior to any critical test.

PCB Piezotronics maintains an ISO-9001 certified metrology laboratory and offers calibration services, which are accredited by A2LA to ISO/IEC 17025, with full traceability to SI through N.I.S.T. In addition to the normally supplied calibration, special testing is also available, such as: sensitivity at elevated or cryogenic temperatures, phase response, extended high or low frequency response, extended range, leak testing, hydrostatic pressure testing, and others. For information on standard recalibration services or special testing, contact your local PCB Piezotronics distributor, sales representative, or factory customer service representative.

Returning Equipment – *Following these procedures will insure that your returned materials are handled in the most expedient manner.* Before

returning any equipment to PCB Piezotronics, contact your local distributor, sales representative, or factory customer service representative to obtain a Return **Warranty, Service, Repair, and Return Policies and Instructions** Materials Authorization (RMA) Number. This RMA number should be clearly marked on the outside of all package(s) and on the packing list(s) accompanying the shipment. A detailed account of the nature of the problem(s) being experienced with the equipment should also be included inside the package(s) containing any returned materials.

A Purchase Order, included with the returned materials, will expedite the turn-around of serviced equipment. It is recommended to include authorization on the Purchase Order for PCB to proceed with any repairs, as long as they do not exceed 50% of the replacement cost of the returned item(s). PCB will provide a price quotation or replacement recommendation for any item whose repair costs would exceed 50% of replacement cost, or any item that is not economically feasible to repair. For routine calibration services, the Purchase Order should include authorization to proceed and return at current pricing, which can be obtained from a factory customer service representative.

Warranty – All equipment and repair services provided by PCB Piezotronics, Inc. are covered by a limited warranty against defective material and workmanship for a period of one year from date of original purchase. Contact

PCB for a complete statement of our warranty. Expendable items, such as batteries and mounting hardware, are not covered by warranty. Mechanical damage to equipment due to improper use is not covered by warranty. Electronic circuitry failure caused by the introduction of unregulated or improper excitation power or electrostatic discharge is not covered by warranty.

Contact Information – International customers should direct all inquiries to their local distributor or sales office. A complete list of distributors and offices can be found at www.pcb.com. Customers within the United States may contact their local sales representative or a factory customer service representative. A complete list of sales representatives can be found at www.pcb.com. Toll-free telephone numbers for a factory customer service representative, in the division responsible for this product, can be found on the title page at the front of this manual. Our ship to address and general contact numbers are:

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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	○	○	○	○	○	○
PCB板	X	○	○	○	○	○
电气连接器	○	○	○	○	○	○
压电晶体	X	○	○	○	○	○
环氧	○	○	○	○	○	○
铁氟龙	○	○	○	○	○	○
电子	○	○	○	○	○	○
厚膜基板	○	○	X	○	○	○
电线	○	○	○	○	○	○
电缆	X	○	○	○	○	○
塑料	○	○	○	○	○	○
焊接	X	○	○	○	○	○
铜合金/黄铜	X	○	○	○	○	○
本表格依据 SJ/T 11364 的规定编制。						
○：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.

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Model 682A16 Series Universal Transmitter



CE

Operating Guide with Enclosed Warranty Information

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Table of Contents.....

Warnings..... Page 3

Symbol Identification..... Page 4

Safety Instructions..... Page 4

How to Dismantle the 682A16..... Page 5

Model 682A16 Universal Transmitter..... Page 6

070A80 Front Display/Programmer..... Page 7

Applications..... Page 8

Electrical Specifications..... Page 9

Visualization of Sensor Error Detection and Input Signal Outside of Range..... Page 12

Connections..... Page 14

Block Diagram..... Page 15

Configuration / Operating the Function Keys..... Page 16

Routing Diagram..... Page 19

Scrolling Help Text in Display Line 3..... Page 24

Graphic Depiction of Relay Action Setpoint..... Page 25

Graphic Depiction of Relay Action Window..... Page 25

ESD Sensitivity..... Page 26

Warranty/Serviceing

Warranty, Service & Return Procedure..... Page 27

Customer Service..... Page 27

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 applied 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 fixed, 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 682A16 must be mounted on a DIN rail according to DIN 46277.

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.

Safety Instructions

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.

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.

Mounting:

Mounting should be performed only technicians who are familiar with the technical terms, warnings, and instructions in this manual. 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:

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

Calibration and Adjustment:

During calibration and adjustment, the measuring and connection of external voltages must be carried out according to the specifications in this manual. The technician must use tools and instruments that provide an acceptable level of protection from electrical shock.

Normal Operation:

Operators are only allowed to adjust and operate modules that are safely fixed in panels, etc., thus avoiding the danger of personal injury and damage. This means there are no electrical shock hazards, and the module is easily accessible.

Cleaning:

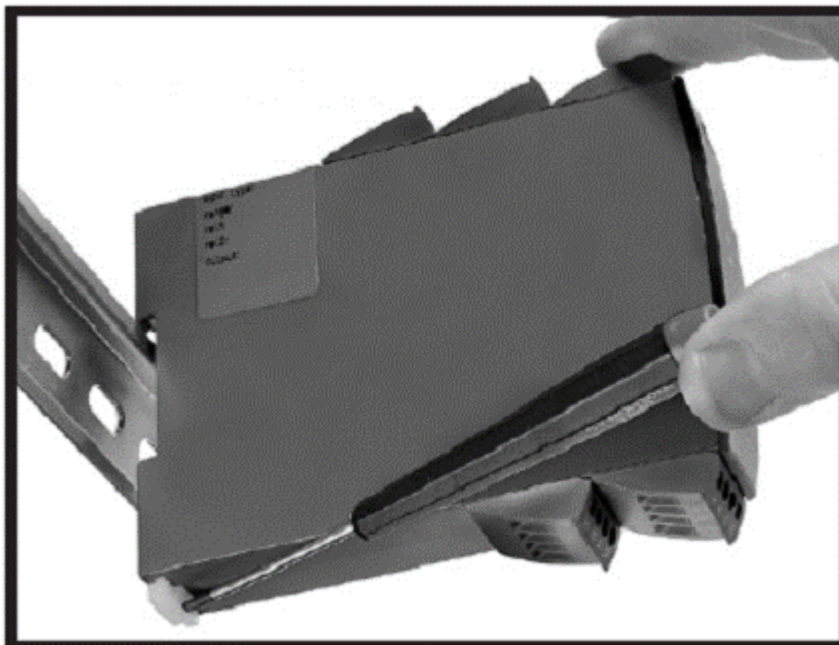
When disconnected, the module may be cleaned with a cloth moistened with distilled water or ethyl alcohol.

Liability:

To the extent that the instructions in this manual are not strictly observed, the customer cannot advance a demand against IMI Sensors that would otherwise exist according to the concluded sales agreement.

How to Dismantle the 682A16

- Demount the connectors with hazardous voltages.
- Detach the module from the DIN Rail by lifting the bottom lock.



