V108i Temperature/Process Indicator and Alarm Unit

Installing and Operating Instructions

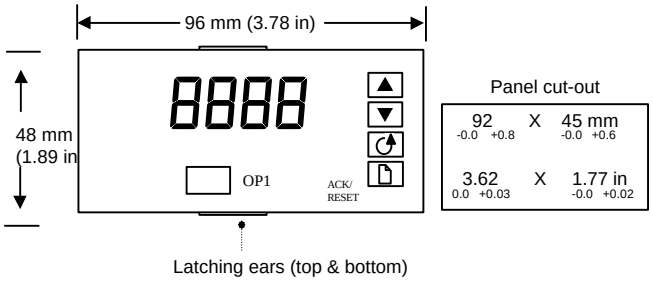
ACTION INSTRUMENTS
...the Industrial I/O Company

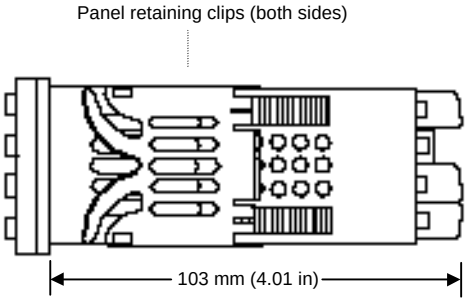
Thank you for choosing the 1/8 DIN indicator and alarm unit. It will provide accurate measurement and display of temperature and other process variables with up to two alarm outputs for operation alert and process protection.

Identification Labels

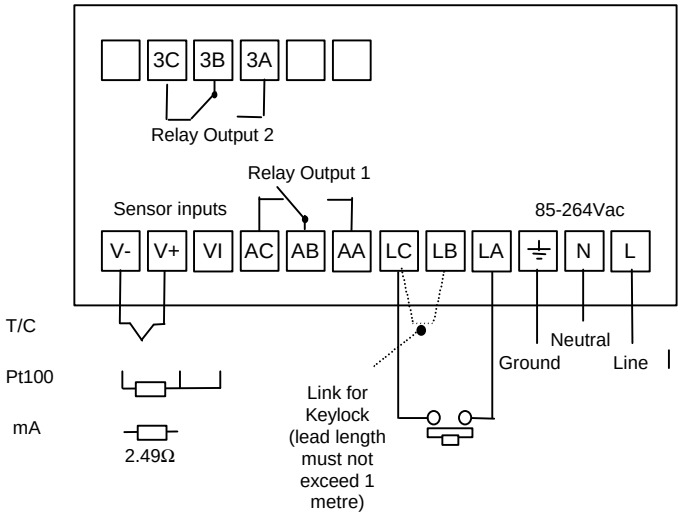
The indicator is identified by a label fixed to the top of the case which gives the serial number and ordering code. The ordering code defines the configuration of your particular indicator. Details of the code are given on page 7.

DIMENSIONS AND INSTALLATION





ELECTRICAL CONNECTIONS



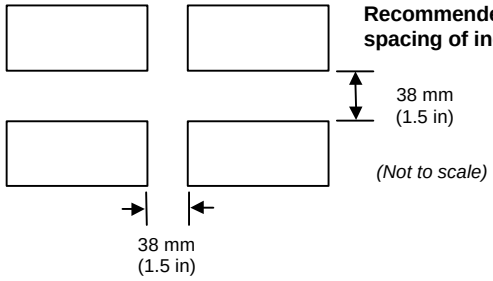
To install the indicator

Please read the safety information on pages 7 & 8 before proceeding.

1. Prepare the panel cut-out to the size shown.
2. Insert the indicator through the cut-out.
3. Spring the panel retaining clips into place. Secure the indicator in position by holding it level and pushing both retaining clips forward.
4. Peel off the plastic film protecting the front of the indicator.

Unplugging the indicator

The indicator can be unplugged from its sleeve by easing the latching ears outwards and pulling it forward out of the sleeve. When plugging the indicator back into its sleeve, ensure that the latching ears click into place to maintain the IP54 sealing.



Relay Ratings

2A, 264Vac resistive

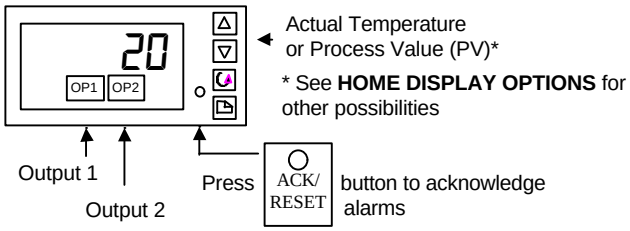
Wire Sizes

The screw terminals accept wire sizes from 0.5 to 1.5 mm (16 to 22 AWG). Hinged covers prevent hands or metal making accidental contact with live wires. The rear terminals screws should be tightened to 0.4Nm (3.5lb in).

