

### Description

The TDA-6 is a 6 channel, display and alarm module. While the TDA-6 is primarily designed to display temperatures, it can also display relative humidity, pressure or any other parameter measured by a 4-20mA transmitter. Temperatures can be displayed in either °F or °C, while transmitter inputs can be scaled to any range between -999 to +1999.

You may set individual high and low alarm setpoints for each channel. The TDA-6 constantly compares the 6 input channels to the alarm thresholds. If a channel exceeds the high or low thresholds, an adjustable time delay (0-99 minutes) is started. This time delay minimizes false alarms due to temporary conditions such as defrost cycles. After the delay, the internal alarm buzzer will sound, the alarm relay

will activate, and the LED for the alarming channel will blink. The TDA-6 can be programmed so the alarm will remain latched until the front panel "silence" button is pushed or to stop when the alarm condition is cleared. The alarm thresholds are retained in memory, even if power is removed from the unit.

The TDA-6 also stores in memory the highest and lowest sensor readings. The highest reading (max) is displayed by depressing the lower pushbutton. The lowest reading (min) is displayed for 3 seconds immediately after the lower pushbutton is released. The max/min memory for a particular channel is cleared to the current reading by holding the lower pushbutton and then momentarily pressing the upper pushbutton. Like the alarm thresholds, the max/min readings are retained in memory during power outages.

### Specifications

#### Temperature Display:

- Channels 1 through 6
- 10 KOhm thermistor sensors
- 50 to +250°F, -45 to +121°C
- ±1°F accuracy
- 1°F / 0.5°C resolution
- "HI" or "LO" when out of range

#### Alarm:

- Individually programmable high and low alarm limits for each channel
- 0-99 minute programmable delay
- 80 db internal horn
- Isolated SPDT relay contacts, 24VAC, 1A max.
- Blinking LEDs indicate which channels are in alarm

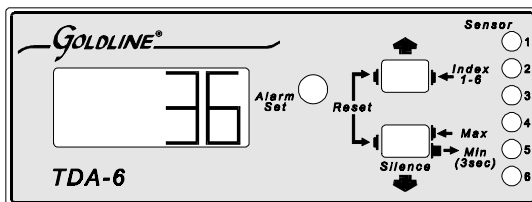
**Dimensions:** 4.25" x 1.75" x 1.62" overall

#### Transmitter Input Channels:

- Channels 5 and/or 6 (when temperature sensor not connected)
- Programmable: Humidity (rH)
- Scalable 4-20mA (SCA)
- Internal power supply: 36VDC max  
12VDC min
- rH mode assumes 0%rH = 4ma  
100%rH = 20mA
- Scalable mode (SCA) requires operator to program zero and full scale readings
- Displays "HI" or "LO" when out of range

**Power:** 24VAC. 50/60Hz, 2VA

**Environmental:** 15 to 130°F  
0-95% rH



# Installation

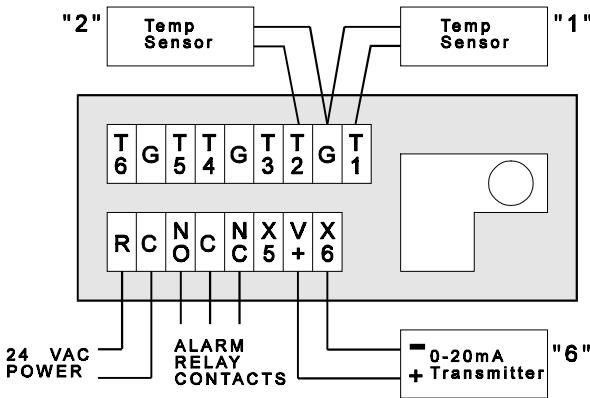
## A. Mounting

The TDA-6 is designed to snap into a 3.94" x 1.50" cutout. The optional MK-1 wallplate allows the TDA-6 to be flush mounted on a wall over a 3 gang electrical box. Alternatively, the MK-2 bracket allows the TDA-6 to be mounted onto a wall without penetrating the wall surface. Both the MK-1 and MK-2 mounting plates must be ordered separately.