Model 682A16 Universal Transmitter

- *Input for RTD, TC, Ohm, Potentiometer, mA and ICPaccelerometers (Volts)*
- *2-wire supply > 16Vdc*
- *Din Rail Mounting*
- *Output for Current, Voltage, and 2Relays*
- *Universal AC or DC Supply*

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:

- Linearised, 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 682A16 is designed according to strict safety requirements and is thus suitable for application in SIL 2 installations.

Technical Characteristics:

- When the 682A16 is used in combination with the 070A80 display/programmer front, all operational parameters can be modified to suit any application. As the 682A16 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.
- 4-port 2.3kVac galvanic isolation.

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 “Configuration/Operating the Function Keys.”

Application:

- Communications interface for modification of operational parameters.
- Can be moved from one 682A16 to another and download the configuration of the first transmitter to subsequent transmitters.
- Fixed display for visualization of process data and status.

Technical Characteristics:

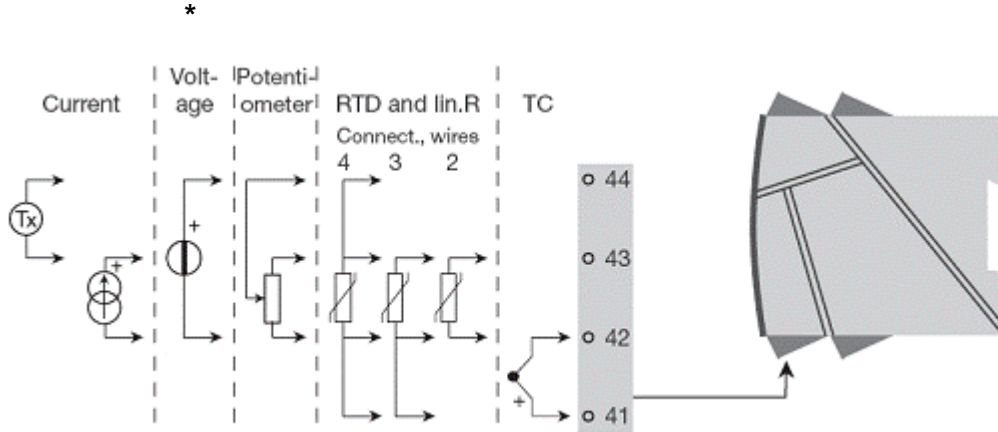
- LCD display with 4 lines; Line 1 (H=5.57mm) shows input signal, Line 2 (H=3.33mm) shows units, Line 3(H=3.33mm) shows analog output or tag number., and Line 4 shows communication and relay status.
- Programming access can be blocked by assigning a password. The password is saved in the transmitter 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 682A16. Installation is indicated by an audible click.

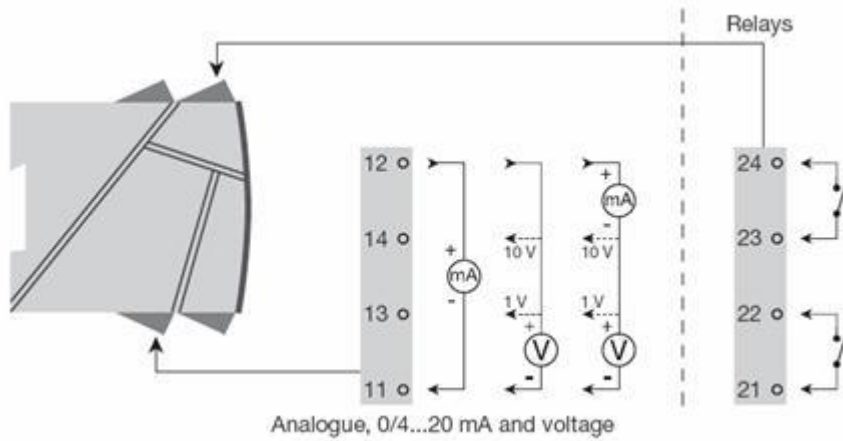
Applications

Input Signals:

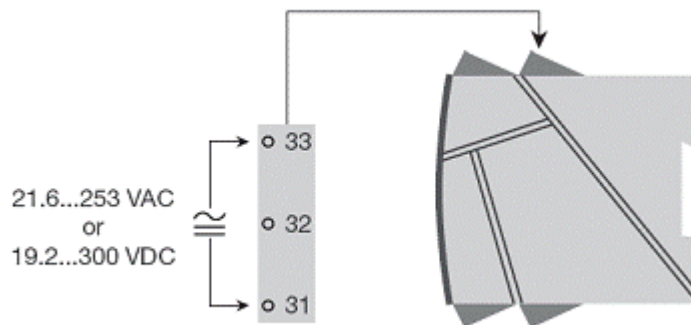


*"Voltage" input here and later means ICP accelerometer input

Output Signals:



Supply:



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

Auxiliary 2 – wire supply (terminals 43 and 44): 25 to 16Vdc / 0 to 20mA

Maximum Wire Size: 1 x 2.5mm²

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 Ω	10000 Ω	-
Potentiometer	10 Ω	100 kΩ	-

RTD Types: Pt10, Pt20, Pt50, Pt100, Pt200, Pt400, PT500, Pt1000, Ni50, Ni100, Ni120, Ni1000

Cable Resistance per wire (max.), RTD: 50Ω

Sensor Current, RTD: 0.2mA nominal

Cable resistance effect (3/4 wire), RTD: < 0.002 Ω/Ω

Sensor Error Detection, RTD: Yes

Short Circuit Detection, RTD: < 15Ω

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: $\pm 1^\circ\text{C}$

Sensor Error Detection, all TC types: Yes

Sensor Error Current: when detecting: 2 μA nominal else 0 μA

Current Input:

Measurement Range:	-1 to 25mA
Programmable Measurement Range:	0 to 20mA and 4 to 20mA
Input Resistance:	Nominal 20 Ω + PTC 50 Ω
Sensor Error Detection (loop break):	Yes

ICP (Voltage) Input:

Measurement Ranges: 8mV/g to 120 mV/g with 100 mV/g nominal (display, voltage and current outputs will be proportional velocity in IPS or mm/s follow the settings)

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

Visualization of Sensor Error Detection and Input Signal Outside of Range

Sensor error check:		
Module:	Configuration	Sensor error detection:
4116	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 No SE.SH for Pt10, Pt20 and Pt50	SE.BR	> ca. 15 kΩ
		SE.SH	< ca. 15 Ω
	RTD, 3-wire No SE.SH for Pt10, Pt20 and Pt50	SE.BR	> ca. 15 kΩ
		SE.SH	< ca. 15 Ω
	RTD, 4-wire No SE.SH for Pt10, Pt20 and Pt50	SE.BR	> ca. 15 kΩ
SE.SH		< ca. 15 Ω	

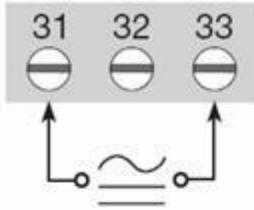
Display readout below min.- / above max. (-1999, 9999):			
Input	Range	Readout	Limit
All	All	-1999	Display readout <-1999
		9999	Display readout >9999