CE This indicator meets the European directives on safety and EMC.

OPERATION

Switch on the indicator. After a 3 second self-test sequence, you will see the display shown below. It is called the HOME display.



ALARM INDICATION

The three internal alarms are configurable as high, low or rate of change alarms which alert an operator when a pre-set level (setpoint) has been exceeded. They are flashed as messages in the main display with the following meaning:

Display	Meaning
1---	Alarm 1 is true
2---	Alarm 2 is true
3---	Alarm 3 is true
Sbr	Sensor Break alarm (open circuit input)

In place of dashes the last three letters indicate the alarm type: FSL = Full Scale Low alarm,
FSH = Full Scale High alarm,
rAt = Rate of change alarm.
If other messages are flashed, see **DIAGNOSTIC ALARMS** on page 4.

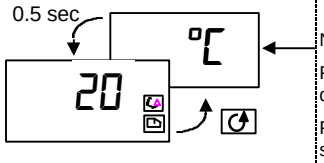
Any combination of the four alarms shown in the table above can operate relay outputs 1 & 2. These would normally provide plant safety interlocks or external audio/visual indication. Alarms are assigned to the relay outputs in accordance with the ordering code.

A relay will operate when any alarm attached to it becomes true. The corresponding beacon, OP1 or OP2 will flash when a new alarm occurs and go steady when the ACK/RESET button is pressed. The relay will remain in the alarm state while the alarm condition persists.

Pressing the ACK/RESET button will acknowledge new alarms and reset any latched alarms that are no longer true.

TO VIEW THE DISPLAY UNITS

In addition to the label set shown on page 1, the temperature units for thermocouple and RTD inputs, are flashed in the main display, as follows: Press and quickly release the [D] or [↺] button. The display units will be flashed for 0.5sec



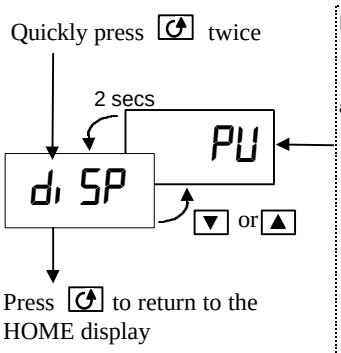
Display Units
°C Celsius
°F Fahrenheit
°K Kelvin
Note: For linear inputs no units are displayed.
Pressing [↺] goes directly to the di SP display - see next column.
Pressing [D] goes directly to the AL List - see next column.

If, at any time you get lost, pressing [D] and [↺] together will always return you to the HOME display.

If, at any time, no key is pressed within 45 seconds, the display will always return to the HOME display.

HOME DISPLAY OPTIONS

When shipped from the factory the HOME display will, by default, show the measured temperature (or PV). You can select alternative HOME displays as follows:



Press [▼] or [▲] to select:

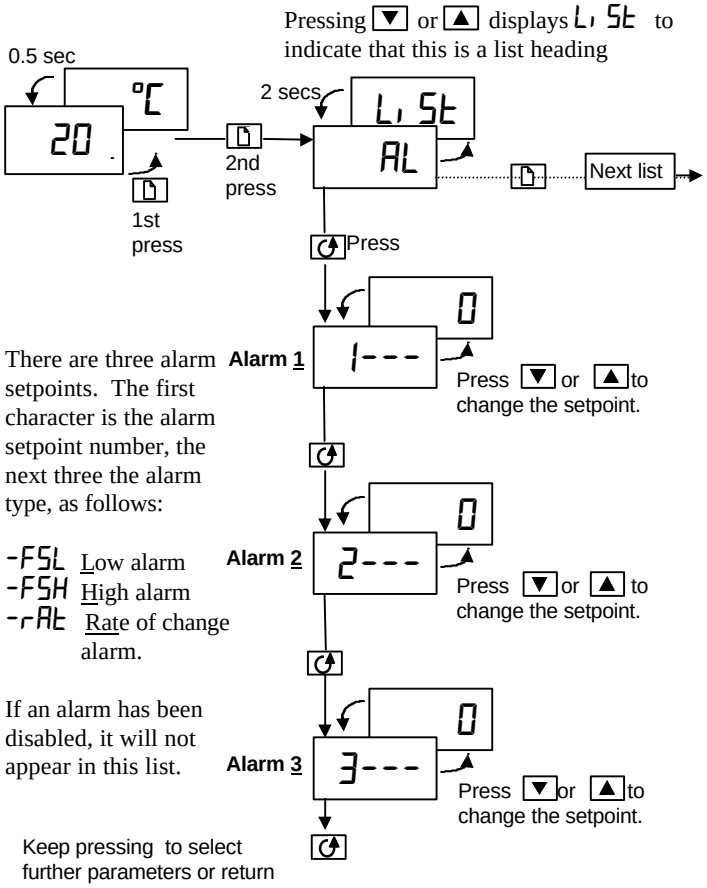
nonE	The HOME display will be blank and only alarm messages will be flashed
PU	The Process value will be displayed
AL.SP	Alarm 1 setpoint will be displayed and can be adjusted by [▼] or [▲]
PU.AL	The Process value will be displayed with Alarm 1 setpoint viewed and adjusted by [▼] or [▲]