## B. Wiring

Wire the 24VAC power to the "R" and "C" terminals. Wire the desired temperature sensors into the appropriately marked terminals as shown in the diagram. Transmitter inputs may

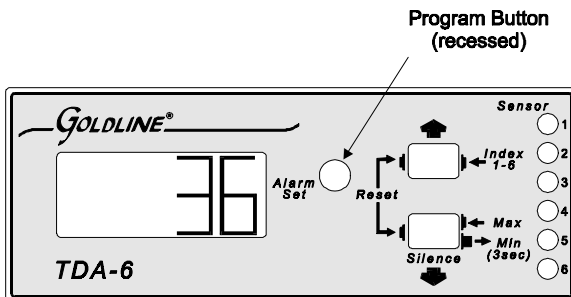
be wired into channels X5 and X6 provided that no temperature sensors are wired into the corresponding T5/T6 channels. If a temperature sensor is wired to channel T5, the TDA-6 will ignore the X5 input; and if a temperature sensor is wired to channel T6, the TDA-6 will ignore the X6 transmitter input. Typical 4-20mA wiring is shown in the diagram below. When using a 4-20mA transmitter, check the transmitter specifications to make sure that the transmitter power supply requirements accept the TDA-6 power supply which may vary from 12 to 36VDC. If your transmitter can not accept this power range (most can) you must use an external power supply.



## C. Programming - Sensor types and °F/°C

All the configuration options and alarms on the TDA-6 are programmed by pushing a sequence of front panel pushbuttons. All program settings

are stored in special memory that will retain the settings even when power is removed—the only time you have to re-program is when you want to change your original settings.



The TDA-6 does its best to determine what types of sensors you have connected and to configure itself accordingly. There are some parameters that cannot be set automatically and you may want to override the automatic settings:

1. Reset the TDA-6 by pressing both pushbuttons for 2 seconds. While the “-188.8” LCD test pattern is displayed, press the programming button (recessed in hole next to the display) with a blunt object.

2. “ch1” will be displayed and the LED marked “1” will light signifying that the TDA-6 is ready to program the configuration for channel 1. Pushing the upper pushbutton will cause the display to cycle through “ch2”, “ch3”, “ch4”, “ch5”, “ch6”, “°FC” and then return to “ch1”. The corresponding LED indicators will light for each channel. This allows you to selectively program only the channel or °F/°C parameter you want to change.

3. After selecting the desired channel to set, you may press the lower pushbutton to display the current channel setting. The options are: “oFF” indicating that the TDA-6 detected no sensor and will not display this channel, “Fd” for fixed temperature. In addition, for channels 5 and 6 only: “rH” for relative humidity and “SCA” for 4-20mA scalable are available.

4. You may change the channel setting by pressing the program button while the channel is being displayed. The display will switch to the current setting as described above. Pressing the upper or lower pushbutton will cycle through the available options for the channel. When the desired setting is displayed, press the program button again. If “oFF”, “Fd” or “rH” were selected the display will return to the channel number and the next channel can be selected for programming. If “SCA” scalable mode was selected then the full scale and 0 scale readings must be programmed as follows. The display will initially be “HI” and then switch to the current full scale value when either pushbutton is pressed. This reading may be adjusted up or down using the upper and lower pushbuttons. When the desired full scale value is displayed, push the program button again and the display will switch to “LO” and then display the current zero scale value when either pushbutton is pressed. During the programming of the full scale the channel

LED indicator will be on continuously and during the zero scale programming the LED will flash. After adjusting this value with the upper and lower pushbuttons, press the program button again to lock in the zero and full scale parameters and return to the channel display.

5. The temperature display units (°F or °C) for all temperature channels is set starting with the “°FC” display immediately after “ch6”. Press the lower pushbutton to view the current setting (“°F” or “°C”). To change the current setting press the program button. The current setting will be displayed. Pressing either pushbutton will cause the TDA-6 to switch from one setting to the other. Press the programming button one more time to lock in the desired setting.

6. To return to normal operating mode momentarily press both pushbuttons. If no pushbuttons are pressed for 90 seconds during any part of the programming procedure, the TDA-6 will abort programming and return to normal operation.

## C. Programming - Alarm thresholds and other alarm parameters

*Note: All programming must be done in °F mode. If °C display is desired, program first in °F mode then change to °C mode.*

The alarm thresholds for all channels and other important parameters that control the way that alarms operate are also programmable.

**1. During normal control operation**, simply press the program button (recessed in hole near the display) with a blunt object.