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

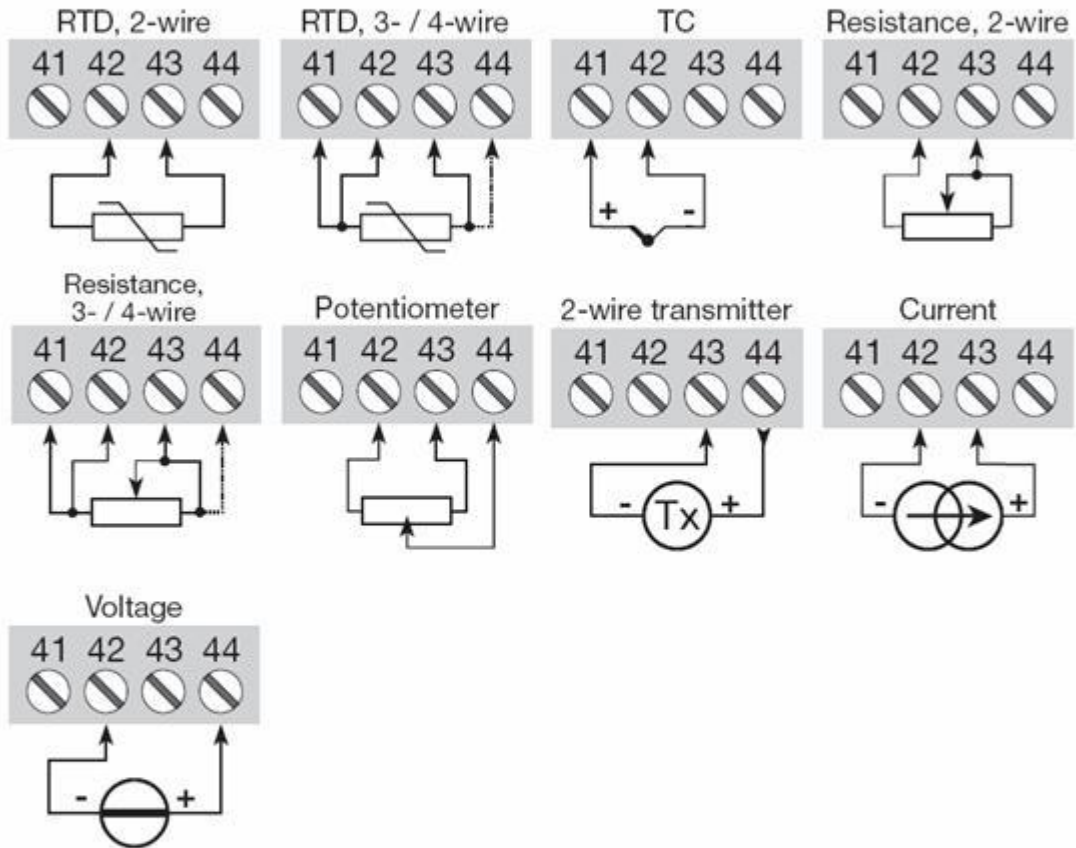
! Error indications in the display blink once a second. The help text explains the error.

Connections

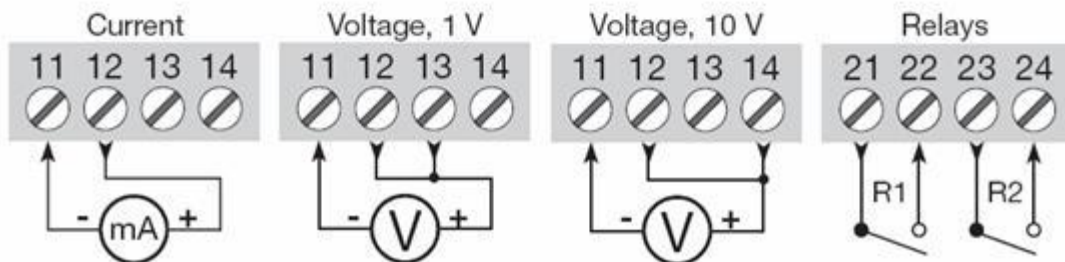
Supply:



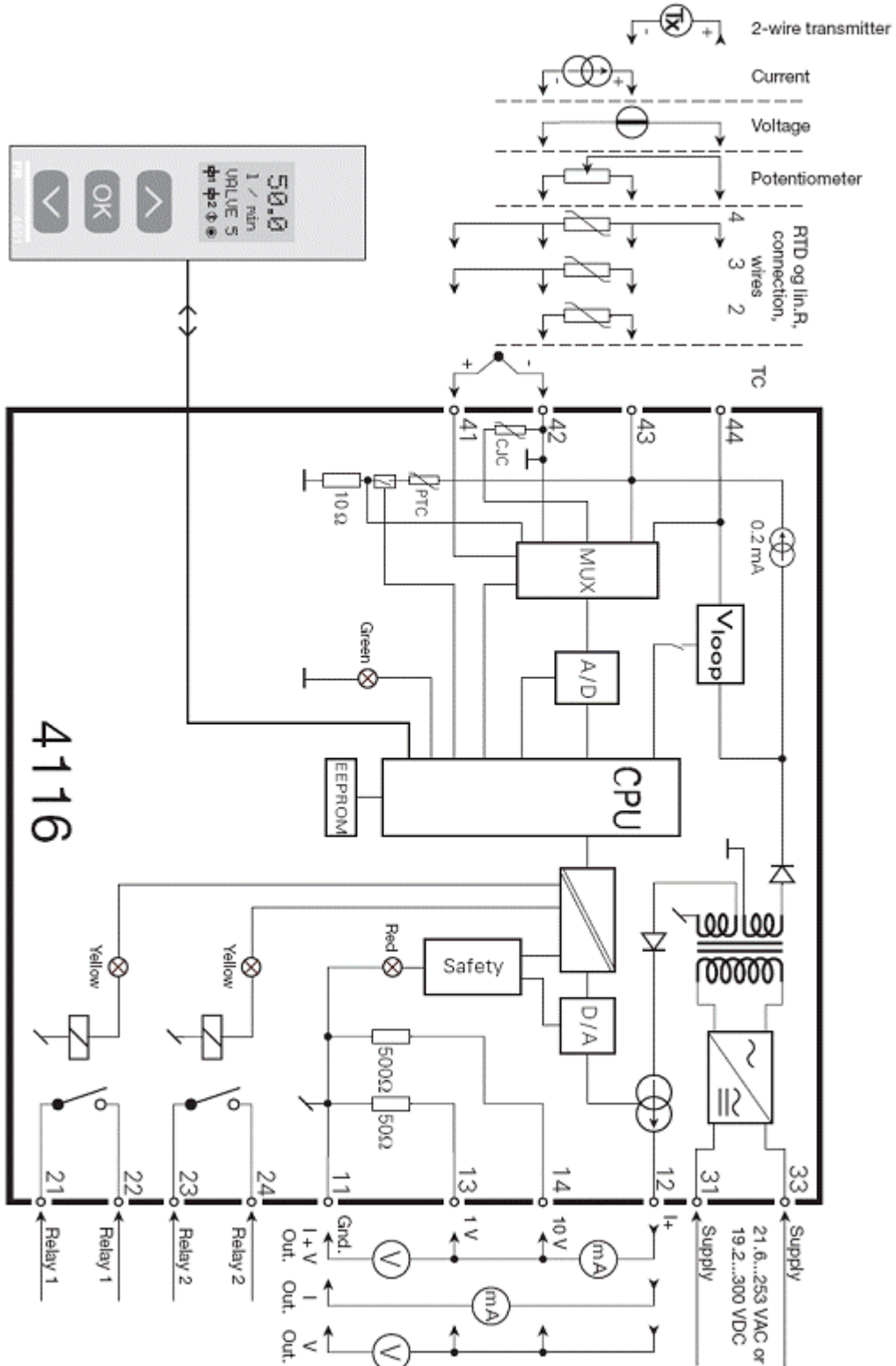
Inputs:



Outputs:



Block Diagram






Configuration / Operating the Function Keys

Documentation for routing diagram.

In General:

When configuring the 682A16, you will be guided through all parameters and you can choose the settings which best fit the applications. 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.
-  Will 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.

Further Explanations:

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: 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. Default password 2008 allows access to all configuration menus.

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.
- Green flashing LED at 1Hz indicates sensor error.
- Steady green LED indicates internal error.
- Steady red LED indicates fatal error.

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: A hysteresis can be set at 0.1 to 25% of the span or between 1 and 2999 counts.

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 you accept to use this calibration, 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 an advanced auto diagnosis of the internal circuits. The following possible error can be displayed on the front panel:

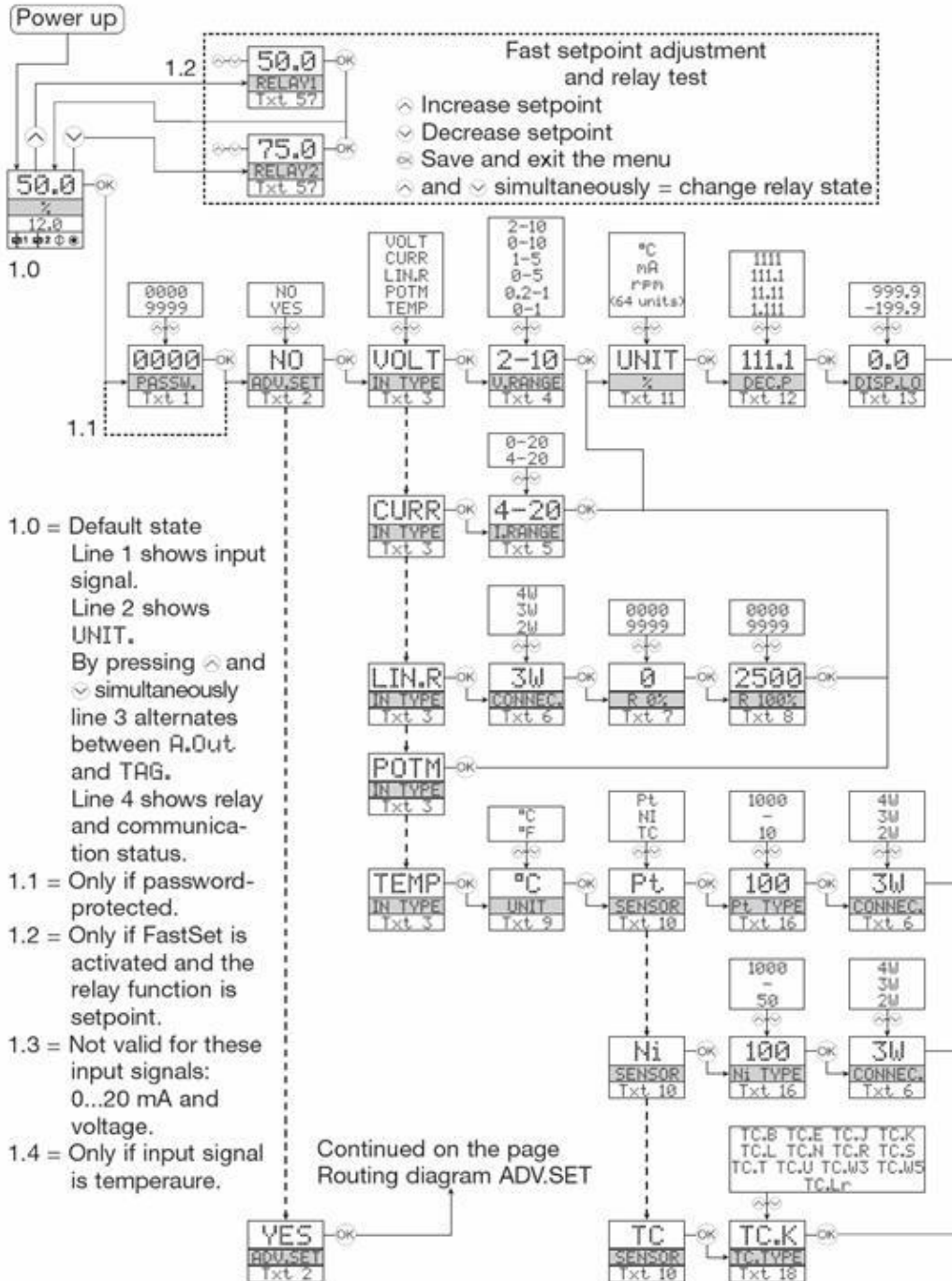
- HW.ER – Permanent Error in the A/D Converter
- CJ.ER – CJC Sensor Error
- RA.ER – Ram Error
- FL.ER – Flash Error
- AO.ER – Analog Output Error
- TY.ER – Configuration in the 682A06 does not match this product type
- NO.CO – Connection Error