To prevent an Operator changing this option, see **TO HIDE, REVEAL AND PROMOTE PARAMETERS** Page 4**.**

TO CHANGE THE ALARM SETPOINTS (TRIP LEVELS)

The [D] button steps through parameter list headings as shown on page 3. The first list is the alarm setpoints list AL.

Quickly press [D] twice to choose the AL list.



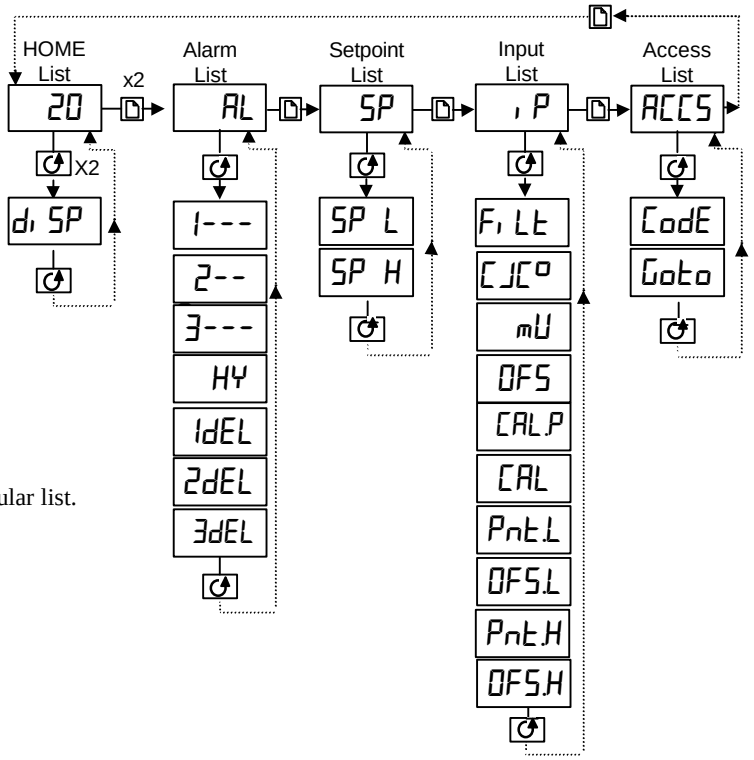
There are three alarm setpoints. The first character is the alarm setpoint number, the next three the alarm type, as follows:

-FSL Low alarm
-FSH High alarm
-rAt Rate of change alarm.

If an alarm has been disabled, it will not appear in this list.

Note: The other parameters listed on page 3 are accessed and adjusted in exactly the same way as this example.

PARAMETER LISTS



Use these lists to change:

- The alarm setpoints (as shown on the previous page)
- The alarm setpoint limits
- The input filter time constant
- User calibration.

The diagram shows the full list of possible parameters. Some may not appear, however, because they are dependant upon the configuration of the indicator.

Select or change parameters

1. Press [D] to step across the list headings.
2. Press [C] to step down the parameters within a particular list. You will eventually return to the list heading.
3. Press [▼] to view the value of a selected parameter. Keep pressing to decrease the value.
4. Press [▲] to view the value of a selected parameter. Keep pressing to increase the value.