**2. “ch1” will be displayed and the “1” LED indicator will be lit** signifying that the control is ready to program the alarm thresholds for channel 1. Subsequent pushes of the upper pushbutton will cause the display to cycle through “ch2”, “ch3”, “ch4”, “ch5”, “ch6”, “dL” (alarm delay), “hrn” (internal horn control), “rL” (alarm relay latching), “AL” (alarm latch), “h” (horn test), and “r” (relay test) before returning to “ch1”. This allows you to selectively program only the parameters that you want to change.

**3. “ch1” through “ch6” high and low alarm thresholds:**

**To display the thresholds:** After the desired

# Installation (Continued)

channel is selected press the lower pushbutton to display the high limit alarm threshold. When the lower pushbutton is released, the low limit alarm threshold will be displayed for 3 seconds.

**To program the thresholds:** After the desired channel is selected, push the program button. “HI” will be displayed and the LED for the selected channel will be on. Pressing either pushbutton will then cause the current high limit alarm setting to display. Adjust the setting by pressing the upper or lower pushbuttons and then press the program button again. “LO will be displayed and the LED for the selected channel will be flashing. Pressing either pushbutton will display the current low limit alarm setting. Adjust this setting by pressing the upper or lower pushbuttons and finally press the program button again to lock in the settings and return to the channel display.

**To disable the alarm for this channel:** Press both pushbuttons simultaneously while the high limit is displayed. The channel display will be preceded by a minus sign (eg “-ch1”).

## 4. “dL” alarm delay setting:

Press the lower pushbutton to display the alarm delay (time from the onset of an alarm condition to the time the horn sounds and relay activates). The delay is displayed in minutes. To program the delay, press the program button and then adjust the setting using the upper and lower pushbuttons. Press the program button again to return to the initial “dL” display.

## 5. “hrn” horn enable:

The horn normally sounds during an alarm. To display the current horn status press the lower pushbutton and either “on” (horn enabled) or “oFF” (horn disabled) will be displayed. To change the setting: Press the program button to again display the setting. Pressing either the upper or lower pushbutton will cause the display to toggle between “on” and “oFF”. When you have the desired setting, press the program button again to lock in the new setting.

## 6. “rL” alarm relay logic:

The alarm relay always turns **on** when the TDA-6 goes into alarm. You may program the TDA-6 so the relay turns **off** when the horn is silenced (when somebody presses either front panel

pushbutton) or you can keep the relay on until the channel that initiated the alarm returns to normal (non-alarm) condition. To display the current relay status press the lower pushbutton and either “hrn” (relay tied to horn state) or “ch” (relay tied to channel status) will be displayed. To change the setting: Press the program button to again display the setting. Pressing either the upper or lower pushbutton will cause the display to toggle between “hrn” and “ch”. When you have the desired setting, press the program button again to lock in the new setting.

## 7. “AL” alarm latch:

By default, the alarm will automatically reset itself when the alarming condition is rectified. While this is desirable in many applications, short duration alarm conditions during unattended periods may go undetected. This program setting allows you to latch any alarm condition until the alarm is cleared by manually pressing the front panel pushbuttons (see “clear alarms”, Operation #6).

To display the current alarm latch status press the lower pushbutton and either “on” (alarm will latch) or “oFF” (alarm will automatically reset) will be displayed. To change the setting: Press the program button to again display the setting. Pressing either the upper or lower pushbutton will cause the display to toggle between “on” and “oFF”. When you have the desired setting, press the program button again to lock in the new setting.

## 8. “h” (horn test):

Press the lower pushbutton to sound the internal alarm horn. The horn will stop sounding when the pushbutton is released.

## 9. “r” (relay test):

Press the lower pushbutton to activate the alarm relay. The relay will deactivate when the pushbutton is released

## 10. To return to normal operating mode:

Hold the lower pushbutton and momentarily press the upper pushbutton. If no pushbuttons are pressed for 90 seconds during any part of the programming procedure, the TDA-6 will abort programming and return to normal operation.

# Operation

## 1. Display:

Upon initial power-up, the TDA-6 will continuously display the reading for the first active channel (typically, this is channel 1 and the “1” LED will be lit). **Important: Connect at least 1 sensor to the TDA-6 in order to ensure proper operation.** Pressing the upper pushbutton (“Sensor Index”) will cause the display to sequence through all of the active channels. The LEDs will always indicate which channel is being displayed. If any channel is “off” (no sensor connected or manually programmed off) it will be skipped. Holding the “Sensor Index” button down for 2 seconds will cause the TDA-6 to begin scrolling through all active channels. Temporarily pressing the “Sensor Index” button will return the TDA-6 to continuously display one channel.