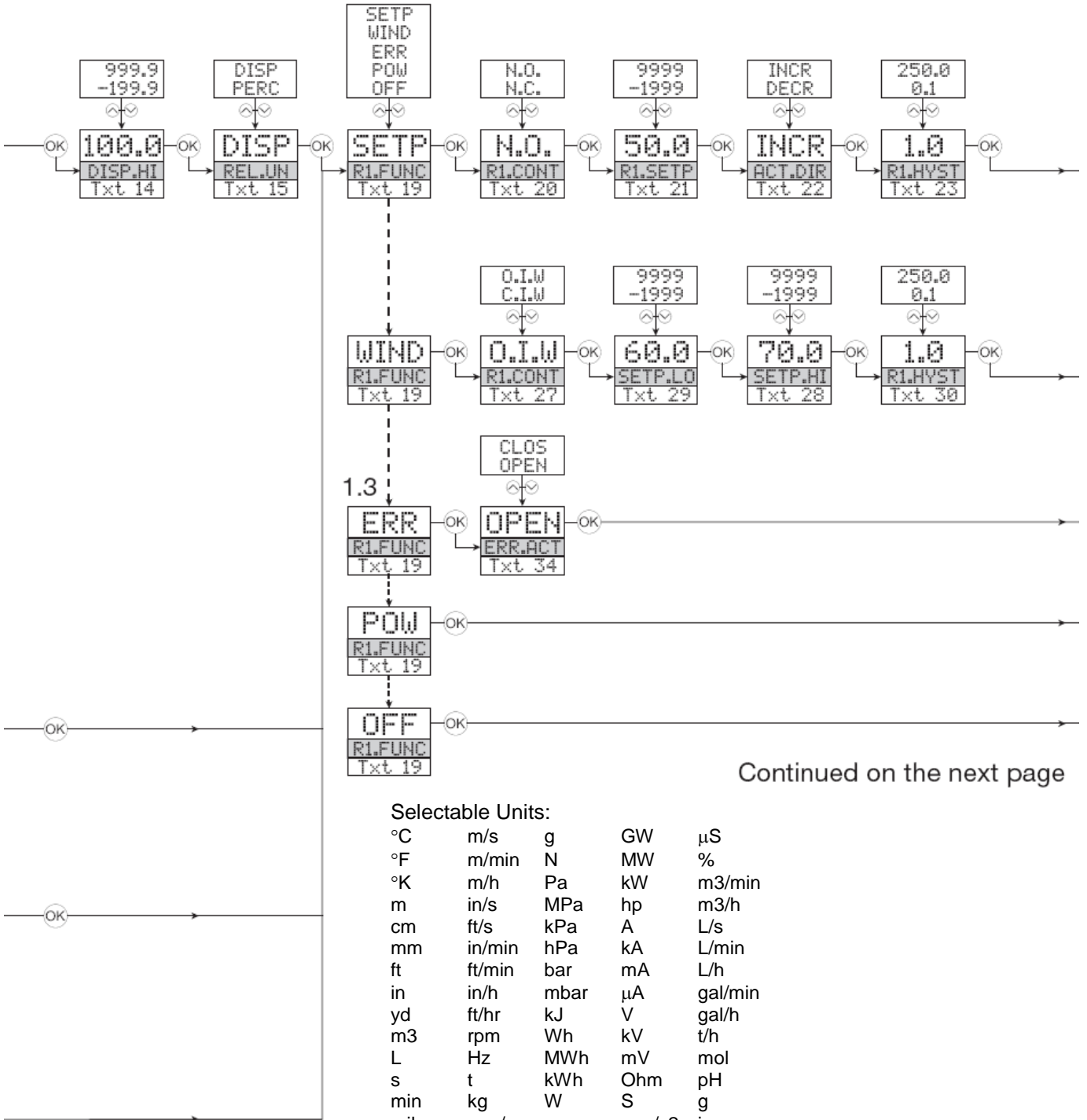
Selection of Units: After choosing the input signal type you can choose which process units should be displayed in text line 2 (see table). By selection of temperature input the process value is always displayed in Celsius or Fahrenheit degrees. This is selected in the menu point after selection of temperature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

Routing Diagram

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
- ∨ Decrease value / choose previous parameter
- ⊞ Save the chosen value and proceed to the next menu
- Hold ⊞ Back to previous menu / return to menu 1.0 without saving