PARAMETER TABLES

HOME	**Home List**	Selectable options	Default setting	Customer setting
di SP	HOME display options	See **HOME DISPLAY OPTIONS** page 2	PV	

AL	**Alarm setpoints**	Adjustable Range	Default setting	Customer setting
1---*	Alarm 1 setpoint	Between low and high setpoint limits.	0	
2---*	Alarm 2 setpoint	Note: If the alarm is disabled, the	0	
3---*	Alarm 3 setpoint	parameter will not appear.	0	
HY	Alarm Hysteresis Prevents relay 'chatter' by setting a difference between relay turn ON and relay turn OFF value	1 to 9999 display units	1	
IdEL	Alarm 1 delay — Used to ignore transient alarms.	OFF to 999.9 seconds	0	
2dEL	Alarm 2 delay — Alarms must be true for the set	OFF to 999.9 seconds	0	
3dEL	Alarm 3 delay — time before they become active	OFF to 999.9 seconds	0	

*In place of dashes, the last three letters indicate the alarm type: FSL = Low alarm. FSH = High alarm. rAt = Rate of change alarm

SP	**Setpoint limits**		Adjustable Range	Default setting	Customer setting
SP L	Alarm setpoint low limit	Prevents alarms from	Between Process Value min and max	As order code else PV min & max	
SP H	Alarm setpoint high limit	being set out of range			

, P	**Input List**		Adjustable Range	Default setting	
F, LE	Input filter time constant Reduces display flicker due to process noise.		OFF to 999.9 seconds	1.6	
CJC°	Cold junction compensation temperature (T/C inputs only) measured at the rear terminals.			Read-only	Read-only
mV	mV input measured at the rear terminals			Read-only	Read-only
OFS	PV offset Customer set fixed calibration offset which applies over the whole display range		-1999 to 9999 display units	0	
CAL.P	Calibration password (See **USER CALIBRATION**)		0 to 9999	3	
CAL	Calibration type.		FACt Restores Factory calibration USEr User calibration applies	FACt	
PnE.L	Low calibration point	These parameters	-1999 to 9999 display units	0	
OFS.L	Low point offset	appear only if	-1999 to 9999 display units	0	
PnE.H	High calibration point	USEr calibration	-1999 to 9999 display units	100	
OFS.H	High point offset	selected	-1999 to 9999 display units	0	

ACCS	**Access list**	Used for re-configuring the indicator. See the next page for details

TO HIDE, REVEAL AND PROMOTE PARAMETERS

The Pro (Promote) option

Up to twelve commonly used parameters can be 'promoted' into the HOME list. This will give the operator quick access to them by simply pressing the ⟳ button. This feature, used in combination with 'hide' and 'read only', allows you to organize the way in which you want your indicator formatted.

Select EDIT level to hide, reveal or promote parameters as below:

ACCS — Press ⌂ until the Access List Heading is reached.

Press ⟳

PASS / CodE — Press ▼ or ▲ to enter the password. The factory default password is 1. 'PASS' will be displayed momentarily when the correct password has been entered.

Press ⟳

Edit / Goto — Press ▼ or ▲ to select 'Edit' level.
Other options are:
- OPEr Operator level - shows selected parameters
- FuLL Reveals the 'FULL' set of parameters
- ConF Gives access to configuration level. (see **CONFIGURING THE INDICATOR**)

Press ⟳ to return to the Access list header.

ACCS — You are now in Edit level. Press ⌂ and ⟳ to select a parameter in the normal way. If no button is pressed for 45 secs the display returns to operator level.

Edit Level Example:

HidE / 2FSH — High alarm 2 has been selected. When ▼ or ▲ is pressed, instead of displaying the parameter value, its availability in Operator level is shown as follows:
- ALtr The parameter will be alterable
- HidE The parameter will be hidden.
- rEAd The parameter will be read-only
- Pro The parameter will be 'promoted' into the HOME list (see below).

Promote Level Example:

Pro / 1FSL — Low alarm 1 has been selected
Press ▼ or ▲ to choose Pro.

The parameter 1FSL will now appear in the HOME list. Repeat the procedure for any other parameters you wish to promote. To de-promote a parameter go to Edit level, select the parameter from the relevant list and change the choice from Pro back to ALtr, rEAd or HidE.

Returning to Operator level

Repeat the above procedure for all the parameters you wish to hide, promote, or make read-only then return to operator level:

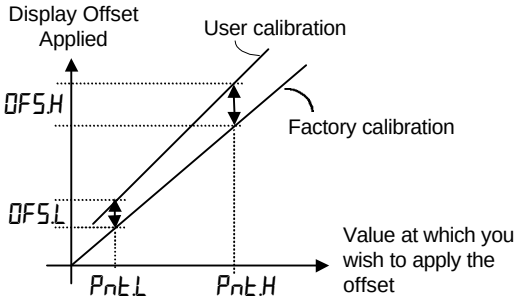
OPEr / Goto
1. Press ⌂ until you reach the ACCS list heading
2. Press ⟳ until you reach Goto
3. Press ▼ or ▲ to select OPEr
4. Press ⌂ to return to Operator level

USER CALIBRATION

Your indicator has been calibrated for life against known reference sources in the factory. User calibration allows you to apply offsets to compensate for sensor and other system errors. You can apply a simple fixed offset over the whole display range using the parameter OFS in the ,P list, or alternatively, you may apply a 2-point calibration as follows:

- Press ⌂ until you reach the ,P list
- Press ⟳ until you reach the CAL.P parameter
- Press ▼ or ▲ to enter the password. The factory default password is 3. PASS will be displayed when correct.
- Press ⟳ to reach the CAL parameter
- Press ▼ or ▲ to select USEr (FAct will restore the factory calibration)
- Press ⟳ to select Pnt.L
- Press ▼ or ▲ to adjust the value at which you wish to apply the low calibration point offset. (e.g. zero)
- Press ⟳ to select OFS.L
- Press ▼ or ▲ to set the low calibration point offset.
- Repeat the above to select and adjust Pnt.H and OFS.H

The graph below shows the effect of a low and high point offset.



DIAGNOSTIC ALARMS

These warn that a fault exists in either the indicator or the connected devices.

Alarm	What it means	What to do about it
EE.Er	*Electrically Erasable Memory Error:* The value of an operator or configuration parameter has been corrupted.	This fault will automatically take you into configuration level. Check all of the configuration parameters before returning to operator level. Once in operator level, check all of the operator parameters before resuming normal operation. If the fault persists or occurs frequently, contact your agent.
S.br	*Sensor Break:* Input sensor is open circuit.	Check that the sensor is correctly connected.
LLLL	*Out of range low reading*	Check the value of the input
HHHH	*Out of range high reading*	Check the value of the input
Err1	*Error 1:* ROM self-test fail	Return the indicator for repair
Err2	*Error 2:* RAM self-test fail	Return the indicator for repair
Err3	*Error 3:* Watchdog fail	Return the indicator for repair
Err4	*Error 4: Keyboard failure* Stuck button, or a button was pressed during power up.	Switch the power off and then on without touching any of the indicator buttons.

CONFIGURING THE INDICATOR

To select configuration level

ACCS Press [D] to reach the Access List Heading.

Press [S]

CodE PASS Use [▼] or [▲] to enter the password. The factory default password is 1. PASS will be displayed when the correct password has been entered.

Press [S]

Goto conF Use [▼] or [▲] to select conF

Press [S]

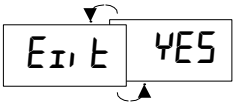
ConF PASS Use [▼] or [▲] to enter the configuration level password. The factory default password is 2. PASS will be displayed when the correct password has been entered.

Press [S] to enter configuration level.

Select configuration level to change:

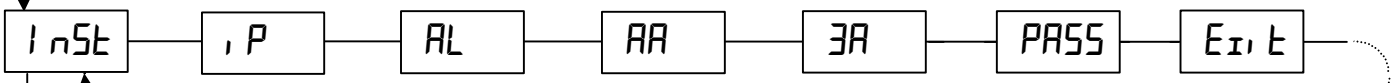
- The display units
- The input sensor type
- The scaling of linear inputs
- The alarm configuration
- The relay output configuration
- The passwords.

To Exit Configuration level



Press [D] to reach the EXIt display
Press [▼] or [▲] to select YES
The instrument will restart in Operator Level.

→ Press [D] to step across the configuration list headings.



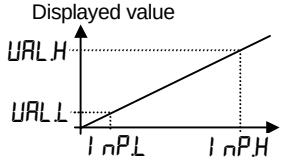
Having selected a list heading, press [D] to select a parameter within a particular list.

Press [▼] or [▲] to view the parameter. Keep pressing to change the value.

InSt	**Instrument configuration list**	Options	Meaning	Default setting	Customer setting
unit	Display units	°C °F °K none	Celsius Fahrenheit Kelvin None (for linear inputs)	Defined by the ordering code, otherwise °C	
dECP	Decimal places in display	nnnn nnn.n nn.nn	None One Two	Defined by the ordering code, otherwise nnnn	
Ac.bu	Front panel Ack/Reset button enable	YES no	YES = Button enabled no = Button disabled	YES	

inP	**Sensor Input configuration list**	Options	Meaning	Default setting	Customer setting
inPt	Input type NOTE: *After selecting an input type, do not forget to adjust the setpoint limits in Full Access level.*	J.tc K.tc L.tc r.tc b.tc n.tc t.tc S.tc PL 2 rtd C.tc mV	J thermocouple K thermocouple L thermocouple R thermocouple B thermocouple N thermocouple T thermocouple S thermocouple Platinell II 100Ω Platinum resistance thermometer Custom input C thermocouple = default* Linear milli volt	Defined by the ordering code otherwise K.tc ** If a different custom input is supplied, C.tc will be replaced by the table reference number listed on page 7,* ***Ordering Code***	
CJC	Cold junction compensation *(CJC does not appear for mV or rtd inputs. For mV see 'Linear input scaling' on page 6)*	Auto 0°C 45°C 50°C	Automatic 0°C external reference 45°C external reference 50°C external reference	Auto	
imP	Sensor break input impedance threshold	OFF Auto Hi Hi Hi	No sensor break (linear inputs only) 1.5KΩ / 5KΩ / 15KΩ — If the sensor input exceeds this value, the sensor break alarm will be activated.	Auto	