## 2. Display the max/min (highest/lowest) readings on a channel:

Select the channel as described above and then press the lower pushbutton. The highest reading reached by the control sensor since the last “clear” (see 3 below) will be displayed. The lowest reading reached by the sensor since the last “clear” (see 3 below) will be displayed for 3 seconds.

## 3. Clear the max/min readings:

Select the desired channel. While holding the lower pushbutton, momentarily press the upper

pushbutton. Both the maximum and minimum readings are set to the current reading.

## 4. Alarms:

The LEDs for all channels that go into alarm will flash. If a channel in alarm is currently being displayed, the LED will flash at a faster rate.

## 5. Silence alarm horn:

To silence the horn, simply push either pushbutton. Note that an additional channel entering into an alarm state will cause the horn to sound again.

## 6. Clear alarms:

If the TDA-6 was programmed for “alarm latch” (see Programming/Alarm thresholds, #7) then the alarm must be manually cleared using the pushbuttons. While holding the lower pushbutton, momentarily press the upper pushbutton. The first actuation will clear the alarm, the second actuation will clear the max/min readings (see 3 above).

## 7. Reset:

To reset the internal microprocessor, press and hold both pushbuttons for approximately 2 seconds. The TDA-6 will restart, go through the self-test procedure, and then resume normal operation.

# Troubleshooting

The TDA-6 is shipped from the factory ready to operate. In addition the internal microprocessor automatically configures the software based on the sensors detected. While this covers many applications, your application may require some operating parameters to be set manually—see the programming section under Installation. If you believe the TDA-6 is programmed correctly but you still have a problem:

1. For “**no display**” condition check that power is connected to “R” and “C” terminals. Lastly, turn power off, wait 1 minute and then reapply power. If there still is a problem the TDA-6 will have to be returned for repair

2. For “**partial displays**” or general “**erratic**” operation: Turn power off, wait 1 minute, and then reapply power. If there still is a problem, the TDA-6 will have to be returned for repair.

3. For temperature displays that “**bounce**” between several different values: Check that the sensor lines are not near other electrical cabling, use shielded sensor wire if required.

4. For “erroneous” readings check that the sensor is making good thermal contact with whatever is being measured and that the sensor is insulated from ambient temperatures. If the sensor is in a wet location (constantly condensing humidity), moisture may, over time, enter the sensor body and result in errors. If this is the case, replace the sensor.

As a last resort, un-wire the sensor, measure the resistance with an ohmmeter and lookup the corresponding temperature on an IE "resistance vs. temperature" chart. This will allow

you to determine whether the sensor or the TDA-6 is causing the error. If it is the TDA-6, then return the unit to IE for repair.

## Technical Assistance

For help in installing, operating, or troubleshooting this control you may call for technical assistance at **800-343-0826**. Independent Energy's technicians are available from 8:00AM

— 5:00PM Eastern Time, Monday through Friday. You may call at other times and leave a message, they will return the call as soon as possible.

## Temperature vs. Resistance

All Goldline controls use 10K thermistor sensors. When disconnected from the control the sensor will read 10 K ohms at 25°C/77°F. Refer to the chart below for the resistance at other

temperatures. For a given temperature, the resistance reading should be accurate to +/- 1%. For a given resistance reading, the temperature reading should be accurate to +/- 0.5°F.