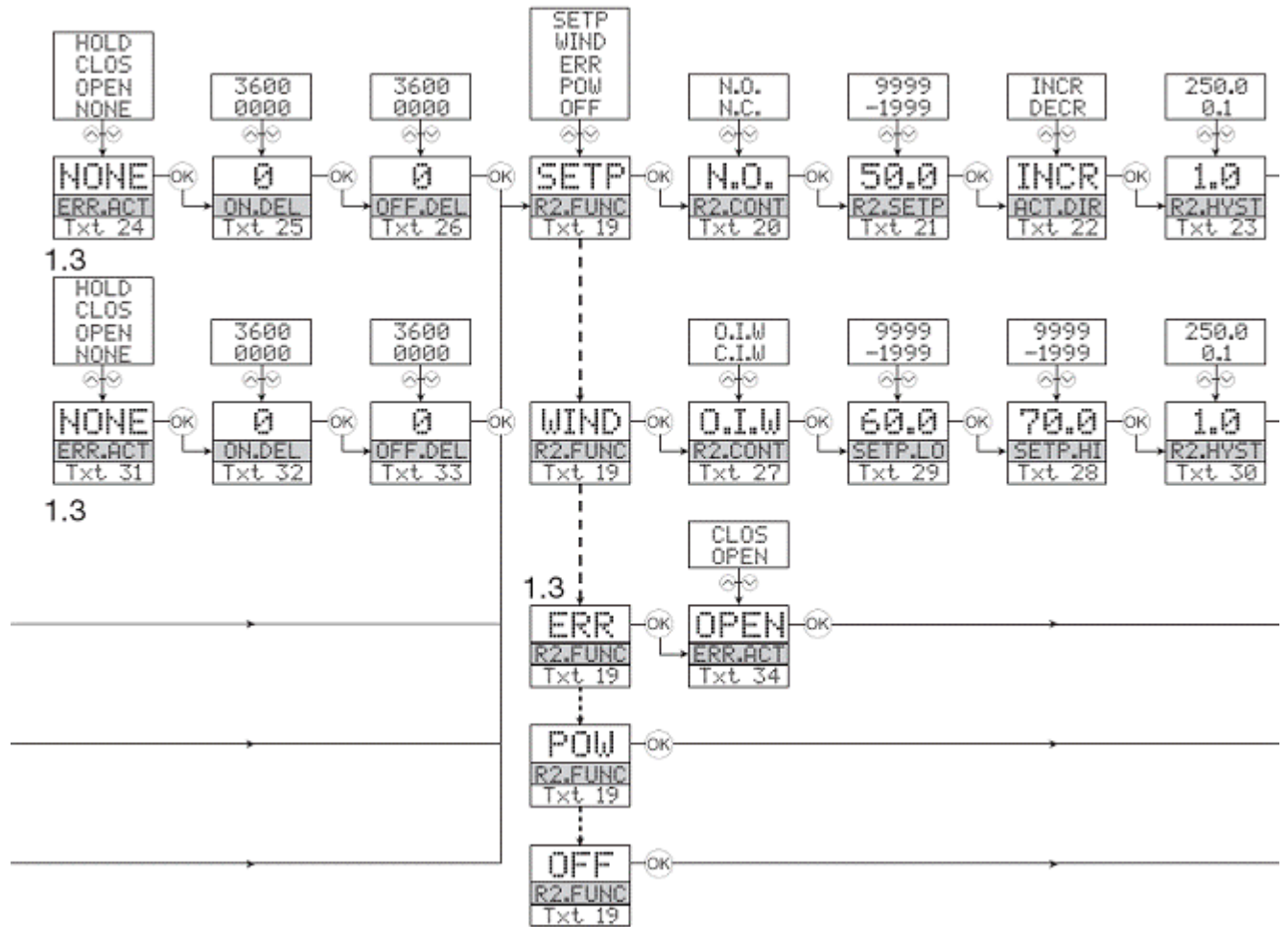


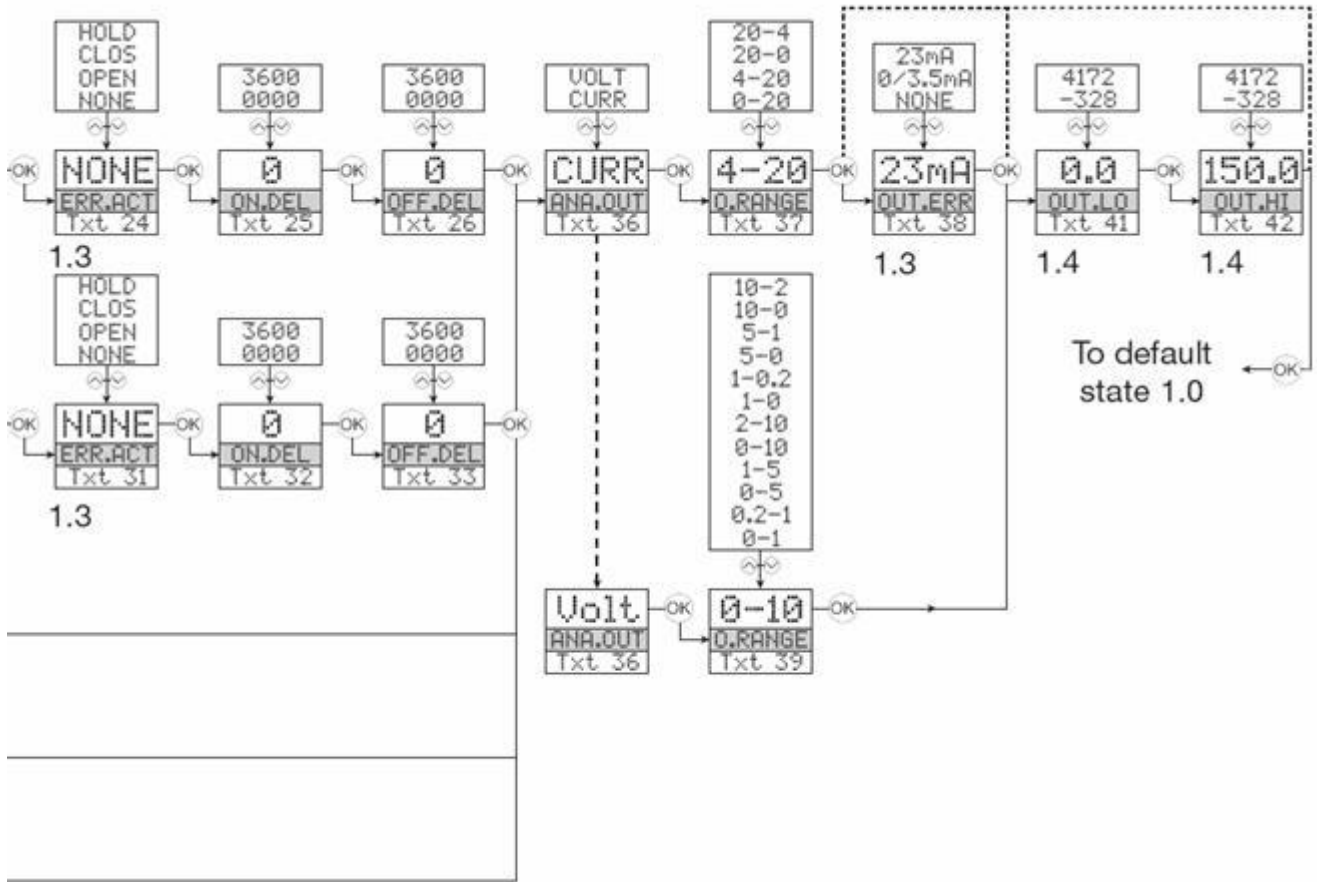


Continued on the next page

Selectable Units:

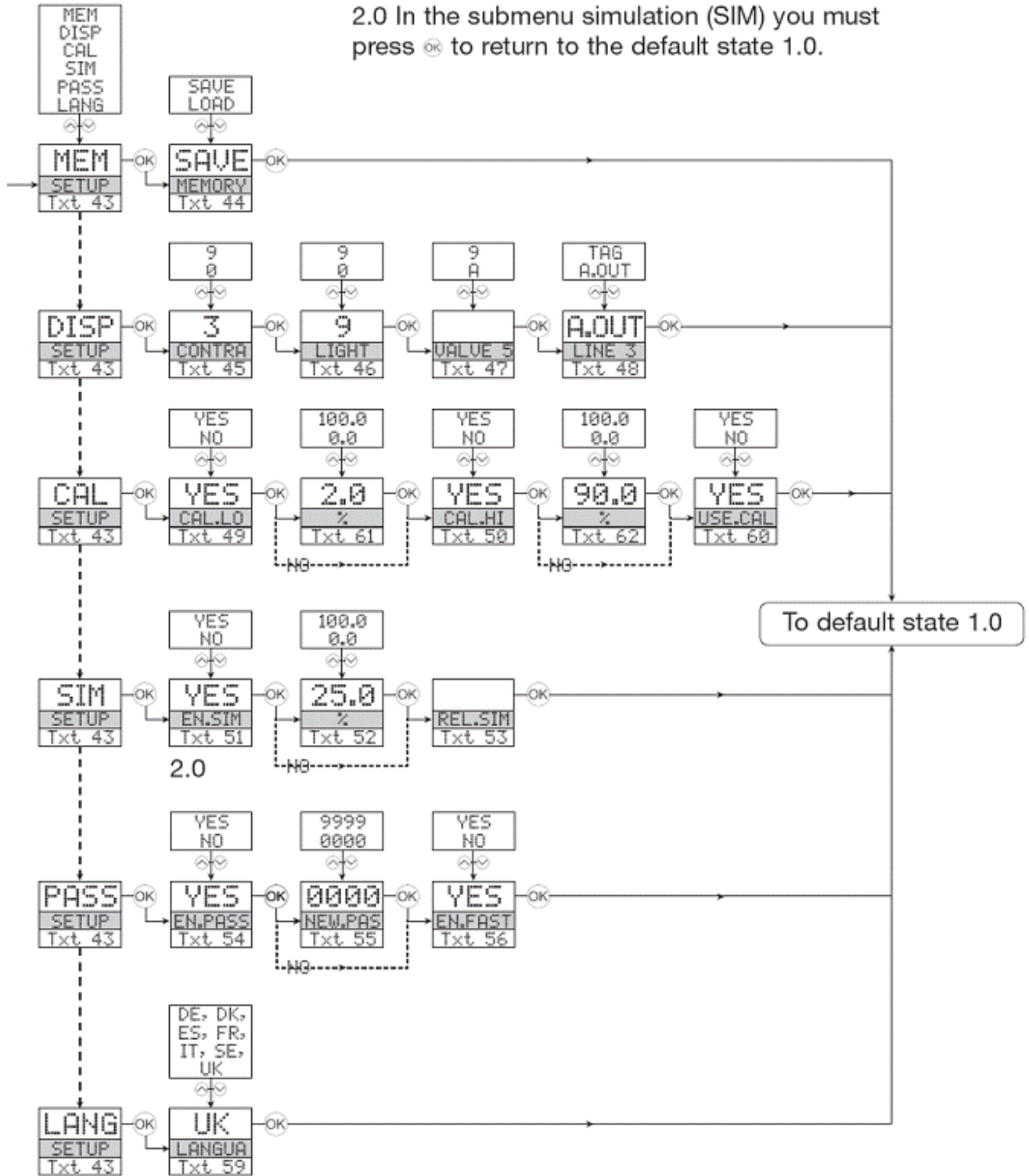
°C	m/s	g	GW	μS
°F	m/min	N	MW	%
°K	m/h	Pa	kW	m3/min
m	in/s	MPa	hp	m3/h
cm	ft/s	kPa	A	L/s
mm	in/min	hPa	kA	L/min
ft	ft/min	bar	mA	L/h
in	in/h	mbar	μA	gal/min
yd	ft/hr	kJ	V	gal/h
m3	rpm	Wh	kV	t/h
L	Hz	MWh	mV	mol
s	t	kWh	Ohm	pH
min	kg	W	S	g
mils	mm/s	μm	mm/s2	ips