Linear input scaling (-9.99 to +80.00mV). These parameters appear after inPt whenever a linear mV input is configured. This allows the low and high displayed values to be set up against the corresponding mV inputs.					
			Displayed value	Default setting	Customer setting
InPL	mV input low			0	
InPH	mV input high			50	
VALL	Displayed value low			0	
VALH	Displayed value high			50	



Alarm Configuration

Alarms are used to alert an operator when a pre-set level or condition has been exceeded. They are normally used to switch a relay output - to provide interlocking of the machine or plant or external audio or visual indication of the condition.

The AL list configures the three internal 'soft' alarms and causes the appropriate alarm message to be flashed in the HOME display.

Soft Alarms are a visual warning message within the indicator. To attach a soft alarm to activate a relay see **'Relay outputs 1 and 2 Configuration'**.

AL	**Alarm type conf**	Options	Meaning	Default setting	Customer setting		
AL 1	Alarm 1 type	OFF	The alarm is disabled	AL 1, AL2,	Alarm number		
		FSL	Full Scale Low alarm The PV exceeds a set low level	and AL3	1	2	3
		FSH	Full Scale High alarm The PV exceeds a set high level	As order code,			
		rAt	Rate of change, -1999 to 1999 display units per min. 0 = OFF	otherwise OFF			
		rAS	Rate of change, -1999 to 1999 display units per sec. 0 = OFF				
Ltch	Alarm latching	no	Non-latching	As order code,			
		YES	Latched with automatic resetting (Note 1)	otherwise no			
		mAn	Latched with manual resetting (Note 2)				
bLoc	Alarm blocking	No	No blocking	no			
		YES	Blocked until first good. (Note 3)				
The above sequence is repeated for: AL 2 (alarm 2) and AL 3 (alarm 3)							

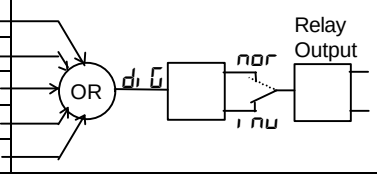
Notes:
1. Automatic resetting means that, once the alarm has been acknowledged, it will automatically clear when it is no longer true.
2. Manual resetting means that the alarm must first clear before it can be reset.
3. In blocking mode, after power on, the process value must first enter a good state before the alarm becomes active. This is particularly useful for low alarms which can be 'blocked' while the process is warming up.

Relay outputs 1 and 2 Configuration

The AA and 3A lists allow the three internal 'soft' alarms to be attached to relay outputs 1 and 2 respectively.

Note: AA is the terminal number for output 1 and 3A is the terminal number for output 3.

AA	**Relay output 1 configuration**	Options	Meaning	Default setting		Customer setting	
3A	**Relay output 2 configuration**			AA	3A	AA	3A
Id	Identity of output	rELY	Relay	rELY	rELY	Read only	
Func	Function of output	nonE	None Output disabled	diG	diG		
		diG	Digital alarm output				
SEnS	Sense of the output.	nor	Normal (relay energized in alarm)	Inv	Inv		
		Inv	Inverted (relay de-energized in alm)				
To Attach Alarms to the Relay Outputs. Any of the following alarms can be combined to operate the selected relay output. Press ↺ to select a particular alarm. Press ▼ or ▲ to select YES if you want it to operate the relay. Select no to disconnect a given alarm.							
			Attaching alarms to a relay	Output 1	Output 2	Output 1	Output 2
1---*	Alarm 1	YES / no		As order code			
2---*	Alarm 2	YES / no		otherwise no,			
3---*	Alarm 3	YES / no		Sbr defaults			
Sbr	Sensor break alarm	YES / no		to YES on both			
nw	New alarm	YES / no		outputs			



* The last three letters will correspond to the alarm type set in the AL list. If the alarm is disabled, AL 1 or AL 2 or AL 3 will be shown.