°F	OHM	°F	OHM	°F	OHM	°F	OHM	°F	OHM	°F	OHM	°F	OHM
-50	491,14	0	85,387	50	19,900	100	5,827	150	2,044	200	829	250	378
-49	472,64	1	82,719	51	19,377	101	5,697	151	2,005	201	815	251	373
-48	454,90	2	80,142	52	18,870	102	5,570	152	1,966	202	802	252	367
-47	437,90	3	77,655	53	18,377	103	5,446	153	1,929	203	788	253	362
-46	421,60	4	75,255	54	17,899	104	5,326	154	1,892	204	775	254	357
-45	405,96	5	72,937	55	17,435	105	5,208	155	1,856	205	763	255	352
-44	390,96	6	70,698	56	16,985	106	5,094	156	1,821	206	750	256	347
-43	376,57	7	68,535	57	16,548	107	4,982	157	1,787	207	738	257	342
-42	362,77	8	66,447	58	16,123	108	4,873	158	1,753	208	726	258	337
-41	349,52	9	64,428	59	15,711	109	4,767	159	1,720	209	714	259	332
-40	336,80	10	62,479	60	15,310	110	4,664	160	1,688	210	702	260	327
-39	324,59	11	60,595	61	14,921	111	4,563	161	1,657	211	691	261	323
-38	312,87	12	58,774	62	14,543	112	4,464	162	1,626	212	680	262	318
-37	301,62	13	57,014	63	14,176	113	4,368	163	1,596	213	669	263	314
-36	290,81	14	55,313	64	13,820	114	4,274	164	1,567	214	658	264	309
-35	280,43	15	53,669	65	13,473	115	4,183	165	1,538	215	648	265	305
-34	270,46	16	52,078	66	13,136	116	4,094	166	1,509	216	637	266	301
-33	260,87	17	50,541	67	12,809	117	4,007	167	1,482	217	627	267	296
-32	251,67	18	49,054	68	12,491	118	3,922	168	1,455	218	617	268	292
-31	242,82	19	47,616	69	12,182	119	3,839	169	1,428	219	607	269	288
-30	234,31	20	46,225	70	11,882	120	3,758	170	1,402	220	598	270	284
-29	226,13	21	44,879	71	11,589	121	3,679	171	1,377	221	588	271	280
-28	218,27	22	43,577	72	11,305	122	3,602	172	1,352	222	579	272	276
-27	210,71	23	42,318	73	11,029	123	3,527	173	1,328	223	570	273	273
-26	203,44	24	41,099	74	10,761	124	3,454	174	1,304	224	561	274	269
-25	196,45	25	39,919	75	10,500	125	3,382	175	1,281	225	553	275	265
-24	189,72	26	38,777	76	10,246	126	3,312	176	1,258	226	544	276	262
-23	183,24	27	37,671	77	9,999	127	3,244	177	1,235	227	536	277	258
-22	177,01	28	36,601	78	9,758	128	3,177	178	1,213	228	527	278	255
-21	171,02	29	35,565	79	9,525	129	3,112	179	1,192	229	519	279	251
-20	165,25	30	34,561	80	9,297	130	3,049	180	1,171	230	511	280	248
-19	159,69	31	33,590	81	9,076	131	2,987	181	1,150	231	503	281	244
-18	154,34	32	32,648	82	8,861	132	2,926	182	1,130	232	496	282	241
-17	149,19	33	31,737	83	8,651	133	2,867	183	1,110	233	488	283	238
-16	144,23	34	30,853	84	8,447	134	2,809	184	1,091	234	481	284	235
-15	139,45	35	29,998	85	8,249	135	2,752	185	1,072	235	473	285	232
-14	134,85	36	29,169	86	8,056	136	2,697	186	1,054	236	466	286	229
-13	130,42	37	28,365	87	7,867	137	2,643	187	1,035	237	459	287	225
-12	126,14	38	27,587	88	7,684	138	2,591	188	1,017	238	452	288	223
-11	122,03	39	26,832	89	7,506	139	2,539	189	1,000	239	445	289	220
-10	118,06	40	26,100	90	7,333	140	2,489	190	983	240	439	290	217
-9	114,23	41	25,391	91	7,164	141	2,440	191	966	241	432	291	214
-8	110,54	42	24,704	92	6,999	142	2,392	192	950	242	426	292	211
-7	106,99	43	24,037	93	6,839	143	2,345	193	933	243	420	293	208
-6	103,56	44	23,391	94	6,683	144	2,299	194	918	244	413	294	206
-5	100,25	45	22,764	95	6,530	145	2,254	195	902	245	407	295	203
-4	97,063	46	22,156	96	6,382	146	2,210	196	887	246	401	296	200
-3	93,986	47	21,566	97	6,238	147	2,167	197	872	247	395	297	198
-2	91,017	48	20,993	98	6,097	148	2,125	198	857	248	390	298	195
-1	88,152	49	20,438	99	5,960	149	2,084	199	843	249	384	299	193
												300	190

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