Advanced Settings (ADV.SET):

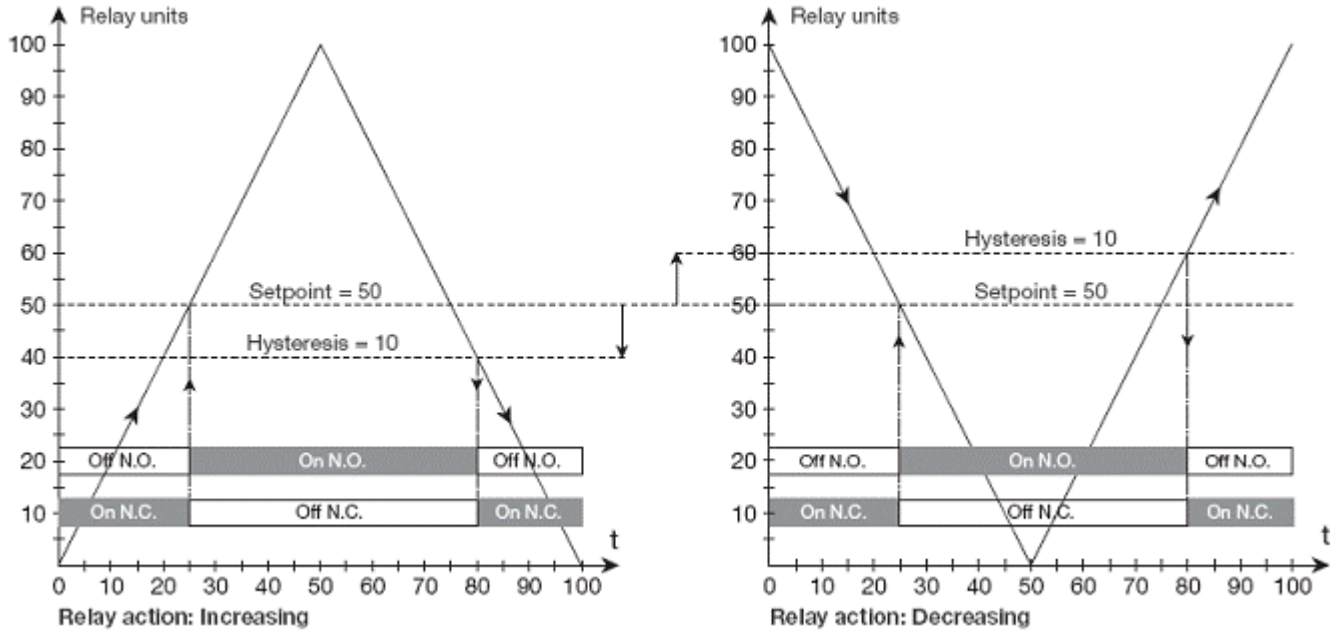
2.0 In the submenu simulation (SIM) you must press **OK** to return to the default state 1.0.



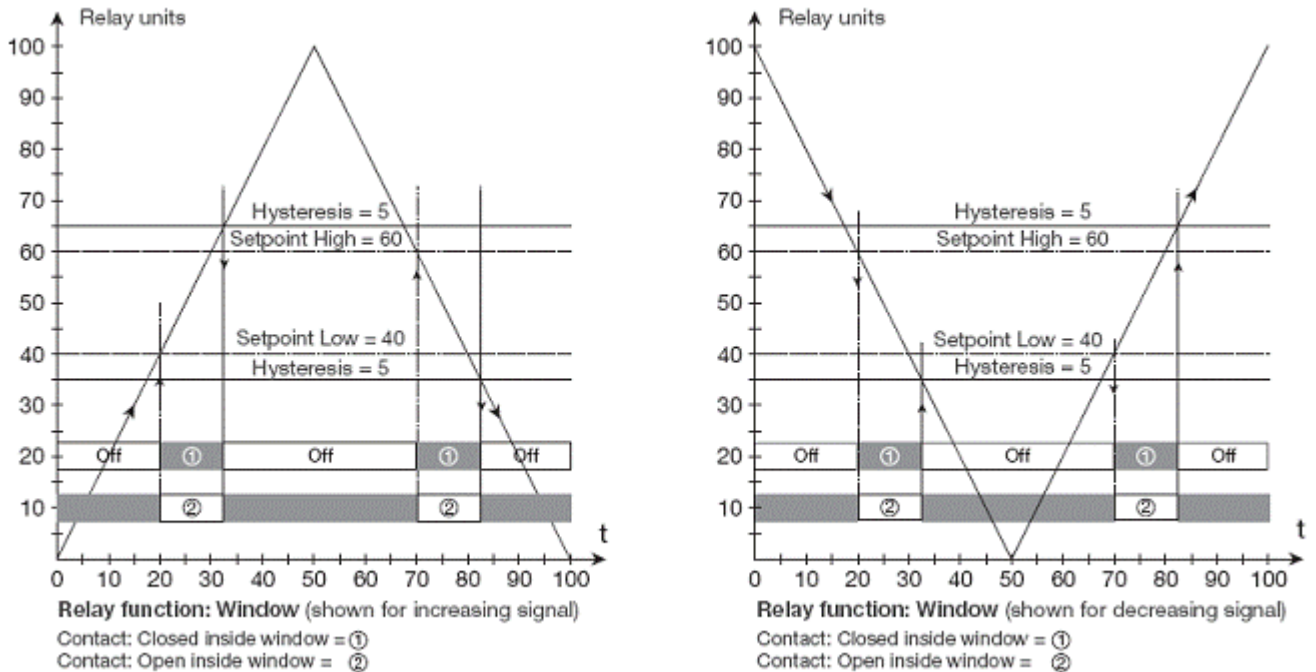
Scrolling Help Text in Display Line 3

- | | |
|---|---|
| [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 ☹ 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 | |