Passwords

PASS	**Passwords configuration**	Range		Default setting	Customer setting
ACCP	Full and Edit level password	0-9999		1	
CnFP	Configuration level password	0-9999		2	
CALP	User calibration password	0-9999		3	

ORDERING CODE

The indicator is supplied confugured according to the ordering code shown below. Here is an example model number **V108-AL/GN/VH.**

Model number	Function		Display color		Supply voltage	
V108i	AL	Alarm unit	GN	Green display	VH	85-264Vac
			RD	Red display		

If preferred, the factory can preconfugure the indicator using the optional configuration code as a second item ordered. Here is an example configuration code, **C620-FH/FL/ENG/J/-210/1200/C/XX**

Configuration Model Number	Relay Output 1	Relay Output 2	Manual	Sensor input	Range min	Range max	Units	Input Adaptor
C620			**ENG**		Note 1	Note 1		

Relay Output 1	
XX	Not fitted
RF	Fitted unconfigured
Un latched alarms	
FH	High alarm 1
FL	Low alarm 1
AL	High alarm 1 & low alarm 3
RA	Rate-of -change alarm 1
Latched alarms	
HA	High alarm 1
LA	Low alarm 1
RT	Rate-of -change alarm 1
AA	High alarm 1 & low alarm 3
NW	New alarm status

Relay Output 2	
XX	Not fitted
RF	Fitted unconfigured
Un latched alarms	
FH	High alarm 2
FL	Low alarm 2
RA	Rate-of -change alarm 2
Latched alarms	
HA	High alarm 2
LA	Low alarm 2
RT	Rate-of -change alarm 2
NW	New alarm status

Units	
C	°C
F	° F
K	Kelvin
X	Linear input

Input Adaptor	
XX	None
V1	0-10Vdc
A1	0-20mA sense resistor (2.49Ω. 0.1%)

Sensor input		Range min & max limits		
Thermocouples			°C	° F
J	Type J		-210 to 1200	-340 to 2192
K	Type K		-200 to 1372	-325 to 2500
T	Type T		-200 to 400	-325 to 750
L	Type L		-200 to 900	-325 to 1650
N	Type N		-200 to 1300	-325 to 2370
R	Type R		-50 to 1768	-58 to 3200
S	Type S		-50 to 1768	-58 to 3200
B	Type B		0 to 1820	32 to 3308
P	Platinell II		0 to 1369	32 to 2496
Resistance thermometer				
Z	Pt100		-200 to 850	-325 to 1562
Custom downloaded inputs		"Table Reference Number"		
C	Type C -W5%Re/W26%Re (default downloaded input)	"[Ec"	0 to 2319	32 to 4200
D	Type D W3%Re/W25%Re	"T035"	0 to 2399	32 to 4350
E	E thermocouple	"T012"	-200 to 999	-325 to 1830
1	Ni/Ni18%Mo	"T033"	0 to 1399	32 to 2550
2	Pt20%Rh/Pt40%Rh	"T025"	0 to 1870	32 to 3398
3	Engelhard W/W26%Re	"T09"	0 to 2000	32 to 3632
4	Hoskins W/W26%Re	"T029"	0 to 2010	32 to 3650
5	Engelhard W5%Re/W26%Re	"T011"	10 to 2300	50 to 4172
6	Bucose W5%Re/W26%Re	"T038"	0 to 2000	32 to 3632
7	Pt10%Rh/Pt40%/Rh	"T023"	200 to 1800	392 to 3272
8	Exergen K80 I.R. Pyrometer	"Er80"	-45 to 650	-49 to 1202
Linear inputs				
M	-9.99 to +80mV		Scaleable	-1999 to 9999
Y	0 to 20mA(note 2)		Scaleable	-1999 to 9999
A	4 to 20mA (note 2)		Scaleable	-1999 to 9999
V	0 to 10Vdc(note 3)		Scaleable	-1999 to 9999
Special input				
X	Special input			

Note 1: Enter the minimum and maximum display range with the number of decimal places required (up to two). Thermocouple and RTD inputs will always display over the full range shown but the values entered here will be used as low and high alarm setpoint limits. For linear inputs, enter the display readings (with up to two decimal places) corresponding to the minimum and maximum input signal values

Note 2: A 1% 2.49Ω current sense resistor is supplied as standard. If greater accuracy is required a 0.1% resistor can be specified in the input adaptor field.

Note 3: An input adaptor is required - see input adaptor field.

TECHNICAL SPECIFICATION

Display	4 digit, red or green, 15.9mm high characters
Calibration accuracy	±0.25% of reading, or ± 1°C, or ± 1LSD whichever is the greater
Cold junction compensation	>15 to 1 rejection of ambient temperature change
Panel sealing	IP54
Operating ambients	0 to 55°C. Ensure that the enclosure is adequately ventilated. 5 to 95%RH, non condensing
Storage temperature	-30°C to +75°C.
Atmosphere	Not suitable for use above 2000m or in explosive or corrosive atmospheres
Power supply	100 to 240Vac -15%, +10%, 48 to 62Hz, maximum consumption 5Watts
Relay rating (isolated)	Maximum: 264Vac, 2A resistive. Minimum operating voltage and current: 12Vdc, 100mA
Wire sizes	Use a minimum of 0.5mm^2 or 16awg wire for plant connections.
Over current protection	Use independent 2A fuses for the indicator supply and relay outputs. Suitable fuses are EN60127 (type T)
Acknowledge/keylock input	Open circuit voltage: 22 volts. Nominal short circuit current: 20mA. Non-isolated from PV input.
Electrical safety	Meets EN 61010 (Voltage transients on the power supply must not exceed 2.5kV). Pollution degree 2.
Isolation:	All isolated inputs and outputs have reinforced insulation to protect against electric shock. (See live sensor note)

SAFETY AND EMC INFORMATION

Safety

This indicator complies with the European Low Voltage Directive 73/23/EEC, amended by 93/68/EEC, by the application of the safety standard EN 61010.

Electromagnetic compatibility

This indicator conforms with the essential protection requirements of the EMC Directive 89/336/EEC, amended by 93/68/EEC, by the application of a Technical Construction File. This indicator satisfies the general requirements of the industrial environment defined in EN 50081-2 and EN 50082-2.

GENERAL

The information contained in these instructions is subject to change without notice. While every effort has been made to ensure the accuracy of the information, Action Instruments, Inc. shall not be held liable for errors contained herein.

Unpacking and storage

The packaging should contain the indicator, two panel retaining clips, a 2.49Ω current sense resistor, a peel off label set and this instruction leaflet.
If the packaging or the indicator are damaged, do not install it but contact the company where you purchased the product.

SERVICE AND REPAIR

This indicator has no user serviceable parts. Contact your nearest agent for repair.

Caution: Charged capacitors

Before removing the indicator from its sleeve, switch off the supply and wait two minutes to allow capacitors to discharge. Failure to observe this precaution may damage the indicator or cause some discomfort to the user.

Electrostatic discharge precautions

When the indicator is removed from its sleeve, it is vulnerable to damage by electrostatic discharge from someone handling the indicator. To avoid this, before handling the unplugged indicator discharge yourself to ground.

Cleaning

Do not use water or water based products to clean labels or they will become illegible. Isopropyl alcohol may be used to clean labels. A mild soap solution may be used to clean other exterior surfaces of the product.

Safety Symbols

The following safety symbols are used on the controller:

⚠ **Caution, (refer to the accompanying**

⏚ **Functional earth (ground) terminal**

Personnel

Installation must be carried out by qualified personnel.

Enclosure of live parts

The indicator must be installed in an enclosure to prevent hands or metal tools touching parts that may be electrically live.

Caution: Live sensors

The alarm acknowledge/keylock inputs are electrically connected to the sensor input (e.g. thermocouple). In some installations the temperature sensor may become live. The indicator is designed to operate under these conditions, but you must ensure that this will not damage other equipment connected to the acknowledge/ keylock inputs and that service personnel do not touch this connection while it is live. With a live sensor, all cables, connectors and switches for connecting the sensor and non-isolated inputs and outputs must be mains rated.

Wiring

Wire the indicator in accordance with the wiring data given in these instructions. Take particular care not to connect AC supplies to the low voltage sensor input or logic outputs. Only use copper conductors for connections, (except thermocouple). Ensure that the installation complies with local wiring regulations.

Power Isolation

The installation must include a power isolating switch or circuit breaker that disconnects all current carrying conductors. The device should be mounted in close proximity to the indicator, within easy reach of the operator and marked as the disconnecting device for the indicator.

Voltage rating

The maximum continuous voltage applied between any connection and ground must not exceed 264Vac.

For the above reason the indicator should not be wired to a three phase supply with an unearthed star connection. Under fault conditions such a supply could rise above 264Vac with respect to ground and the product would not be safe.

Conductive pollution

Electrically conductive pollution must be excluded from the cabinet in which the indicator is mounted. For example, carbon dust is a form of electrically conductive pollution. Where condensation is likely, for example at low temperatures, include a thermostatically controlled heater in the cabinet.

Installation requirements for EMC

- It may be necessary to fit a filter across the relay output to suppress conducted emissions. The filter requirements will depend on the type of load. For typical applications we recommend Schaffner FN321 or FN612.

Routing of wires

To minimize the pick-up of electrical noise, the sensor input wiring should be routed away from high-current power cables. Where it is impractical to do this, use shielded cables with the shield grounded at both ends.