Graphic Depiction of Relay Action Setpoint



Graphic Depiction of Relay Action Window



Warning 1 – ESD sensitivity

er 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

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:

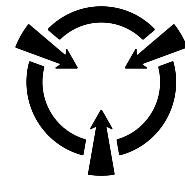
- *Laying on and moving across a rug,*
- *Any movement through air,*
- *The action of rolling out a cable, and/or*
- *Contact with a non-grounded person.*

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.



CAUTION
ELECTROSTATIC
DISCHARGE SENSITIVE



Warranty

IMI instrumentation is warranted against defective material and workmanship for 1 year unless otherwise expressly specified. Damage to instruments caused by incorrect power or misapplication, is not covered by warranty. *If there are any questions regarding power, intended application, or general usage, please consult with your local sales contact or distributor.* Batteries and other expendable hardware items are not covered by warranty.

Service

Because of the sophisticated nature of IMI instrumentation, field repair is typically **NOT** recommended and may void any warranty. If factory service is required, return the instrumentation according to the "Return Procedure" stated below. *A repair and/or replacement quotation will be provided prior to servicing at no charge.* Before returning the unit, please consult a factory IMI applications engineer concerning the situation as certain problems can often be corrected with simple on-site procedures.

Return procedure

To expedite returned instrumentation, contact a factory IMI applications engineer for a RETURN MATERIAL AUTHORIZATION (RMA) NUMBER. Please have information available such as model and serial number. Also, to insure efficient service, *provide a written description of the symptoms and problems with the equipment to a local sales representative or distributor, or contact IMI if none are located in your area.*

Customers outside the U.S. should consult their local IMI distributor for information on returning equipment. For exceptions, please contact the International Sales department at IMI to request shipping instructions and an RMA. For assistance, please call (716) 684-0003, or fax us at (716) 684-3823. You may also receive assistance via e-mail at imi@pcb.com or visit our web site at www.pcb.com.

Customer Service

IMI, a division of PCB Piezotronics, guarantees **Total Customer Satisfaction**. If, at any time, for any reason, you are not completely satisfied with any IMI product, IMI will repair, replace, or exchange it at no charge. You may also choose to have your purchase price refunded.

IMI offers to all customers, at no charge, 24-hour phone support. This service makes product or application support available to our customers, day or night, seven days a week. When unforeseen problems or emergency situations arise, call the **IMI Hot Line at (716) 684-0003**, and an application specialist will assist you.



3425 Walden Avenue, Depew, NY 14043-2495
Phone: (716) 684-0003 • USA Fax: (716) 684-3823 • INTL Fax: (716) 684-4703

*ICP[®] is a registered trademark of PCB Group, Incorporated,
which uniquely identifies PCB sensors that incorporate built-in microelectronics.*

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	33025



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

2

1

33026

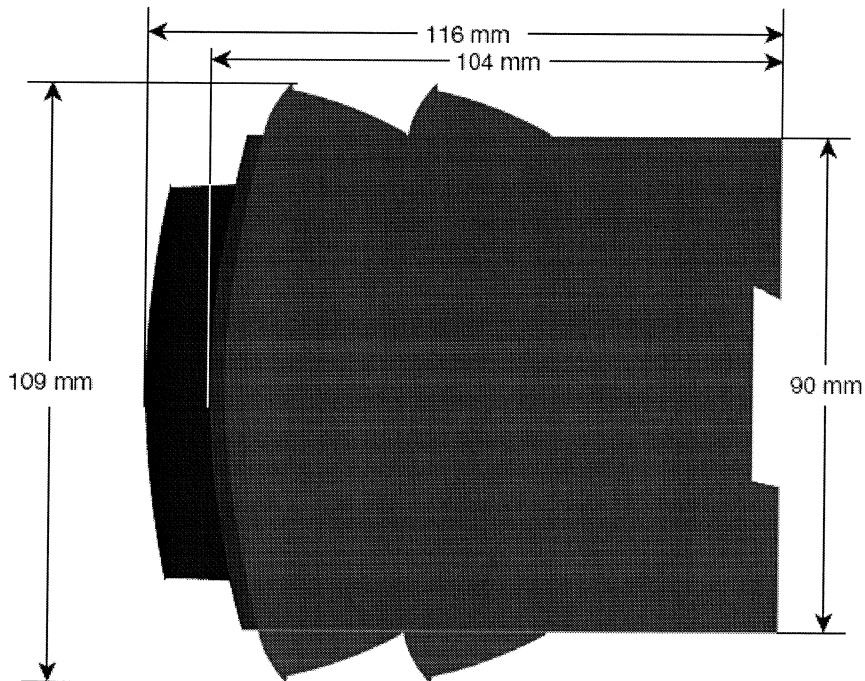
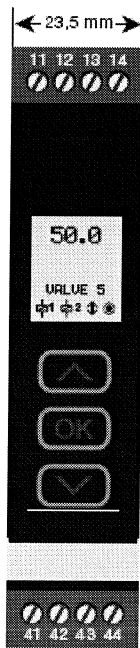
APPLICATION

REVISIONS

NEXT ASS'Y	USED ON	VAR

REV	DESCRIPTION	ECN	APP'D
NR	RELEASED TO DRAFTING		DM 3/06

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1.) SHOWN WITH MODEL 070A80 DISPLAY/PROGRAMMER

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:

DIMENSIONS IN INCHES	DIMENSIONS IN MILLIMETERS [IN BRACKETS]
DECIMALS XX ± .03	DECIMALS X ± 0.8
XXX ± .010	XX ± 0.25
ANGLES ± 2 DEGREES	ANGLES ± 2 DEGREES

DRAWN	ECB	3/15/06	MFG	P.D	3/14/06
CHK'D	DM	3/15/06	ENGR	MJE	3/15/06
APP'D	NA	3/18/06	SALES	EG	3/20/06

PCB PIEZOTRONICS^{INC.}
 3425 WALDEN AVE. DEPEW, NY 14043
 (716) 684-0001 E-MAIL: sales@pcb.com

TITLE
 OUTLINE DRAWING
 MODEL 682A06
 UNIVERSAL TRANSMITTER

CODE IDENT. NO. 52681	DWG. NO. 33026
SCALE: FULL	SHEET 1 OF 1

2

1